



# Applications Note DRAFT

# LinkStar

## LinkStar™ SNMP Operations

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### *Overview of Operations*

SNMP (Simple Network Management Protocol) operations in LinkStar allow management software running on PCs and workstations to monitor and control the LinkStar NCC and RNCC. Through SNMP subagents and proxy processes, standards-based access is provided to any SNMP Manager. This capability permits equipment configuration and status monitoring. The agents support the LinkStar-specific private MIBs (Management Information Base).

LinkStar-specific MIB variables consist of a map of hierarchical objects that match the configuration, statistics, and status of data structures and elements in the LinkStar NCC and RNCC. There are two MIBs specified in LinkStar. One represents the data structures and variables present in the NCC; the other represents those present in the RNCC.

The LinkStar SNMP proxy agent is the gatekeeper of managed objects and performs the actual reads and writes based on requests made by the management systems. There is an individual proxy process running in both the NCC and the RNCC to manage their respective variables and data structures.

The LinkStar NCC and RNCC Proxy interpret queries from the LinkStar NCC or RNCC subagent respectively and convert the queries into appropriate Cosmos proprietary commands. They invoke query-associated procedures to access information in the MIB database and respond the query results back to the respective subagents, which are ultimately sent to the SNMP Manager via the Master agent.

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### *Flow of Messages*

The LinkStar SNMP-based Management architecture is explained in this section. The control flow when an SNMP Manager requests a Set or Get operation is described in detail, along with how Trap messages are propagated.

In order to perform any Get/Set operation, the SNMP manager contacts the Master agent running in either the NCC or RNCC; whether it is the NCC or RNCC depends on which database variable is being requested. The Master agent is always listening on Port 161 for requests.

On receiving a request, the Master agent finds out which subagent is responsible for that variable (which tree that variable belongs to) and then forwards the request to the appropriate subagent. The subagent then sends the appropriate message to the SNMP Proxy agent, which performs the operation and returns the appropriate success or error code back to the subagent. The subagent in turn forwards the response to the Master agent who then sends it across to the SNMP Manager.

In the current implementation of SNMP, Trap messages in the LinkStar system are only generated at the NCC. All the RNCC events, which need to be reported as Trap messages such as terminal going up/down, CIR not being allocated etc. get forwarded to the NCC. The NCC receives these events as alarms in addition to its own alarm events. It converts these alarm events into Trap messages. The NCC Proxy sends these Trap messages to the NCC subagent who in turn forwards them to the Master Agent. Depending upon the trap recipient configured in the Master agents access control file, these Trap messages then get directed to the appropriate SNMP Manager who listens on port 162 for Trap messages.

This flow of control is illustrated in Figure 1 and Figure 2.

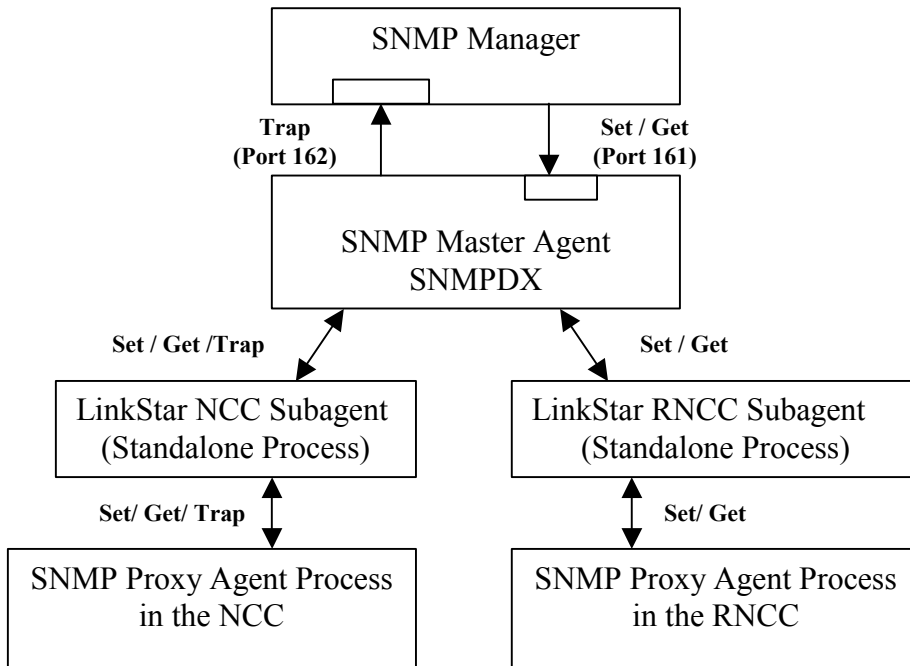


Figure 1:Single NCC/RNCC Machine

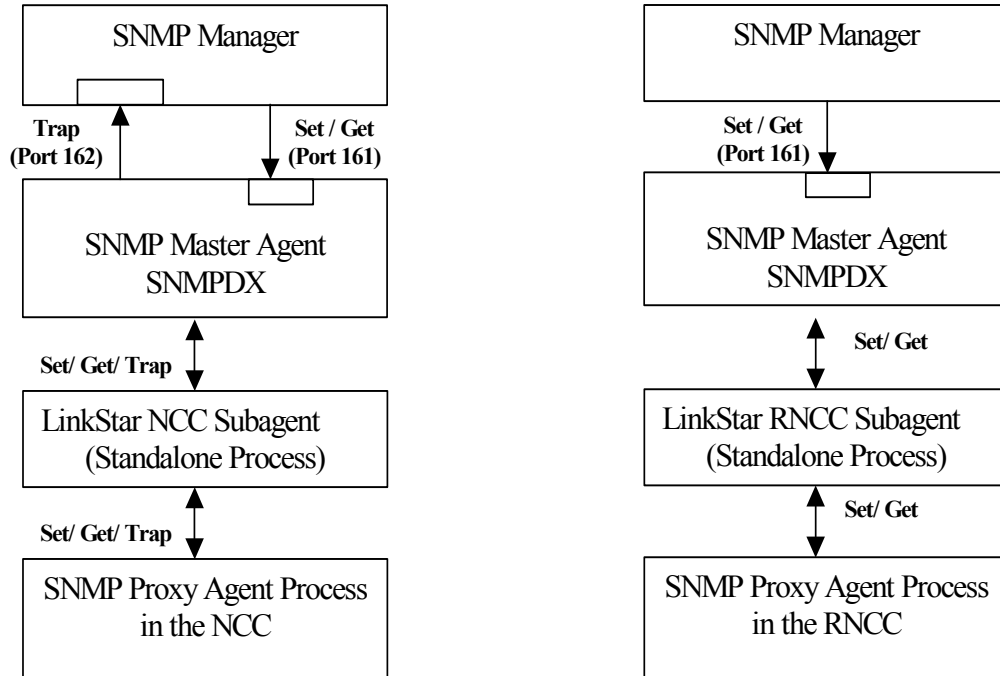


Figure 2: Separate NCC &amp; RNCC Machines

*(Same or different SNMP Managers may be used in the above scenario)*

## SNMP Architecture Details

The LinkStar SNMP design features two separate MIBs for the LinkStar Tree. One MIB is for the NCC (lstar\_ncc) and represents all the variables that can be monitored or set in the NCC databases via SNMP. The other MIB is for the RNCC (lstar\_rncc) and represents all the variables that can be monitored or set in the RNCC databases via SNMP.

There can be several RNCCs running in one LinkStar system. However, only one RNCC can be run with an NCC on the same machine. The Master agent is a separate standalone Unix daemon supplied by Solaris and is run on both the NCC and the RNCC machines. If an NCC and RNCC are running on the same machine, only one Master agent needs to be run on that machine. The NCC and RNCC subagents are separate standalone Unix daemons. These are run on the NCC and RNCC machines respectively. If an NCC and RNCC are running on the same machine, both the NCC and the RNCC subagents need to be run on that machine. On getting dynamically invoked, the subagent processes register with the Master agent for their part of the LinkStar tree. The SNMP Proxy agent is a part of the NCC and RNCC executables. The Proxy agent gets installed when the NCC or RNCC processes are started. If an NCC and RNCC are running on the same machine, the SNMP Manager needs to contact the Master agent running on that machine. However if the NCC and RNCCs are running on separate machines, the SNMP Manager will need to contact the appropriate Master agent running on either the NCC or RNCCs depending on which database variable it needs to monitor or modify the value of. For this to happen, the SNMP Manager will need to specify the IP address of the machine on which the Master agent is running.

