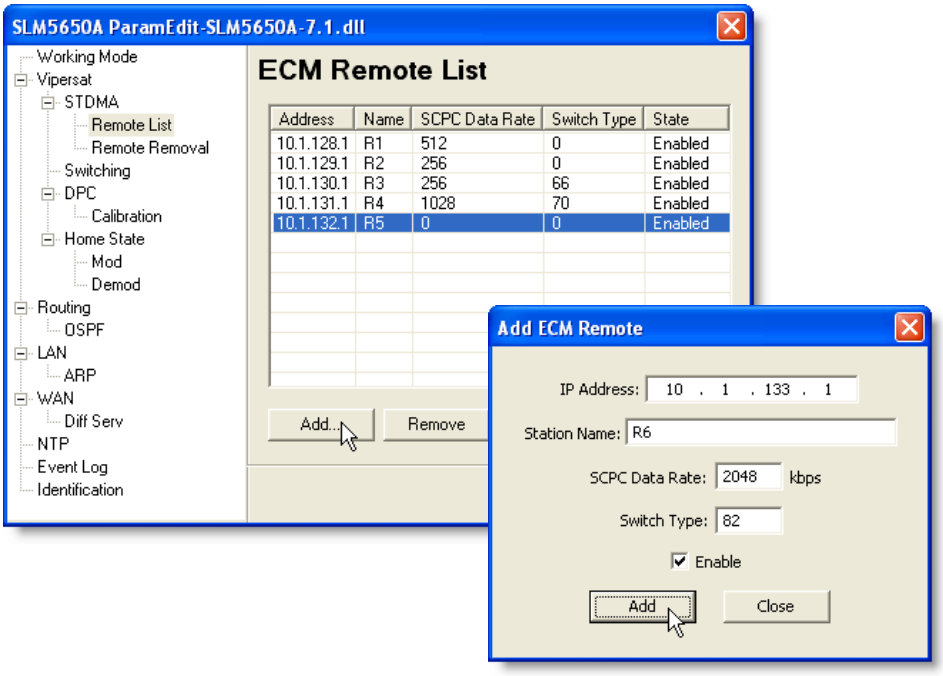
# Vipersat SLM-5650A
# Parameter Editor




# User Guide

Part Number MN-0000041 Revision 2

# Vipersat SLM-5650A
# Parameter Editor

# User Guide

Part Number MN-0000041
Document Revision 2

Software version 1.7.1.106

March 19, 2010

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| 1 | 2/24/09 | General Update for compatibility of SLM-5650A software version 1.5.2. |
| 2 | 3/16/10 | General Update for compatibility of SLM-5650A software version 1.7.1. |

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CHAPTER

# 1

# GENERAL

## How to Use This Manual

This manual documents the features and functions of the Vipersat Parameter Editor software user interface, and guides the user in how to use this product for configuring a Vipersat SLM-5650A network unit.

Workstation users, as well as network administrators and operators responsible for the configuration and maintenance of the Vipersat satellite network, are the intended audience for this document.

### Manual Organization

This User Guide is organized into the following sections:

#### Chapter 1 — General

Contains Parameter Editor product description, customer support information, and manual conventions and references.

#### Chapter 2 — Using Parameter Editor

Covers the Parameter Editor dialogs and the associated fields that are used to configure the SLM-5650A.

#### Appendix A — Glossary

A glossary of terms that pertain to Vipersat satellite network technology.

## Conventions and References

The following conventions are utilized in this manual to assist the reader:


**Note:** Provides important information relevant to the accompanying text.

**Tip:** Provides complementary information that facilitates the associated actions or instructions.

**Caution:** Provides explanatory text that notifies the reader of possible consequences of an action.

**Warning:** Provides precautionary text that describes a potentially hazardous situation. Failure to take or avoid a specified action may result in damage to equipment.

The following documents are referenced in this manual, and provide supplementary information for the reader:

- *SLM-5650A Installation and Operation Manual* (Part Number MN-0000031)
- *Vipersat SLM-5650A User Guide* (Part Number MN-0000035)
- *Vipersat Management System User Guide* (Part Number MN/22156)
- *Vipersat Load Utility User Guide* (Part Number MN/22117)

# Product Description

## Introduction

The Parameter (Param) Editor provides a simple graphical user interface (GUI) for making configuration changes to modem/routers used in a Vipersat satellite network. Accessible from both the VMS and VLoad, the Parameter Editor operates on the param files that store the operating parameters for network terminals. This user guide documents the Parameter Editor as it applies to the SLM-5650A satellite modem.

The Parameter Editor is the same in both the VMS and VLoad. However, the way edited parameters are applied to the Vipersat network modem/routers differs between the two. Once a modem's configuration has been changed using the VMS, the change is immediately applied to the modem. In contrast, changes made using the VLoad utility are not applied until the new param file is Put (uploaded) to the unit by the operator.