## SNMP Operations

Get/Set operations are allowed on all variables accessible via the NMS interface. The only Set operation allowed in the current implementation is Update. However, there is no validation being done for values being Set. It is the responsibility of the user to make sure valid values are entered otherwise results will be unpredictable.

Traps are generated at the NCC whenever an alarm occurs. The Trap messages are generated by the NCC Proxy agent and are sent to the Master Agent via the NCC subagent. The Master agent in turn redirects them to the appropriate SNMP Manager.

### Get Operation

All the variable values accessible via the NMS can be retrieved using the SNMP Get Operation. The Get\_Bulk operation is not supported in the current implementation of SNMP in LinkStar. Only Get and Get-Next operations are supported. Most of the variables in the system are keyed or identified by some key variable. This value needs to be specified in the Get message sent in order to retrieve the correct corresponding value.

Example (Configurable Parameter):

#### ***Retrieving the IP Address of an RNCC in the LinkStar System***

To retrieve the IP address of a particular RNCC in the LinkStar system, the management application must construct an SNMP message, which contains the region ID of the RNCC and then send it to the Master Agent using an SNMP Get request. The Master Agent in turn will see which subagent has registered for that part of the LinkStar tree (the NCC subagent in this particular case) and then forward the Get request to the subagent.

- ◆ Locate the region ID of the RNCC whose IP address needs to be obtained. This information needs to be known in advance depending upon the system set-up.
- ◆ For example, to retrieve the IP address of the RNCC operating under region 30 (0x1e – In Hexadecimal notation), send an SNMP Get request for object ***RnccConf\_ipaddress.30*** or ***OID: 1.3.6.1.4.1.3500.1.4.1.1.1.1.1.1.4.30***.
- ◆ To retrieve the IP Addresses for all the RNCCs running in the system or if one is not aware of the region ID's in the system, a Get-Next request could also be issued for ***RnccConf\_ipaddress.0*** or ***OID: 1.3.6.1.4.1.3500.1.4.1.1.1.1.1.1.4.0***. This will retrieve the IP address of the RNCC in the first region and then by issuing subsequent Get-Next commands on the values retrieved, the IP Addresses of the RNCCs running in all the regions can be obtained.

Example (Configurable Parameter):

#### ***Retrieving the Return CIR to the Hub for a particular terminal***

To retrieve the return CIR to the Hub for a particular terminal in the LinkStar system, the management application must construct an SNMP message, which contains the terminal ID of the RCST and then send that message to the Master Agent using an SNMP Get request. Even though the terminal ID is generally represented in hexadecimal notation, for SNMP operations, the decimal values of the IDs are used. The Master Agent in turn will see which subagent has registered for that part of the LinkStar tree

(the RNCC subagent in this particular case) and then forward the Get request to the subagent.

- ◆ Locate the terminal ID of the RCST whose return CIR needs to be obtained. This information needs to be known in advance.
- ◆ For example, to retrieve the return CIR for the RCST with a terminal ID of 29459, send an SNMP Get request for object *IPRCCConf\_cirtohub. 29459* or *OID: 1.3.6.1.4.1.3500.1.4.2.1.1.1.1.3.1.1.3.1.3.29459*.

Example (Statistic Parameter):

### ***Obtaining the current allocation of bandwidth in the LinkStar network***

To obtain the current allocation of bandwidth in the LinkStar network, the management application must construct an SNMP message and then send that message to the Master Agent using an SNMP Get request. The Master Agent in turn will see which subagent has registered for that part of the LinkStar tree (the NCC subagent in this particular case) and then forward the Get request to the subagent.

- ◆ Get queries need to be performed on the *BTPTable* (*OID: 1.3.6.1.4.1.3500.1.4.1.1.3.1.1*).
- ◆ Each entry in the BTPTable gives information about the burst ID (*BtpBurst\_BurstId*), the burst flags used (*BtpBurst\_BurstFlags*), the burst offset (*BtpBurst\_BurstOffset*), the carrier on which the burst is allocated (*BtpBurst\_CarrierId*), number of channels in the burst (*BtpBurst\_NumChannels*), which frames within a multi frame are used (*BtpBurst\_MultiFrameMask*), source terminal for the burst (*BtpBurst\_Src*) and destination terminal for the burst (*BtpBurst\_Dst*).
- ◆ Each entry in this table is keyed by Burst ID. Hence, to retrieve the number of channels in a particular burst identified by *BurstID*, send an SNMP Get request for object *BtpBurst\_NumChannels.<BurstID>* or *OID: 1.3.6.1.4.1.3500.1.4.1.1.3.1.1.5.<BurstID>*.

To obtain the current allocation of bandwidth in the LinkStar Network, Get-Next request could also be issued for *BtpBurst\_BurstId.0* or *OID: 1.3.6.1.4.1.3500.1.4.1.1.3.1.1.1.0*. This will retrieve the Burst ID of the first entry in the BTPTable. By issuing subsequent Get-Next commands on the values retrieved, the values of all the fields for all entries in the table can be obtained.

Example (Status Parameter):

### ***Retrieving the status of a terminal or of every terminal in the LinkStar Network***

To obtain the status of a particular terminal or of all the terminals in the LinkStar network, the management application must construct an SNMP message and then send that message to the Master Agent using an SNMP Get request. The Master Agent in turn will see which subagent has registered for that part of the LinkStar tree (the RNCC subagent in this particular case) and then forward the Get request to the subagent.

- ◆ Get queries need to be performed on the TermStatusTable (OID: 1.3.6.1.4.1.3500.1.4.2.1.2.3).
- ◆ Each entry in the TermStatusTable gives information about the Terminal ID (*TermStatus\_TermId*), the population ID of the terminal (*TermStatus\_PopId*), the administrative status (*TermStatus\_AdminStatus*), the summary status indicating whether it is operational or not (*TermStatus\_SummaryStatus*), the

modulation used (TermStatus\_Modulation), the time when the status of the terminal changed (TermStatus\_StatusChangeTime), the current value of the satellite - terminal delay (TermStatus\_Dn) the terminal longitude (TermStatus\_longitude) and the terminal latitude (TermStatus\_latitude).

- ◆ Each entry in this table is keyed by Terminal ID. Hence, to retrieve the summary status of a particular terminal identified by TermID, send an SNMP Get request for object TermStatus\_SummaryStatus.<TermID> or OID: 1.3.6.1.4.1.3500.1.4.2.1.2.3.1.4.<TermID>.

To obtain the status of all the terminals in the LinkStar Network, Get-NEXT request could also be issued for **TermStatus\_TermId.0** or **OID: 1.3.6.1.4.1.3500.1.4.2.1.2.3.1.1.0**.

This will retrieve the Terminal ID of the first entry in the TermStatusTable. By issuing subsequent Get-NEXT commands on the values retrieved, the values of all the fields for all entries in the Table can be obtained.

## Set Operation

All the variable values that can be modified via the NMS can be changed using the SNMP Set Operation. Most of the variables in the system are keyed or identified by some key variable. This value needs to be specified in the Set message sent in order to modify the correct corresponding value. Add and Delete Set operations are not supported in the current LinkStar SNMP functionality. Only Updates are supported for the Set operation. No validations are done presently for any value being modified. Hence, it is the responsibility of the user to make sure that valid values are entered.

Example (Configurable Parameter):

### ***Changing the name of an RNCC in the LinkStar System***

To change the name of a particular RNCC in the LinkStar system, the management application must construct an SNMP message, which contains the region ID of the RNCC and then send that message to the Master Agent using an SNMP Set request. The Master Agent in turn will see which subagent has registered for that part of the LinkStar tree (the NCC subagent in this particular case) and then forward the Set request to the subagent.

- ◆ Locate the region ID of the RNCC whose name needs to be changed. This information needs to be known in advance depending upon the system set-up.
- ◆ For example, to change the name of the RNCC operating under region 30 (0x1e – In Hexadecimal notation), send an SNMP Set request for object **RnccConf\_Name.30** or **OID: 1.3.6.1.4.1.3500.1.4.1.1.1.1.1.1.2.30**.