**Note:** Many of the parameters will interact with other parameters. Carefully read the instructions before making changes to a unit's configuration settings.

Parameter modifications may also be made directly to the modem/router using a direct console connection, a Telnet connection, or the World Wide Web. Refer to the modem/router's documentation for details on making equipment parameter modifications directly at the unit.

For more information on using the Parameter Editor with the VMS, refer to the *Vipersat Management System User Guide*.

For more information on using the Parameter Editor with VLoad, refer to the *Vipersat Load Utility User Guide*.

## Parameter Editor Features

The Parameter Editor software has the following features:

- Simple yet comprehensive graphical user interface.
- Integrates with both the VMS and VLoad.
- Context sensitive for device type as well as for unit role (Hub/Remote).
- Configuration alert error checking on range value parameters.

# Customer Support

## Contact Information

Contact Comtech Vipersat Network Products Customer Support for information or assistance with product support, service, or training on any Vipersat product.

**Mail**: Attn: CTAC
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**Web**: www.comtechefdata.com

## Reader Comments / Corrections

If the reader would like to submit any comments or corrections regarding this manual and its contents, please forward them to a Comtech Vipersat Customer Support representative. All input is appreciated.

CHAPTER

# 2

# USING PARAMETER EDITOR

## General

### DLL Files

The Parameter Editor is a shared run-time Dynamic Link Library (DLL) file which is called from both VLoad and VMS software applications. It is used as an extension to both of these programs in providing an extendable User Interface. This file resides in a locally sourced directory for access by the host application.

To access the Parameter Editor from either the VMS or VLoad, the appropriate DLL files are required. There is a DLL file for each modem firmware version. For example, ParamEdit-5.4.dll is utilized for modems that are running firmware v1.5.4. For networks that have multiple modem firmware versions, multiple DLL files are required.

Please note that the naming convention for these files may differ, depending on what version of VMS or VLoad is used. Prior to *VMS v3.6.2* and *VLoad v3.4.1*, the convention used is ParamEdit-x.x.dll, where x.x identifies the modem firmware version. For *VMS v3.6.2 and later*, and *VLoad v3.4.1 and later*, the convention used includes the modem designation and firmware version (e.g., ParamEdit-SLM5650A-x.x.dll).

### Updating DLL Files

To update the Parameter Editor for one or both of the installed applications, VLoad and/or VMS, the new DLL file is simply copied into the appropriate directory for that application.

#### VMS Update

On both the VMS Client machine and the VMS Server, copy the distributed DLL file to the following directory:

C:\Program Files\Vipersat\VMS\3.0\bin

#### Vload Update

Copy the distributed DLL file into the same local directory that holds the VLoad application (.exe).

These DLL file updates will not cause any disruption to the host applications.

## Configuration Changes

When changes are made to a modem unit configuration with Parameter Editor, these changes are saved by clicking on the **OK** button at the bottom of the Editor window. Alternatively, these changes are ignored by either clicking on the **Cancel** button or closing the Editor window.

**Caution:** Clicking the OK button saves *all of the data* from *all of the menu category dialogs* simultaneously to the modem unit Param file. The OK and Cancel buttons do not apply to any single dialog, but apply to all dialogs in the Parameter Editor.

Because the Parameter Editor closes after a save operation, it is recommended that all desired changes be input prior to clicking on the OK button.

# Parameter Editor Tree Menu

The Parameter Editor displays the editable parameter categories for each network modem/router in the form of a tree menu. The tree appearance will vary depending on the selected Working Mode, and whether the unit has both a modulator and a demodulator, or a demodulator only.