Example (Configurable Parameter):

### ***Changing the value of the Return CIR to the Hub for a particular terminal***

To change the return CIR to the Hub for a particular terminal in the LinkStar system, the management application must construct an SNMP message, which contains the terminal ID of the RCST and then send that message to the Master Agent using an SNMP Set request. The Master Agent in turn will see which subagent has registered for that part of the LinkStar tree (the RNCC subagent in this particular case) and then forward the Set request to the subagent.

- ◆ Locate the terminal ID of the RCST whose return CIR needs to be changed. This information needs to be known in advance.

- ◆ For example, to change the return CIR for the RCST with a terminal ID of 29459, send an SNMP Set request for object *IPRCCConf\_cirtohub. 29459* or *OID: 1.3.6.1.4.1.3500.1.4.2.1.1.1.1.3.1.1.3.1.3.29459*.

NOTE \*\*

There are a few databases in both the NCC and RNCC that are not keyed by any particular field and only have one entry or one row in their table (e.g. Satellite, NccConf, GUCParms, IPEParms etc.). For such databases, Get and Set Operations need to be carried out by specifying any value for the key field.

- ◆ For example, to change the name of the NCC, send an SNMP Set request for object *NccConf\_Name. <0 or any value>* or *OID: 1.3.6.1.4.1.3500.1.4.1.1.1.1.1.2.1.1. <0 or any value>*.
- ◆ For example, to retrieve the nominal longitude of the satellite, send an SNMP Get request for object *Satellite\_NomLongitude. <0 or any value>* or *OID: 1.3.6.1.4.1.3500.1.4.1.1.1.2.1.1.2. <0 or any value>*.

## Trap Operation

In the LinkStar Network all alarm conditions are generated at the NCC. These alarm messages get translated into Trap messages and are sent by the NCC Proxy to the NCC subagent. The subagent in turn forwards these messages to the Master Agent. Depending upon the Trap Recipient configured in the Master Agents access control file, these Trap messages then get directed to the appropriate SNMP Manager.

There are 19 kinds of Trap messages in the LinkStar Network. Each Trap message is identified by a unique number and has 12 variables in its variable bindings list:

- ◆ *alarm\_alSeqNum* - Unique ID for the alarm.
- ◆ *alarm\_logReason* - Reason why the alarm occurred.
- ◆ *alarm\_nodeId* - Population or Region ID where the alarm occurred.
- ◆ *alarm\_classId* - ID used for internal purposes.
- ◆ *alarm\_fieldId* - ID used for internal purposes.
- ◆ *alarm\_objIndex2* – ID of the entity causing the alarm.
- ◆ *alarm\_level* – Severity lever of the alarm.
- ◆ *alarm\_text* – Alarm Text.
- ◆ *alarm\_timeCreated* - Creation Time of the alarm in seconds since 00:00:00 UTC, January 1, 1970.
- ◆ *alarm\_timeAcknowledged* - Acknowledgement Time of the alarm in seconds since 00:00:00 UTC, January 1, 1970.
- ◆ *alarm\_timeCleared* - Clearing Time of the alarm in seconds since 00:00:00 UTC, January 1, 1970.
- ◆ *alarm\_alDesc* - Alarm Description.

These values are sent along with the Trap message to the SNMP Manager in order to explain where exactly a problem has occurred.

In case, there is a need to retrieve a particular value for a variable binding in the Trap message after one has been received, the management application could construct an SNMP Get message for up to 10 minutes after the Trap Message has been received at the SNMP Manager. The message should contain the alarm sequence number and should be sent to the Master Agent using an SNMP Get request. The Master Agent in turn will see which subagent has registered for that part of the LinkStar tree (the NCC subagent in this particular case) and then forward the Get request to the NCC subagent.

- ♦ Locate the alarm sequence number for the Trap Message whose variable binding needs to be retrieved.
- ♦ For example, to retrieve the reason for why the alarm occurred which had an alarm sequence number of 6, send an SNMP Get request for object *alarm\_logReason.6* or *OID: 1.3.6.1.4.1.3500.1.4.1.1.4.1.1.2.6*.

It is important to note that the alarm database gets purged 10 minutes after a Trap Message has been sent. Hence one can only retrieve the alarm table variables for up to 10 minutes after the Trap Message has been sent.

Example

Trap Name: CIRSTATUSDOWN

***Trap generated because Cir is not available- Trap # 1***

The receipt of this trap means that CIR for a specified terminal is not available.

Example

Trap Name: RCSTSTATUSDOWN

***Trap generated because an RCST went down- Trap # 18***

The receipt of this trap means that a particular RCST identified by the node ID and objIndex2 has gone down.

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## **Configuring SNMP in the NCC/RNCC Machines**

To ensure that the version of the "snmpdx" [Master Agent provided by Solaris] program provided by COMSAT is run every time the system is booted up, changes need to be made to the /etc/init.d/init.snmpdx startup script with root privileges. These changes are documented and are available at \$HOME/snmp/doc in lstar\_nccsnmp.doc and lstar\_rnccsnmp.doc files. Changes also need to be made in the snmpdx.acl file available at \$HOME/snmp/conf in order to reflect the name of the machine where the traps need to be directed (Generally this is the name of the machine where the SNMP Manager is running). These changes too are documented in the lstar\_nccsnmp.doc and lstar\_rnccsnmp.doc files.

The Master agent is invoked every time the system boots up. The LinkStar NCC and RNCC subagents are started and stopped by the `lstar_startup` scripts and need to be specified in the `lstar_runlist` files.

### Steps for Management Application Developers

The NCC and RNCC variables can be configured and monitored via SNMP operations. The LinkStar NCC (`lstar-x.y.x.lstar_ncc.mib`) and RNCC (`lstar-x.y.z.lstar_rncc.mib`) MIBs are available in the `$HOME/release` directory. These MIBs need to be compiled with the SNMP Manager to be used.

All the key fields for the databases are specified to have read-write access in the MIB. These variables only have write access for the SNMP Set operation when they are being added to the database for the first time. Once added, these variables only have read access and can no longer be changed. On trying to change key fields an SNMP General Error is generated.

## MIB Description

The following section describes each variable that occurs in the MIB. It gives the access permission for the variable, possible values it might take and a brief description of what it represents.

Any fields or variables that are present in the MIB but have not been included are *not-accessible* via SNMP operations and hence have not been mentioned.

The field Delete Dummy (write-only access) in some of the databases, when set to 1, represents a row or entry, which has been deleted. Since Delete operations are not supported in the current implementation of SNMP, this field cannot be set.

### NCC MIB Description

The **LinkStar** tree is a child of **Products**, which is a child of **Comsat** under the **Enterprises** tree (`comsat`: = enterprises 3500).

LinkStar is further split into the **NCC** and **RNCC** sub trees.

The LinkStar NCC Management MIB is split up into four main branches

- ◆ Configuration
- ◆ Status
- ◆ Performance
- ◆ Fault Management

Configuration is further subdivided into

- ◆ Network
- ◆ Space Segment
- ◆ Carrier Configuration
  - - Network deals with the NCC and RNCC configuration variables

### NCC Configuration

The following fields can be accessed

**Name** – Represents the name of the NCC

Set and Get operations can be performed on this variable

**Admin Status**- Indicates the status of the NCC i.e. whether it is enabled or disabled

The following are the possible values for this field:

- ◆ ADMINSTATUS\_DISABLED (0)
- ◆ ADMINSTATUS\_ENABLED (1)

Set and Get operations can be performed on this variable

**IP Address** -- Represents the IP Address of the NCC in dotted decimal format

Set and Get operations can be performed on this variable

The NCC Configuration Database only has one record in its table. Its entry is not keyed by any field. Hence in order to carry out Get or Set operations, any value can be specified for the key field in the SNMP message sent.