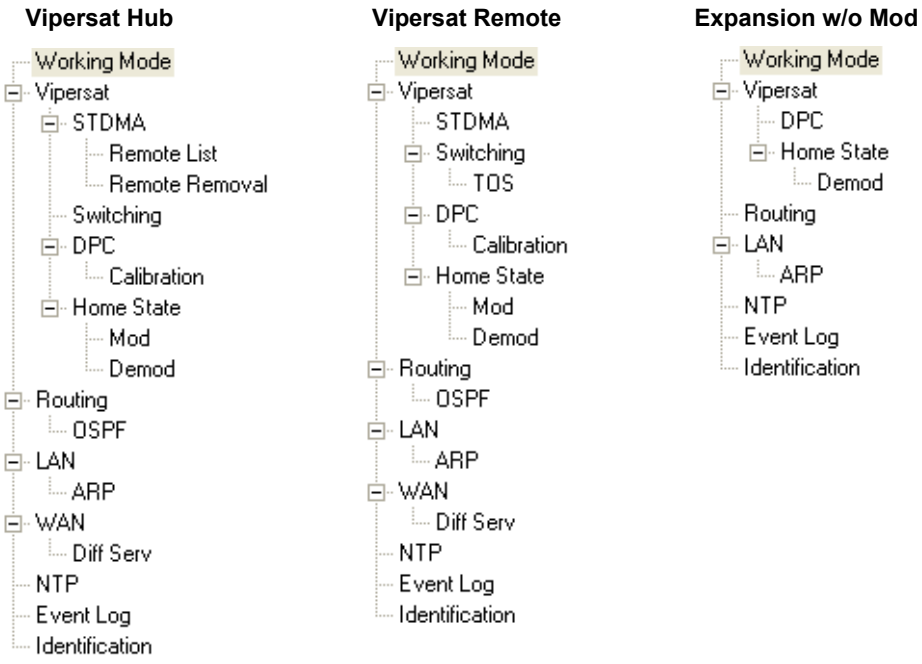


**Figure 2-1** Tree Menus, Vipersat Modes

*From the VMS*, Parameter Editor is accessed by selecting the modem **Configure** command.

*From VLoad*, Parameter Editor is accessed by clicking on the **Edit Param File** button.

## Configuration Alert

Parameter Editor performs a check of the configuration settings that are input by the user. If any settings are found to be in conflict for the unit, an alert message is generated to inform the user that an adjustment is necessary. When a dialog containing a conflicting parameter setting is exited, an alert icon will appear in front of the associated menu item (figure 2-2). Upon re-opening the dialog, an

alert icon will be displayed next to the field in question. Clicking on the icon will display a pop-up info-tip that explains the conflict.

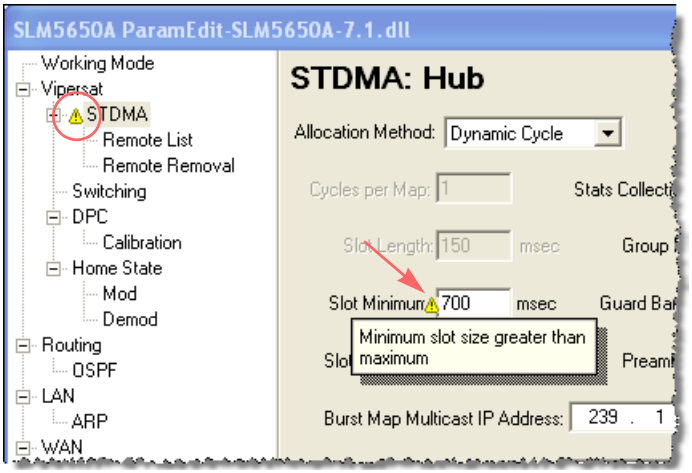


**Figure 2-2** Alert, Parameter Conflict

Edit the setting to eliminate the conflict. Note that, once the setting is corrected, the alert icons will remain visible until either the dialog is exited (i.e., another menu item is chosen) or the Editor window is closed.

The following sections describe each of the menu items and their associated parameter settings.

# Working Mode

Clicking on the **Working Mode** menu item displays the dialog shown in figure 2-3. When the Parameter Editor opens, this is the window that first appears. This parameter is used to configure the modem/router with the function (role) it is to perform in the network. The first four modes listed are for Vipersat roles, the last four modes are for non-Vipersat roles.

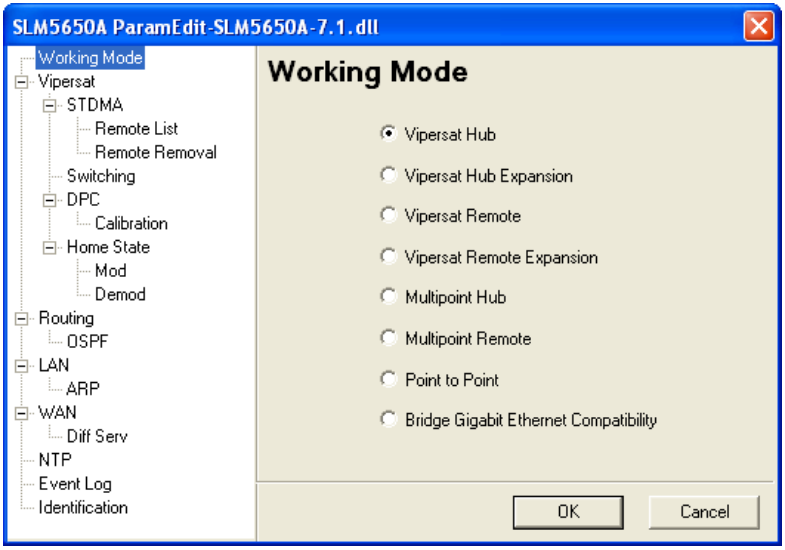


**Figure 2-3** Working Mode dialog

## Role Designation

**Caution:** Only the Vipersat modes are used to configure the target modem to operate in a Vipersat network. Selecting any other mode will remove the unit from the network.

When using the Parameter Editor to configure a modem for operation in an environment other than a Vipersat network, refer to the modem documentation for details on setting the unit's configuration.

A Vipersat unit is a flexible network component able to perform different functions, or roles, depending on how it is used in a network. The network role selected for each Vipersat unit will determine which functions are available for that unit in order for it to perform its role.

When configured as an *Expansion unit*, either as a Hub (switched) or as a Remote (mesh), the modem is set up so that the demod is in SCPC mode and

available as a resource for dedicated communications with the other end of the satellite link.

Table 2-1 lists some typical network functions and the corresponding network role a sample SLM-5650A must have to perform its functions.

**Table 2-1** SLM-5650A Network Functions and Roles

| SLM-5650A Network Function | Hub | Remote | Expansion |
|---|---|---|---|
| Hub TDM / Burst Controller providing STDMA Timing Maps | X | | |
| Hub Switched Demodulator | X | | X |
| Remote STDMA Modem | | X | |
| Remote Mesh Demodulator | | X | X |

# Vipersat

Clicking on the **Vipersat** menu item displays the dialog shown in figure 2-4.

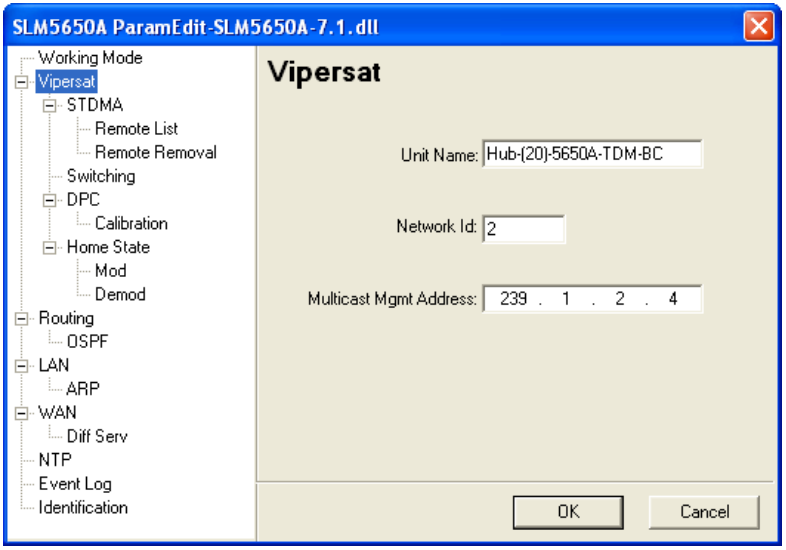


**Figure 2-4** Vipersat dialog

## Unit Name

Enter any name (24 characters or less) for the node which serves to identify the Vipersat unit on the network.

## Network ID

The number entered in the **Network ID** field defines the network of which the target Vipersat unit is a member. All devices in a common network will share the same network ID.

The network ID is used by the VMS to identify Vipersat units within a network and allows the VMS to manage multiple networks, each with its own unique network ID number.

## Multicast Management Address

The **Multicast Management Address** is the IP address assigned to all Vipersat modem units in the network that are managed by the VMS server. This address must match the corresponding Management Multicast Address that is specified for the VMS (in the *Vipersat Manager Properties*) in order for the modem units to receive the maintenance and control packets that are multicast by the VMS.

# STDMA

Clicking on the **STDMA** menu item displays the STDMA dialog, the appearance of which will vary based on whether the unit function is set to *Hub* or *Remote* (as selected from Working Mode), and the chosen allocation method.