### **RNCC Configuration**

The following fields can be accessed

**Region Id** – Represents the integer value of the region ID of the RNCC

This is the key field for this database

Set and Get operations can be performed on this variable

**Name** – Represents the name of the RNCC

Set and Get operations can be performed on this variable

**Admin Status**- Indicates the status of the RNCC i.e. whether it is enabled or disabled

The following are the possible values for this field:

- ◆ ADMINSTATUS\_DISABLED (0)
- ◆ ADMINSTATUS\_ENABLED (1)

Set and Get operations can be performed on this variable

**IP Address**- Represents the IP Address of the RNCC in dotted decimal format

Set and Get operations can be performed on this variable

**Hub Upchain Delay** – Indicates the current HUB upchain delay in clocks

Set and Get operations can be performed on this variable

**Delete Dummy** -- Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable

- Space Segment deals with the Satellite configuration variables

### **Satellite Configuration**

The following fields can be accessed

**Name** – Represents the name of the Satellite

Set and Get operations can be performed on this variable

**Nominal Longitude** – Represents the nominal longitude of the Satellite degrees east

Set and Get operations can be performed on this variable

**Absent** – Indicates whether a satellite is present or not

The following are the possible values for this field:

FALSE (0)

TRUE (1)

Set and Get operations can be performed on this variable

**Delete Dummy**-Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable

The Satellite Configuration Database only has one record in its table. Its entry is not keyed by any field. Hence in order to carry out Get or Set operations, any value can be specified for the key field in the SNMP message sent.

- Carrier Configuration deals with the configuration variables for the TDMA Carrier

### **Carrier Configuration**

The following fields can be accessed

**Carrier ID** - Represents the integer value of the carrier ID for the TDMA Carrier

This is the key field for this database.

Set and Get operations can be performed on this variable

**Region ID** - Represents the integer value of the region ID to which the TDMA carrier belongs

Only Get operation can be performed on this variable

**Tx Polarization** – Represents the Transmit Polarizations for the TDMA Carrier

The following are the possible values for this field:

- ◆ POL\_HORIZONTAL (0)
- ◆ POL\_VERTICAL (1)
- ◆ POL\_RHS (2)
- ◆ POL\_LHS (3)

Set and Get operations can be performed on this variable

**Rx Polarization** – Represents the Receive Polarizations for the TDMA Carrier

The following are the possible values for this field:

- ◆ POL\_HORIZONTAL (0)
- ◆ POL\_VERTICAL (1)
- ◆ POL\_RHS (2)
- ◆ POL\_LHS (3)

Set and Get operations can be performed on this variable

**Symbol Rate** – Represents the symbol rate for the TDMA Carrier in symbols/s

The following are the possible values for this field:

- ◆ RATE\_1 (156250)
- ◆ RATE\_2 (312500)
- ◆ RATE\_3 (625000)
- ◆ RATE\_4 (1250000)

Set and Get operations can be performed on this variable

**Tx RF Freq** – Represents the Transmit RF Frequency for the TDMA Carrier in KHz

Set and Get operations can be performed on this variable

**Rx RF Freq** – Represents the Receive RF Frequency for the TDMA Carrier in KHz

Set and Get operations can be performed on this variable

**Default FEC** – Represents the FEC rate for the TDMA Carrier

The following are the possible values for this field:

- ◆ FEC\_1\_1(0)
- ◆ FEC\_1\_2(1)
- ◆ FEC\_2\_3(2)
- ◆ FEC\_3\_4(3)
- ◆ FEC\_7\_8(4)
- ◆ FEC\_5\_6(5)

Set and Get operations can be performed on this variable

**Delete Dummy**- Indicates whether this row is a valid entry or has been deleted

Only Set operations can be performed on this variable

Status deals with the NCC Status and RNCC Summary database variables.

## **NCC Status**

The following fields can be accessed

**Operational** – Indicates the number of operational RNCCs

Only Get operation can be performed on this variable

**Enabled**-Indicates the number of enabled RNCCs

Only Get operation can be performed on this variable

**Disabled**-Indicates the number of disabled RNCCs

Only Get operation can be performed on this variable

The NCC Status Database only has one record in its table. Its entry is not keyed by any field. Hence in order to carry out Get or Set operations, any value can be specified for the key field in the SNMP message sent.

### **RNCC Summary**

The following fields can be accessed

**Region Id** – Represents the integer value of the region ID for the RNCC

This is the key field for this database.

Only Get operation can be performed on this variable

**Summary Status**-Indicates whether the RNCC is UP or DOWN

The following are the possible values for this field:

- ♦ SUM\_NONOPERATIONAL (0)
- ♦ SUM\_OPERATIONAL (1)

Only Get operation can be performed on this variable

Performance deals with the BTP Burst Table database variables.

### **BTP Burst Table**

The following fields can be accessed

**Burst ID** – Represents the integer value of the burst ID for the burst

This is the key field for this database.

Only Get operation can be performed on this variable

**Burst Flags**- Represents the type of burst

Only Get operation can be performed on this variable

**Burst Offset**- Represents the 1<sup>st</sup> bit of the burst preamble- In TDMA base clocks

Only Get operation can be performed on this variable

**Carrier ID**- Represents the Carrier ID of the burst

Only Get operation can be performed on this variable

**Number of Channels**-Represents the number of channels used by the burst

Only Get operation can be performed on this variable

**MultiFrameMask**-Represents which frames within a multiframe are used

Only Get operation can be performed on this variable

***Destination***-Represents the GCU Terminal ID

Only Get operation can be performed on this variable

***Source***-Represents the RCST Terminal ID

Only Get operation can be performed on this variable

Fault Management deals with the alarm database, which contains the variables that are sent as trap bindings whenever a Trap message is sent to the SNMP Manager. This database is populated with the trap bindings every time an alarm is generated and is purged ten minutes after the Trap has been sent. Hence it is only possible to retrieve the alarm variable values via SNMP Get requests for upto ten minutes from the time the Trap is sent.

### **Alarm Table**

The following fields can be accessed

***Alarm Seq. No.*** – Represents a unique ID for the alarm

This is the key field for this database

Only Get operation can be performed on this variable

***Log Reason***-Represents the reason why this alarm was generated

The following are the possible values for this field:

- ◆ ALARM\_LOGREASON\_NULL (0)
- ◆ ALARM\_LOGREASON\_SET (1)
- ◆ ALARM\_LOGREASON\_CLEAR (2)
- ◆ ALARM\_LOGREASON\_ACK (3)
- ◆ ALARM\_LOGREASON\_OPERCLEAR (4)
- ◆ ALARM\_LOGREASON\_AUTOCLEAR (5)
- ◆ ALARM\_LOGREASON\_ACKCLEAR (6)
- ◆ ALARM\_LOGREASON\_MAXDELETE (7)
- ◆ ALARM\_LOGREASON\_PARENTCLEAR (8)

Only Get operation can be performed on this variable

***Note ID***-Represents the population or region ID where this alarm occurred

Only Get operation can be performed on this variable

***Class ID***-Represents an ID for the alarm used for internal purposes

Only Get operation can be performed on this variable

***Field Id***-Represents an ID for the alarm used for internal purposes

Only Get operation can be performed on this variable

***ObjIndex***-Represents an ID for the alarm used for internal purposes

Only Get operation can be performed on this variable

**ObjIndex2**-Represents the entity ID that caused the alarm

Only Get operation can be performed on this variable

**ObjIndex3**-Represents an ID for the alarm used for internal purposes

Only Get operation can be performed on this variable

**Level**-Represents the severity level of the alarm generated

The following are the possible values for this field:

- ◆ ALARM\_LEVEL\_INFO (17)
- ◆ ALARM\_LEVEL\_WARN (18)
- ◆ ALARM\_LEVEL\_MINOR (19)
- ◆ ALARM\_LEVEL\_MAJOR (20)
- ◆ ALARM\_LEVEL\_CRITICAL (21)

Only Get operation can be performed on this variable

**Clear Level**-Represents the clear level of the alarm generated

The following is the only possible value for this field:

- ◆ ALARM\_LEVEL\_BASE (16)

Only Get operation can be performed on this variable

**Text**-Represents the text for the alarm

Only Get operation can be performed on this variable

**Time Created**-Indicates the time the alarm was created in seconds since 00:00:00 UTC, January 1, 1970

Only Get operation can be performed on this variable

**Time Acknowledged**-Indicates the time the alarm was acknowledged in seconds since 00:00:00 UTC, January 1, 1970

Only Get operation can be performed on this variable

**Time Cleared**-Indicates the time the alarm was cleared in seconds since 00:00:00 UTC, January 1, 1970

Only Get operation can be performed on this variable

**Is One Shot**-Indicates if this is a one shot alarm i.e. if the alarm is associated with the state of any object

The following are the possible values for this field:

- ◆ FALSE (0)
- ◆ TRUE (1)