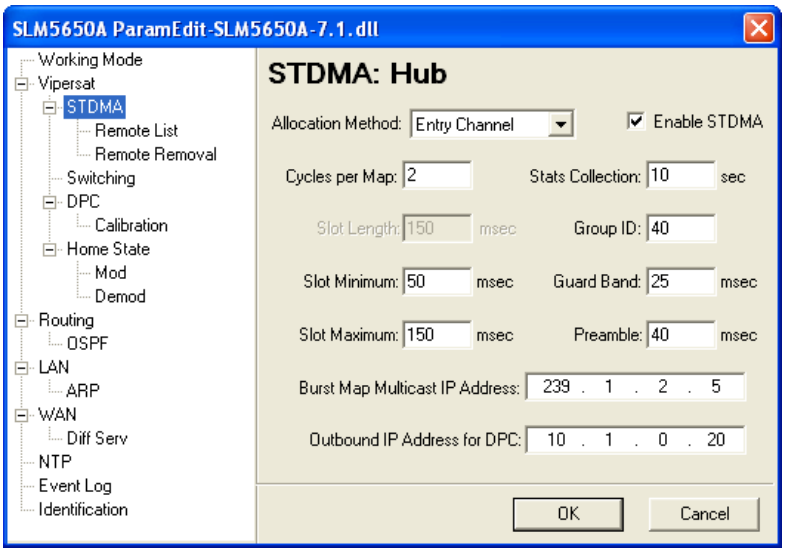


**Figure 2-5** STDMA: Hub dialog

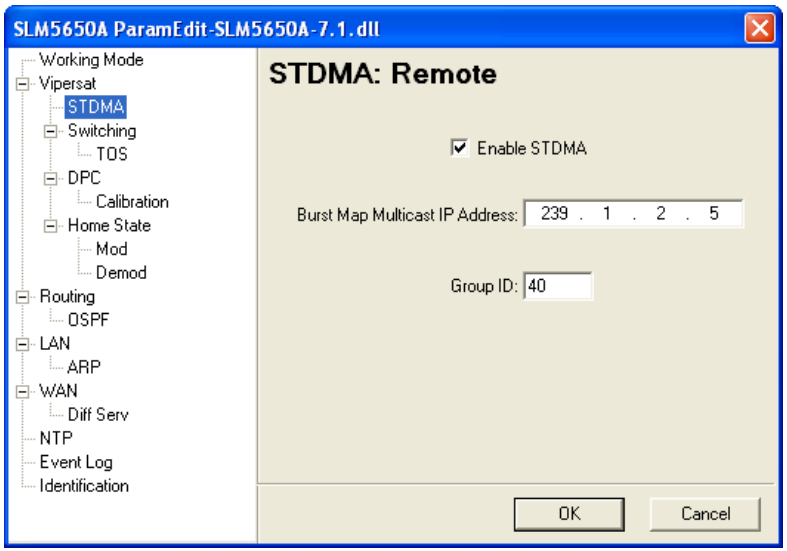


**Figure 2-6** STDMA: Remote dialog

For example, the SLM-5650A shown in figure 2-5 is operating as a Hub, with the allocation method set for *Entry Channel Mode*. Some of the parameter fields may be unavailable for input (grayed out), depending upon the method that is selected. The screen shown in figure 2-6 shows an SLM-5650A being used as a Remote, with only a subset of the fields that appear for a Hub unit.

If the SLM-5650A is being used as an *Expansion unit* — for either a Hub or a Remote — no STDMA menu options are available since it is only used as an SCPC demod.

## Enable STDMA

In order to utilize the Vipersat STDMA feature (burst mode) in this modem, the **Enable STDMA** check box must be selected.

For a Hub STDMA Burst Controller or a Remote STDMA modem, this feature must be Enabled. For a private point-to-point SCPC modem, Hub or Remote, this feature must be Disabled.

## Allocation Method

*Active for Hub modems only*.

When the target SLM-5650A is being used as a Hub, it has five modes of operation which define the method the Burst Controller uses to allocate slot timing.


**Figure 2-7** Burst Slot Allocation Method

Select an STDMA mode of operation for the SLM-5650A from the **Allocation Method** drop-down menu shown in figure 2-7.

- **Fixed -** All Remotes get the same size slot, regardless of each Remote's activity.
- **Dynamic Slot -** Slot size is adjusted each cycle depending on activity during the previous cycle.
- **Dynamic Cycle -** A Dynamic Cycle allows changing the cycle time—and corresponding latency—as loads change, always providing minimum latency for the current traffic load.
- **GIR -** Guaranteed Information Rate allows assigning guaranteed data rates for each Remote in the group within the burst channel.

- **Entry Channel -** Entry Channel Mode provides an immediate acquisition into an SCPC channel upon Remote burst registration.


**Note:** If the Hub STDMA mode is **GIR** (Guaranteed Information Rate) or **Entry Channel**, normal load switching is automatically disabled. In GIR mode, the Remote is switched to SCPC as soon as the GIR threshold is reached, if there is a switch rate defined. In Entry Channel Mode, the Remote is switched to SCPC as soon as the Hub receives the first transmission from the Remote.

The bandwidth allocation method that is selected will determine which of the associated parameters are available and applicable.

### Fixed

In the **Fixed** mode, all Remotes have the same slot size regardless of type of traffic or load. No calculations are made to actively change slot size when operating in this mode.

Fixed mode minimizes the amount of jitter between Remote transmission times, and is useful for tuning STDMA as well as for troubleshooting purposes.

### Dynamic Slot

In the **Dynamic Slot** mode, the slot size for each Remote is computed based on the time (at the current data rate) needed to transmit all the Bytes in Queue. If the result is less than the minimum slot size or more than the maximum slot size, the slot is adjusted accordingly.

This mode allows the Burst Controller to provide additional slot time in the cycle to Remotes with higher traffic demands, increasing throughput and alleviating congestion.

### Dynamic Cycle

In the **Dynamic Cycle** bandwidth allocation method, available bandwidth is allocated to Remotes proportionally based on their current bandwidth needs. The bandwidth requirements are determined by the number of bytes in queue for each Remote divided by the total number of bytes in queue for all Remotes to determine the percentage of bandwidth to allocate for each Remote.

This mode provides improved efficiency of STDMA due to faster cycle times during periods of light traffic demands, thus providing minimum latency for the current load.

### GIR (Guaranteed Information Rate)

In the **GIR** mode, the initial computed slot size value is the same as the Dynamic Cycle mode except there is no maximum limit. After all Remotes have been assigned slots, the burst map is checked to see if the total cycle length exceeds 1 second. If not, then all requirements are satisfied and the burst map is complete. However, if the cycle is greater than one second, then the slots are adjusted proportionally so that all Remotes receive at least their guaranteed rate plus whatever excess is still available.

GIR mode allows guaranteed information rates to be set for each Remote in the group. When the one second restriction is exceeded, Remotes without a specified GIR are reduced to the global minimum slot size and the remaining bandwidth is distributed to Remotes that have been assigned a GIR rate, thus ensuring additional bandwidth for these units when needed.


**Note:** GIR allocations are restricted so that assigned GIR totals cannot exceed the available bandwidth to insure proper bandwidth allocation when the network is overloaded. Attempts to enter a GIR which would result in a spin time of more than one second will error out.

### Entry Channel

The **Entry Channel** Mode (ECM) provides Remotes in the group with a shared channel in which they can gain initial access to the network. Since very small STDMA data rates are required in this configuration, a larger number of Remotes can share the cycle. As soon as the Hub receives an STDMA ACK from the Remote, it initiates an immediate switch to SCPC mode based on the policy set for that Remote. Note that the switch occurs as soon as the Hub receives an ACK even though there may not be traffic at that time. The persistence of the link will be determined by the unit's flag settings.

When choosing Entry Channel as the Hub type for the STDMA Controller, the Auto switching feature must be Enabled on this Hub unit, and switching policies for the Remotes must be configured (refer to the section "Remote List" on page 2-14). Corresponding Remote modems must be configured with Auto switching and Load switching Enabled.

This mode is designed to accommodate the needs of a Remote that will not be continuously connected to the network, but which has the need to be able to make an on-demand connection when required, such as in a mobile application. In the event of a power outage, Entry Channel provides a bandwidth-efficient method for Remotes with low latency requirements to re-enter the network once power is restored.


**Note:** In ECM, the switch occurs as soon as the Hub receives an STDMA ACK from the Remote, even though there may not be traffic at that time.

## Cycles per Map

This menu item, which appears for all Hub types *except Dynamic Cycle and GIR*, displays the number of spin cycles that will occur between each broadcast of the Burst Map by the Burst Controller to the Remotes. One cycle is the amount of time it takes for all Remotes in a group to burst on the common channel. The burst map provides each Remote with its allocated bandwidth and position in the cycle.

For Dynamic Cycle and GIR configurations, the number of cycles per map is automatically set to **1** in order to ensure optimum performance for these Hub types.

## Slot Data Length

This setting specifies the **Slot Data Length** in milliseconds for the Remotes in the group, and represents the amount of data that can be transmitted or received in one spin of the STDMA cycle by each of the Remotes belonging to that group. This is the amount of time that the Remote is provided to send data in the cycle.

Depending on the Hub allocation type that is defined for the modem, the appearance of this setting will vary and may be comprised of one or two parameters:

- *Fixed* – Slot Length
- *Dynamic Slot* – Slot Nominal, Slot Minimum
- *Dynamic Cycle* – Slot Minimum, Slot Maximum
- *GIR* – Slot Minimum
- *Entry Channel* – Slot Length, Slot Maximum

## Group ID

*This field appears for Hub and Remote modems*.

The STDMA **Group ID** number defines a group of equipment which will respond to the output of the Burst Controller. This group is addressable within a network which, in turn, is defined by the network ID number assigned to the SLM-5650A.

Allocation of bandwidth is shared among the Remotes in an STDMA group. Depending on the number of Remotes in a network, a Hub may have multiple Burst Controllers, each with its own set of Remotes. This is accomplished by assigning a unique Group ID number to each controller and its associated Remotes.


**Note:** The STDMA group number and the network ID are independent. There can be multiple STDMA groups within a single network.

## Stats Collection

*This field appears for Hub modem only*.

The Burst Controller monitors statistics in the received ACK from each Remote. The statistics report the fill status of the STDMA buffers. The Burst Controller builds a table of the group and calculates the relative buffer fill for each Remote. It then calculates the length of the Data Slot for each Remote based on the Minimum Slot Size plus a percentage of the Available Bandwidth. Idle Remotes would receive a Data Slot equal to the Minimum Slot size.