Only Get operation can be performed on this variable

**Level Text**-Represents the text for the level of the alarm

Only Get operation can be performed on this variable

**Description**-Describes the alarm

Only Get operation can be performed on this variable

### **Types of Traps**

The following kinds of Traps can be generated in the LinkStar System

Name: **CIRSTATUSDOWN**

Trap #: 1

Description: This alarm indicates that CIR for a specified terminal is not available

Name: **GCUSTATUSDOWN**

Trap #: 2

Description: This alarm indicates that the GCU has gone down

Name: **GPUERRBIT**

Trap #: 3

Description: This alarm indicates that the GCU error bit is on

Name: **GCUNOTCONNECT**

Trap #: 4

Description: This alarm indicates that the TDU/GCU cable is disconnected

Name: **GCUTIANOTFOUND**

Trap #: 5

Description: This alarm indicates that the GCU-TIA card is not found

Name: **TDUSTATUSDOWN**

Trap #: 6

Description: This alarm indicates that the TDU has gone down

Name: **MODINTALRM**

Trap #: 7

Description: This alarm indicates that the modulator has an internal alarm

Name: **MODINPUTALRM**

Trap #: 8

Description: This alarm indicates that the modulator has an input alarm

Name: ***IPECRITICAL***

Trap #: 9

Description: This alarm indicates that the IPE has a critical alarm

Name: ***IPEMAJOR***

Trap #: 10

Description: This alarm indicates that the IPE has a major alarm

Name: ***GPSLOCK***

Trap #: 11

Description: This alarm indicates that the GPS is locked

Name: ***GPSTRACKING***

Trap #: 12

Description: This alarm indicates that the GPS has regained tracking

Name: ***MUX***

Trap #: 13

Description: This alarm indicates that the multiplexer (MUX) has an alarm

Name: ***CHAINSWITCH***

Trap #: 14

Description: This alarm indicates that the primary chain has switched

Name: ***CHAINNOSWITCH***

Trap #: 15

Description: This alarm indicates that a switch was requested but the secondary is down.

Hence the primary chain still remains as primary

Name: ***IOCONNDOWN***

Trap #: 16

Description: This alarm indicates that the terminal server – IO Link connection is down

Name: ***RNCCTTPDOWN***

Trap #: 17

Description: This alarm indicates that the RNCC is down

Name: ***RCSTSTATUSDOWN***

Trap #: 18

Description: This alarm indicates that the RCST (Terminal) is down

Name: ***FILENOTAVAILABLE***

Trap #: 19

Description: This alarm indicates that the file specified could not be opened

### ***RNCC MIB Description***

The LinkStar RNCC Management MIB is split up into three main branches

- ◆ Configuration
- ◆ Status
- ◆ Performance

Configuration is further subdivided into

- ◆ Network
- ◆ Space Segment
- ◆ Carrier Configuration

Network deals with the NCC and RNCC configuration variables

#### ***NCC Configuration Variables:***

Since this database belongs to both the NCC and the RNCC, write access to its variables is only given via the NCC MIB. Hence it has read-only access for its variables in the RNCC MIB.

### ***NCC Configuration***

The following fields can be accessed

***Name*** - Represents the name of the NCC

Only Get operation can be performed on this variable

**Admin Status** -Indicates the status of the NCC i.e. whether it is enabled or disabled

The following are the possible values for this field:

- ♦ ADMINSTATUS\_DISABLED (0)
- ♦ ADMINSTATUS\_ENABLED (1)

Only Get operation can be performed on this variable

**IP Address** -Represents the IP Address of the NCC in dotted decimal format

Only Get operation can be performed on this variable

The NCC Configuration Database only has one record in its table. Its entry is not keyed by any field. Hence in order to carry out Get or Set operations, any value can be specified as the key field in the SNMP message sent.

**RNCC Configuration Variables:**

These are further subdivided into

- ♦ Hub
- ♦ Software Download
- ♦ Population

## **RNCC Configuration**

The following fields can be accessed

**Region Id** -Represents the integer value of the region ID of the RNCC

This is the key field for this database

Set and Get operations can be performed on this variable

**Name** - Represents the name of the RNCC

Set and Get operations can be performed on this variable

**Admin Status** -Indicates the status of the RNCC i.e. whether it is enabled or disabled

The following are the possible values for this field:

- ♦ ADMINSTATUS\_DISABLED (0)
- ♦ ADMINSTATUS\_ENABLED (1)

Set and Get operations can be performed on this variable

**IP Address** -Represents the IP Address of the RNCC in dotted decimal format

Set and Get operations can be performed on this variable

**Hub Upchain Delay** -Indicates the current HUB upchain delay in clocks

Set and Get operations can be performed on this variable

**Delete Dummy** -Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable

- ◆ - Hub deals with the GUC Parameters and configuration variables

## **GUCParms**

The following fields can be accessed

**Region Id** -Represents the integer value of the region ID of the RNCC

Only Get operation can be performed on this variable

**Primary TDU** - Indicates which TDU is primary

The following are the possible values for this field:

- ◆ TDU\_A (0)
- ◆ TDU\_B (1)

Set and Get operations can be performed on this variable

**Terminal Server** - Indicates the IP Address of the terminal server in dotted decimal

**IP Address** format

Set and Get operations can be performed on this variable

The GUCParms Database only has one record in its table. Its entry is not keyed by any field. Hence in order to carry out Get or Set operations, any value can be specified as the key field in the SNMP message sent.

- ◆ Software Download deals with the LinkStar Multicast File Transfer Protocol configuration variables

## **LMFTP File Configuration**

The following fields can be accessed

(This database has two fields making up the key)

**Filename** -Represents the name of the file

Set and Get operations can be performed on this variable

**Region Id** -Represents the integer value of the region ID of the RNCC

Only Get operation can be performed on this variable

**Terminal ID** -Indicates the terminal ID of the RCST where the file is to be sent

This is the one of the key field for this database

Set and Get operations can be performed on this variable

**Admin Status** - Indicates whether this file should be downloaded or not

The following are the possible values for this field:

- ◆ ADMINSTATUS\_DISABLED (0)
- ◆ ADMINSTATUS\_ENABLED (1)

Set and Get operations can be performed on this variable

**Duration** - Indicates the time in seconds taken to stream this file

Set and Get operations can be performed on this variable

**File Type** - Represents the type of file – altera, cosmos etc.

This is the one of the key field for this database

The following are the possible values for this field:

- ◆ FILETYPE\_COSMOS\_RCST (1)
- ◆ FILETYPE\_ALTERA\_RCST (2)
- ◆ FILETYPE\_COSMOS\_GCU (3)
- ◆ FILETYPE\_ALTERA\_GCU (4)

Set and Get operations can be performed on this variable

**Download Flags** - Represents the flags used by this file

The following are the possible values and operations for this field:

1 -> Reboot with this File

2 -> Switch to this File

4 -> Force Switch to this File

Set and Get operations can be performed on this variable

Flag Options - This field is reserved and is to be used in future

Set and Get operations can be performed on this variable

Delete Dummy -Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable

- Population deals with the Population configuration, Terminal configuration and RFPort Info configuration variables.