In the Dynamic Slot mode, the dynamic range of STDMA is a function of the difference between the Nominal Data Slot size and the Minimum Data Slot size parameters. These parameters are operator selectable. The speed with which STDMA reacts to changes in dynamic load is a function of the **Stats Collection** parameter and the **Cycles per Map** parameter, both of which are also operator selectable.

The value entered in the **Stats Collection** field defines the period of time, in seconds, over which the SLM-5650A will collect statistics. A longer time will average out peak conditions, a shorter time will shorten the VMS reaction time to changing network conditions.

## Guard Band

*This field appears for Hub modem only*.

This field, which appears for all Hub configurations, specifies the length of the Slot **Guardband** in milliseconds for the Remotes in the group. The Slot Guardband is the amount of time between the point when one Remote completes transmitting data and the point when the next Remote in the cycle begins transmitting. This prevents the Remote from overrunning the next terminal in the cycle.

The setting for this parameter should be obtained using the *Vipersat STDMA Calculator*—a free tool available from Vipersat Customer Support.

## Preamble

*This field appears for Hub modem only*.

This field, which appears in all Hub configurations, specifies the current Slot **Preamble** size in milliseconds and bytes for the Remotes in the group. The Slot Preamble is the period between when the Remote begins to transmit (sends an ACK) to the Hub and when the first data packet is sent. This allows time for

signal lock to occur before data is sent, thus preventing data loss. Higher data rates allow for a shorter preamble, since it is easier to achieve signal lock.

The setting for this parameter (default = 0) should be obtained using the *Vipersat STDMA Calculator*—a free tool available from Vipersat Customer Support.

## Burst Map Multicast IP Address

*This field appears for Hub and Remote modems*.

This field is used to define the **IP Address** for the **Burstmap Multicast** that is sent out by the STDMA Burst Controller at the Hub to all of the associated Remotes in that group. This address must be the same for all members of the group. The burstmap is a proprietary message sent from the Hub to all Remotes, at regular intervals, specifying the relative start time and duration for each terminal to transmit.

## Outbound IP Address for DPC

*This field appears for Hub modem only*.

This field, which appears for all Hub configurations, defines the current **Outbound IP Address**. This identifies the Hub device that is supplying the TDM outbound to the satellite. Specifying this address is necessary when configuring a Hub that utilizes a Burst Controller that is a separate device from the TDM modem.

This address must always be defined when the DPC feature is to be used, whether or not the BC and TDM are separate devices. The Outbound IP address will be the same as the Burst Controller IP address when the Burst Controller and the TDM modem are the same device.

## Remote List

This menu item appears under STDMA when the Unit Role is **Hub**, and is used to define and make modifications to the Remotes that belong to the STDMA group for the Hub Burst Controller.

Click the **Add** button to add a new Remote(s) to the list for this Burst Controller. Define the IP Address, Name, and switching policies for the Remote.

An example for an *ECM Hub* is shown in figure 2-8 and figure 2-9. Enter the SCPC Data Rate and the Switch Type to determine when the Remote will switch and the desired starting point for communications. Note that a Data Rate value of **0** will prevent the Remote from switching out of STDMA mode and into SCPC mode.