### **Population Configuration**

The following fields can be accessed

**Name** – Represents the name of the population

Set and Get operations can be performed on this variable

**Population Id**-Represents the integer value of the population ID for this population

This is the key field for this database

Set and Get operations can be performed on this variable

**Admin Status** -Indicates the status of the population i.e. whether it is enabled or disabled

The following are the possible values for this field:

- ♦ ADMINSTATUS\_DISABLED (0)
- ♦ ADMINSTATUS\_ENABLED (1)

Set and Get operations can be performed on this variable

**Default Terminal** -Represents the defaults for the terminal configuration when a **Profile Name** terminal is added to this population

Only Get operation can be performed on this variable

**Delete Dummy**-Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable

### **Terminal Configuration**

The following fields can be accessed

**Name** -Represents the name of the terminal

Set and Get operations can be performed on this variable

**Terminal Id** -Represents the integer value of the terminal ID for the terminal

This is the key field for this database

Set and Get operations can be performed on this variable

**Population Id** -Represents the integer value of the population ID to whom this terminal belongs

Only Get operation can be performed on this variable

**Longitude** - Represents the longitude of the terminal

Set and Get operations can be performed on this variable

**Latitude** - Represents the latitude of the terminal

Set and Get operations can be performed on this variable

**Da** - Represents the round trip delay to the satellite in clocks

Only Get operation can be performed on this variable

**Admin Status**-Indicates whether the terminal is enabled or disabled

The following are the possible values for this field:

- ♦ ADMINSTATUS\_DISABLED (0)
- ♦ ADMINSTATUS\_ENABLED (1)

Set and Get operations can be performed on this variable

**Max. Tx Rate** -Represents the maximum transmit rate in symbols/sec

Set and Get operations can be performed on this variable

**Max. Rx Rate** -Represents the maximum receive rate in symbols/sec

Set and Get operations can be performed on this variable

**User Group ID** -Represents the bandwidth user group ID

Only Get operation can be performed on this variable

**Carrier Assign Mode**-Represents the carrier assignment mode

The following are the possible values for this field:

- ◆ MODE\_AUTO (0)
- ◆ MODE\_MANUAL (1)

Set and Get operations can be performed on this variable

**Assigned Carrier ID**-Represents the carrier ID when manual mode is selected

Set and Get operations can be performed on this variable

**Delete Dummy**-Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable

The variables for terminal configuration dealing with IP Network Configuration are further classified under the **IP Interface**, which comes under the **Logical Interfaces** subdivision in the MIB.

The IP Interface is subdivided into:

- ◆ IPIF
- ◆ IPRIP
- ◆ IPRC
- ◆ IPMRoute
- ◆ IPSRoute

## **IPIF Configuration**

The following fields can be accessed

**Terminal Id** -Represents the integer value of the terminal ID

This is the key field for this database

Only Get operation can be performed on this variable

**Is Disabled** -Indicates whether this terminal is enabled or disabled

The following are the possible values for this field:

- ◆ FALSE (0)
- ◆ TRUE (1)

Set and Get operations can be performed on this variable

**Proxy TCP** -Indicates whether proxy TCP has been enabled for the TDMA Interface

The following are the possible values for this field:

- ◆ FALSE (0)
- ◆ TRUE (1)

Set and Get operations can be performed on this variable

**Routing Protocol** -Indicates the routing protocol used

The following are the only values for this field available today:

- ◆ ROUTINGPROTOCOL\_NONE (0)
- ◆ ROUTINGPROTOCOL\_RIP (1)

The following values are not supported

- ◆ ROUTINGPROTOCOL\_OSPF (2)
- ◆ ROUTINGPROTOCOL\_BGP (3)

Set and Get operations can be performed on this variable

**MTU Size** -Represents the maximum transfer unit in octets

A value of 0 represents 1500 bytes

Set and Get operations can be performed on this variable

**IP Address** -Indicates the IP Address of the terminal in dotted decimal format

Set and Get operations can be performed on this variable

**Subnet mask** -Indicates the subnet mask of the terminal in dotted decimal format

Set and Get operations can be performed on this variable

**IPPidBwUserGroup** -Represents the PID from Bandwidth user group used for IP Traffic

Only Get operation can be performed on this variable

**IPPid 1** -Represents PID 1 used for IP Traffic

Set and Get operations can be performed on this variable

**IPPid 2** -Represents PID 2 used for IP Traffic

Set and Get operations can be performed on this variable

**Delete Dummy** -Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable

## **IPRIP Configuration**

The following fields can be accessed

**Terminal Id** -Represents the integer value of the terminal ID

This is the key field for this database

Only Get operation can be performed on this variable

**RIP TX Mode** -Represents the transmit mode for RIP

The following are the possible values for this field specified by the RFC:

- ◆ RIPTXMODE\_NONE (0)
- ◆ RIPTXMODE\_V1 (1)
- ◆ RIPTXMODE\_V1COMPATIBLE (2)
- ◆ RIPTXMODE\_V2 (3)

Set and Get operations can be performed on this variable

**RIP RX Mode** -Represents the receive mode for RIP

The following are the possible values for this field specified by the RFC:

- ◆ RIPRXMODE\_V1 (0)
- ◆ RIPRXMODE\_V1ORV2 (1)
- ◆ RIPRXMODE\_V2 (2)
- ◆ RIPRXMODE\_NONE (3)

Set and Get operations can be performed on this variable

**Authenable** -This field is only used for RIP V2 for optional authentication

The following are the possible values for this field:

- ◆ FALSE (0)
- ◆ TRUE (1)

Set and Get operations can be performed on this variable

**Authentication Key** -If RIPV2 is used and the Authenable field is set to TRUE (1), this field represents the authentication key and is a null terminated string

Set and Get operations can be performed on this variable

**Delete Dummy**-Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable

## **IPRC Configuration**

The following fields can be accessed

**RCST Terminal Id** -Represents the integer value of the terminal ID

This is the key field for this database

Only Get operation can be performed on this variable

**QOS Profile No.** -Represents the profile number of QOS queues for the terminal

Set and Get operations can be performed on this variable

**CIR to Hub** -Represents the amount of bandwidth available on the TDMA return path in kilobits per second (kbps)

Set and Get operations can be performed on this variable

**Is Disabled** -Indicates whether the return channel is enabled or disabled

The following are the possible values for this field:

- ◆ FALSE (0)
- ◆ TRUE (1)

Set and Get operations can be performed on this variable

**Delete Dummy**- Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable

### **IPMRoute Configuration**

The following fields can be accessed

(This database has four fields making up the key)

**Terminal Id** -Represents the integer value of the terminal ID

This is one of the key fields for this database

Only Get operation can be performed on this variable

**Dest. Mcast Address** -Represents the Destination Multicast IP Address in dotted decimal format

This is one of the key fields for this database.

Set and Get operations can be performed on this variable

**Source IP Address** -Represents the source IP address in dotted decimal format

This is one of the key fields for this database

Set and Get operations can be performed on this variable

**Direction** -Indicates the direction of flow

This is one of the key fields for this database.

The following are the possible values for this field:

- ◆ DIRECTION\_TOTDMA (0)
- ◆ DIRECTION\_FROMTDMA (1)

Set and Get operations can be performed on this variable

**Delete Dummy**-Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable

### **IPSRRoute Configuration**

The following fields can be accessed

(This database has three fields making up the key)

**Terminal Id** -Represents the integer value of the terminal ID

This is one of the key fields for this database

Only Get operation can be performed on this variable

**IP Address** -Represents the IP Address of the subnet or host in dotted decimal format

This is one of the key fields for this database

Set and Get operations can be performed on this variable

**Subnet mask** -Indicates the subnet mask in dotted decimal format

Set and Get operations can be performed on this variable

**Next IP Address** -Indicates the IP Address of the next hop in dotted decimal format

This is one of the key fields for this database

Set and Get operations can be performed on this variable

**Connected to** -Indicates the interface through which the router is available

The following are the possible values for this field:

CONNECTEDTO\_TDMA (0) – Valid for RCST only

CONNECTEDTO\_ETHER (1) – Valid for GCU and RCST

Set and Get operations can be performed on this variable

**Metric** -Represents the metric field. Possible values are between 1 and 16

Set and Get operations can be performed on this variable

**Delete Dummy**-Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable

### **RFPort Info Configuration**

The following fields can be accessed

**Population Id**-Represents the integer value of the population ID

This is the key field for this database Only Get operation can be performed on this variable

**Tx Polarizations** -Represents the transmit polarizations

The following are the possible values for this field:

- ◆ POL\_HORIZONTAL (0)
- ◆ POL\_VERTICAL (1)

- ◆ POL\_RHS (2)
- ◆ POL\_LHS (3)

Set and Get operations can be performed on this variable

**Rx Polarizations** -Represents the receive polarizations

The following are the possible values for this field:

- ◆ POL\_HORIZONTAL (0)
- ◆ POL\_VERTICAL (1)
- ◆ POL\_RHS (2)
- ◆ POL\_LHS (3)

Set and Get operations can be performed on this variable

**Tx-RF Center Freq** -Represents the transmit RF Center frequency in kHz

Set and Get operations can be performed on this variable

**Rx-RF Center Freq** -Represents the receive RF Center frequency in kHz

Set and Get operations can be performed on this variable

**Tx-IF Center Freq** -Represents the transmit IF Center frequency in Hz

Set and Get operations can be performed on this variable

**Rx-IF Center Freq** -Represents the receive IF Center frequency in Hz

Set and Get operations can be performed on this variable

**Tx-Bandwidth** -Represents the transmit bandwidth in Hz

Set and Get operations can be performed on this variable

**Rx- Bandwidth** -Represents the receive bandwidth in Hz

Set and Get operations can be performed on this variable

**Delete Dummy** -Indicates whether this row is a valid entry or has been deleted Only Set operation can be performed on this variable

### **Bandwidth User Group Configuration**

The following fields can be accessed

**User Group Id** - Represents the integer value of the user group ID

This is the key field for this database.

Only Get operation can be performed on this variable

**User Group Name** - Represents the User Group Name

Only Get operation can be performed on this variable

**Max Tx Bandwidth** -Represents the maximum allowed bandwidth for the user group in kbps

Set and Get operations can be performed on this variable

**IP Pid** -Represents the IP PID

Set and Get operations can be performed on this variable

**Region Id** -Represents the integer value of the region ID of the RNCC

Only Get operation can be performed on this variable

**Delete Dummy** -Indicates whether this row is a valid entry or has been deleted Only Set operation can be performed on this variable

### **Flow Profile Configuration**

The following fields can be accessed

**Flow Id** - Represents the integer value of the flow ID

This is the key field for this database

Only Get operation can be performed on this variable

**Region Id** -Represents the integer value of the region ID of the RNCC to which this flow profile belongs

Only Get operation can be performed on this variable

**Source IP Address** -Represents the Source IP Address for the flow in dotted decimal format

Set and Get operations can be performed on this variable

**Source IP Mask** -Represents the Source IP Address Mask for the flow in dotted decimal format

Set and Get operations can be performed on this variable

**Dest IP Address** -Represents the Destination IP Address for the flow in dotted decimal format

Set and Get operations can be performed on this variable

**Dest IP Mask** -Represents the Destination IP Address Mask for the flow in dotted decimal format

Set and Get operations can be performed on this variable

**Source Port** - Represents the source port for the flow

Set and Get operations can be performed on this variable

**Destination Port** - Represents the destination port for the flow

Set and Get operations can be performed on this variable

**Source Port Mask** - Represents the source port mask for the flow

A value of -1 signifies that the source port field value will be ignored

A value of 0 signifies that the source port field value will be considered  
Set and Get operations can be performed on this variable

**Dest. Port Mask** - Represents the destination port mask for the flow

A value of -1 signifies that the destination port field value will be ignored

A value of 0 signifies that the destination port field value will be considered  
Set and Get operations can be performed on this variable

**Protocol** -Represents the protocol associated with the flow

Set and Get operations can be performed on this variable

**Protocol Port Mask** - Represents the protocol port mask for the flow

A value of -1 signifies that the protocol field value will be ignored

A value of 0 signifies that the protocol field value will be considered  
Set and Get operations can be performed on this variable

**CodePoint** -Represents the codepoint to be assigned to the packet belonging to the flow. This is the one-byte value that is put in the ToS field of the IP packet header, if the packet matches the flow profile criteria

Set and Get operations can be performed on this variable

**Flags** -If the flow profile codepoint is **Assured Forwarding**, the flag should have a value of 4

If the flow profile codepoint is **Expedited forwarding**, the flag should have a value of 8

Set and Get operations can be performed on this variable

**Rate** -Represents the CIR that the flow should receive in kilobits per second (kbps)

Set and Get operations can be performed on this variable

**Burst** -Represents the burst length in terms of time specified as ms

Set and Get operations can be performed on this variable

**Flow Profile Name** - Represents the Flow Profile Name

Set and Get operations can be performed on this variable

**Delete Dummy** -Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable

### IPQOSQ Configuration

The following fields can be accessed

(This database has two fields making up the key)

**Region Id** - Represents the integer value of the region ID of the RNCC

Only Get operation can be performed on this variable

**Profile Number** - Represents the queue profile to which this queue belongs

This is one of the key fields for this database

Only Get operation can be performed on this variable

**Code Point** - Represents the codepoint for all the packets queued here

This is one of the key fields for this database

Set and Get operations can be performed on this variable

**Flags** - Represents the flags used

For a queue of type “**Assured Forwarding**”, the flag should have a value of 4

For a queue of type “**Expedited Forwarding**”, the flag should have a value of 8

Set and Get operations can be performed on this variable

**CIR** - Represents the CIR given to the flows in this queue in kbps

***The value for CIR has to be  $\geq 1$ . If an incorrect value is specified, the terminal may behave unpredictably (including loss of sync or rebooting repeatedly) until the specified value is put in.***

Set and Get operations can be performed on this variable

**DenominatorWQ** - Represents the weight assigned to the queue

***The only allowed value is 512. If an incorrect value is specified, the terminal may behave unpredictably (including loss of sync or rebooting repeatedly) until the specified value is put in.***

Set and Get operations can be performed on this variable

**Minth** - Represents the minimum threshold for average queue size

***The only allowed value is 7. If an incorrect value is specified, the terminal may behave unpredictably (including loss of sync or rebooting repeatedly) until the specified value is put in.***

Set and Get operations can be performed on this variable

**Maxth** - Represents the maximum threshold for average queue size

***The only allowed value is 15. If an incorrect value is specified, the terminal may behave unpredictably (including loss of sync or rebooting repeatedly) until the specified value is put in.***

Set and Get operations can be performed on this variable

**MaxP** -Represents the maximum probability with which a packet can be marked

**The only allowed value is 0.02. If an incorrect value is specified, the terminal may behave unpredictably (including loss of sync or rebooting repeatedly) until the specified value is put in.**

Set and Get operations can be performed on this variable

**Delete Dummy** -Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable

### **IPEParms Configuration**

The following fields can be accessed

**Region Id** - Represents the integer value of the region ID of the RNCC

Only Get operation can be performed on this variable

**IPE Mgr Enabled** - Represents whether the IPE Manager is enabled or disabled

The following are the possible values for this field:

- ◆ FALSE (0)
- ◆ TRUE (1)

Set and Get operations can be performed on this variable

**Control PID** -Represents the control PID for this region

Set and Get operations can be performed on this variable

**Community** -Represents the community string for read write access to the IPE

Set and Get operations can be performed on this variable

**SMR 1 IP Address** -Represents the IP Address of the first IPE dotted decimal format

Set and Get operations can be performed on this variable

**SMR 2 IP Address** -Represents the IP Address of the second IPE dotted decimal format

Set and Get operations can be performed on this variable

**Floating IP Address** -Represents the IPE's floating IP Address in dotted decimal format

Set and Get operations can be performed on this variable

**IPE Redundant** -Indicates whether the IPE setup is redundant or not

The following are the possible values for this field:

- ◆ FALSE (0)
- ◆ TRUE (1)

Set and Get operations can be performed on this variable

**Frac Data Rate** -Represents the fraction of the pipe for IP Data

Typical value is 95%

Set and Get operations can be performed on this variable

**Info Rate** -Represents the information rate seen on the Modulator in bits per second (bps). The DVB ASIOut rate of the Encapsulator is set to this value

Set and Get operations can be performed on this variable

**StatsFileWrite** -Represents the accounting file write frequency in minutes

**Interval** Set and Get operations can be performed on this variable

**Delete Dummy** -Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable

The IPEParms Configuration Database only has one record in its table. It entry is not keyed by any field. Hence in order to carry out Get or Set operations, any value can be specified as the key field in the SNMP message sent.

### **IPHCParms Configuration**

The following fields can be accessed

**Region Id** - Represents the integer value of the region ID of the RNCC

Only Get operation can be performed on this variable

**IPHC Enabled** - Represents whether IPHC is enabled or disabled

The following are the possible values for this field:

- ◆ FALSE (0)
- ◆ TRUE (1)

Set and Get operations can be performed on this variable

**Refresh Rate** -Represents the periodicity of fullheader refreshes in packets

Set and Get operations can be performed on this variable

### **IPQOSParms Configuration**

The following fields can be accessed

**Region Id** -Represents the integer value of the region ID of the RNCC

Only Get operation can be performed on this variable

**IPQOSEnabled** -Represents whether IPQOS is enabled or disabled

The following are the possible values for this field:

- ◆ FALSE (0)
- ◆ TRUE (1)

Set and Get operations can be performed on this variable

**FmonitorEnabled** -Represents whether flow monitoring is enabled or disabled

The following are the possible values for this field:

- ◆ FALSE (0)
- ◆ TRUE (1)

Set and Get operations can be performed on this variable

**FlowMatching** -Represents whether flow profile matching is enabled or disabled

**Enabled** The following are the possible values for this field:

- ◆ FALSE (0)
- ◆ TRUE (1)

The IPQOSParms Configuration Database only has one record in its table. It entry is not keyed by any field. Hence in order to carry out Get or Set operations, any value can be specified as the key field in the SNMP message sent.

- Space Segment deals with the Satellite configuration variables

### **Satellite Configuration**

The following fields can be accessed

**Name** – Represents the name of the Satellite

Set and Get operations can be performed on this variable

**Nominal Longitude**–Represents the nominal longitude of the Satellite degrees east

Set and Get operations can be performed on this variable

**Absent** – Indicates whether a satellite is present or not

The following are the possible values for this field:

- ◆ FALSE (0)
- ◆ TRUE (1)

Set and Get operations can be performed on this variable

**Delete Dummy**-Indicates whether this row is a valid entry or has been deleted

Only Set operation can be performed on this variable.

The Satellite Configuration Database only has one record in its table. Its entry is not keyed by any field. Hence in order to carry out Get or Set operations, any value can be specified for the key field in the SNMP message sent.

- Carrier Configuration deals with the configuration variables for the TDMA Carrier

### **Carrier Configuration**

The following fields can be accessed

**Carrier Id** - Represents the integer value of the carrier ID for the TDMA Carrier

This is the key field for this database

Set and Get operations can be performed on this variable

**Region ID** - Represents the integer value of the region ID to which the TDMA carrier belongs

Only Get operation can be performed on this variable

**Tx Polarization** – Represents the Transmit Polarizations for the TDMA Carrier

The following are the possible values for this field:

- ◆ POL\_HORIZONTAL (0)
- ◆ POL\_VERTICAL (1)
- ◆ POL\_RHS (2)
- ◆ POL\_LHS (3)

Set and Get operations can be performed on this variable

**Rx Polarization** – Represents the Receive Polarizations for the TDMA Carrier

The following are the possible values for this field:

- ◆ POL\_HORIZONTAL (0)
- ◆ POL\_VERTICAL (1)
- ◆ POL\_RHS (2)
- ◆ POL\_LHS (3)

Set and Get operations can be performed on this variable

**Symbol Rate** – Represents the symbol rate in for the TDMA Carrier in symbols/s

The following are the possible values for this field:

- ◆ RATE\_1 (156250)
- ◆ RATE\_2 (312500)

- ◆ RATE\_3 (625000)
- ◆ RATE\_4 (1250000)

Set and Get operations can be performed on this variable

***Tx RF Freq*** – Represents the Transmit RF Frequency for the TDMA Carrier in KHz

Set and Get operations can be performed on this variable

***Rx RF Freq***–Represents the Receive RF Frequency for the TDMA Carrier in KHz

Set and Get operations can be performed on this variable

***Default FEC*** – Represents the FEC rate for the TDMA Carrier

The following are the possible values for this field:

- ◆ FEC\_1\_1(0)
- ◆ FEC\_1\_2(1)
- ◆ FEC\_2\_3(2)
- ◆ FEC\_3\_4(3)
- ◆ FEC\_7\_8(4)
- ◆ FEC\_5\_6(5)

Set and Get operations can be performed on this variable

***Delete Dummy***-Indicates whether this row is a valid entry or has been deleted

Only Set operations can be performed on this variable

Status deals with the RNCC Status, Population Status, Terminal Status and TDU Status database variables.

## **RNCC Status**

The following fields can be accessed

***Region Id*** – Represents the integer value of the region ID for the RNCC

This is the key field for this database.

Only Get operation can be performed on this variable

***Operational*** – Indicates the number of operational terminals or RCSTs in region

Only Get operation can be performed on this variable

***Enabled***-Indicates the number of enabled terminals or RCSTs in region

Only Get operation can be performed on this variable

***Disabled***-Indicates the number of disabled terminals or RCSTs in region

Only Get operation can be performed on this variable

**POP Status**

The following fields can be accessed

**Pop Id** – Represents the integer value of the population ID for the population  
This is the key field for this database.

Only Get operation can be performed on this variable

**Admin Status** -Indicates the status of the population i.e. whether it is enabled or disabled

The following are the possible values for this field:

- ◆ ADMINSTATUS\_DISABLED (0)
- ◆ ADMINSTATUS\_ENABLED (1)

Only Get operation can be performed on this variable

**Operational** – Indicates the number of operational terminals or RCSTs in population

Only Get operation can be performed on this variable

**Enabled**-Indicates the number of enabled terminals or RCSTs in population

Only Get operation can be performed on this variable

**Disabled**-Indicates the number of disabled terminals or RCSTs in population

Only Get operation can be performed on this variable

**Term Status**

The following fields can be accessed

**Terminal Id** -Represents the integer value of the terminal ID  
This is the key field for this database

Only Get operation can be performed on this variable

**Pop Id** – Represents the integer value of the population ID for the population to which this terminal belongs

Only Get operation can be performed on this variable

**Admin Status** -Indicates the status of the terminal i.e. whether it is enabled or disabled

The following are the possible values for this field:

- ◆ ADMINSTATUS\_DISABLED (0)
- ◆ ADMINSTATUS\_ENABLED (1)

Only Get operation can be performed on this variable

**Summary Status** -Indicates whether the terminal is operational or not

The following are the possible values for this field:

- ◆ SUM\_NONOPERATIONAL (0)
- ◆ SUM\_OPERATIONAL (1)

Only Get operation can be performed on this variable

**Modulation** – Represents the modulation type of the terminal

The following are the possible values for this field:

- ◆ MODULATION\_QPSK (0)
- ◆ MODULATION\_BPSK (1)

Only Get operation can be performed on this variable

**Status Change Time**- Represents the time when the status changed, in seconds since 00:00:00 UTC, January 1, 1970

Only Get operation can be performed on this variable

**Dn** – Represents the round trip satellite delay in clocks

Only Get operation can be performed on this variable

**Longitude** – Represents the terminal longitude

Only Get operation can be performed on this variable

**Latitude** – Represents the terminal latitude

Only Get operation can be performed on this variable

## **TDU Status**

The following fields can be accessed

**Region Id** – Represents the integer value of the region ID for the TDU

Only Get operation can be performed on this variable

**Is Primary** – Indicates whether this is the Primary or Backup TDU

Only Get operation can be performed on this variable

**Status** -Indicates the status of the TDU

The following are the possible values for this field:

- ◆ TDU\_DISABLE (0)
- ◆ TDU\_DOWN (1)
- ◆ TDU\_UP (2)

Only Get operation can be performed on this variable

***TDU Id*** – Represents the integer value of the TDU ID

This is the key field for this database

Only Get operation can be performed on this variable

***Alarm Msg.*** –Represents the alarm message for the TDU

Only Get operation can be performed on this variable

Performance deals with the BTP Burst Table database variables.

### ***BTP Burst Table***

The following fields can be accessed

***Burst ID*** – Represents the integer value of the burst ID for the burst

This is the key field for this database.

Only Get operation can be performed on this variable

***Burst Flags***-Represents the type of burst

Only Get operation can be performed on this variable

***Burst Offset***-Represents the 1<sup>st</sup> bit of the burst preamble- In TDMA base clocks

Only Get operation can be performed on this variable

***Carrier ID***-Represents the Carrier ID of the burst

Only Get operation can be performed on this variable

***Number of Channels***-Represents the number of channels used by the burst

Only Get operation can be performed on this variable

***MultiFrameMask***-Represents which frames within a multiframe are used

Only Get operation can be performed on this variable

***Destination***-Represents the GCU Terminal ID

Only Get operation can be performed on this variable

***Source***-Represents the RCST Terminal ID

Only Get operation can be performed on this variable

Currently there are no traps generated at the RNCC. Hence there is no fault management component in the RNCC MIB.

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**Publication Information**

| <b>Revision Number</b> | <b>Date Released</b> | <b>Comments</b> |
|------------------------|----------------------|-----------------|
| 01                     | TBD                  | Initial ER      |
|                        |                      |                 |
|                        |                      |                 |

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