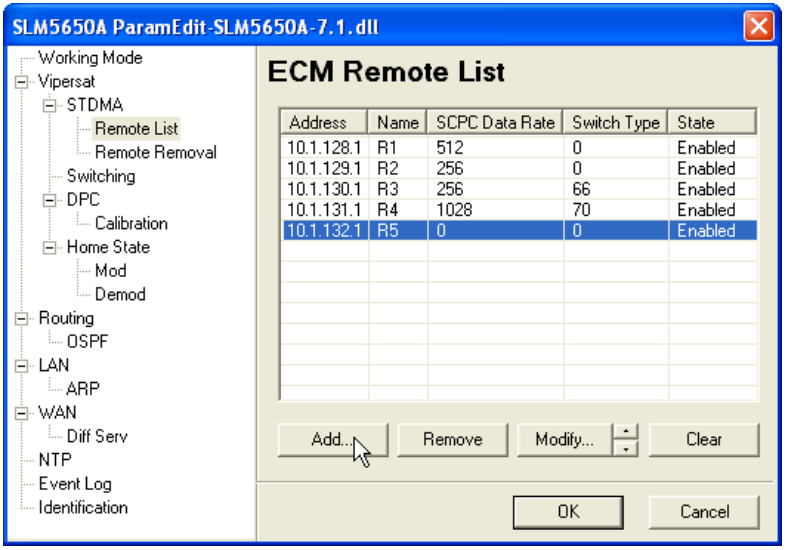


**Figure 2-8** STDMA Remote List dialog

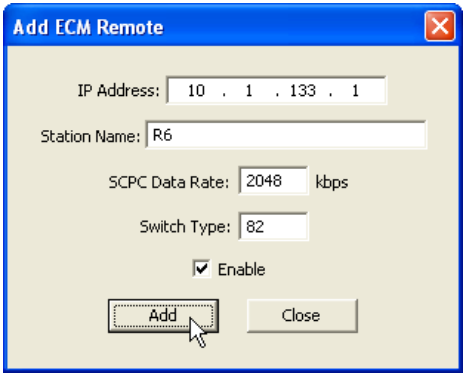


**Figure 2-9** Add STDMA Remote dialog, ECM

For a *GIR Hub*, enter the automatic load Switch Rate and the Guaranteed Information Rate for the Remote. Set the Switch Rate to a value greater than the GIR to allow the Remote to be automatically switched out of STDMA and into SCPC mode when traffic exceeds the GIR. A Switch Rate of **0** will prevent the Remote from being switched out of STDMA and into SCPC mode.

Switch type **0** corresponds to Load Switching. Switch types **64** through **255** are user-defined, and must match VMS policies. When choosing Load Switching as the Switch Type, the associated Remote must have the Load Switching feature Enabled (see the section “Switching” on page 2-17).

After field entry, add this Remote to the list by clicking the **Add** button. Note that the Add Remote dialog remains open after adding a Remote so that additional Remotes can be added easily. Click the **Close** button to return to the List dialog.

When one or more Remotes that appear in the list are selected, the **Remove** and **Modify** buttons become active.

The **Clear** button is used to clear all Remotes from the list.

## Remote Removal

This menu item appears under STDMA when the Unit Role is **Hub**, and is used to define and make modifications to the Remotes that belong to the STDMA group for the Hub Burst Controller.

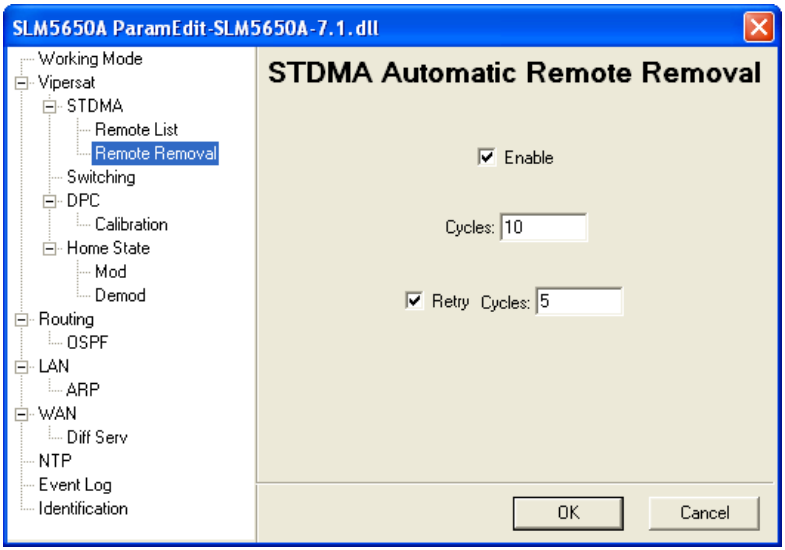


**Figure 2-10** STDMA Remote Removal dialog

Once Enabled (figure 2-10), the value entered for the number of **Cycles** defines the amount of time with no communication from a Remote to the Hub before that Remote is removed from the Burstmap. If communications are lost for this period of time, the Remote is removed from the STDMA group, and the bandwidth resources it had been allocated are then made available for use by the other Remotes remaining in the group.

This feature is useful, for example, in an SNG application where a mobile Remote has finished its assignment and has shut down.

Enabling the **Retry** feature allows specifying the number of Cycles to have pass prior to returning the Remote to the Burstmap for purposes of re-establishing communications.

When a Remote is removed from the STDMA group, entering a value in the Retry Cycles field defines the amount of time that is allowed to pass before a retry attempt is made to return the removed Remote to the group. The Remote is re-entered into the burst map cycle; if the Remote does not burst back (ACK) to the Hub Burst Controller, it is again removed from the Burst Map.

This allows, again using a mobile Remote as an example, shutting down the Remote at one location, moving it to a new location, and then automatically re-establishing a connection to the satellite network.

## Switching

For a detailed description of automatic switching in a Vipersat network, refer to the *Vipersat Management System User Guide*.

Clicking on the **Switching** menu item displays the dialog shown in figure 2-11 (Hub) or figure 2-12 (Remote).

For a unit being used as an Expansion unit, no switching options are available. This type of unit operates in dedicated SCPC mode and all switching control is performed by the VMS.

**Caution:** Load switching must be enabled on all SLM-5650As in a network in order for VMS to utilize load switching when dynamically optimizing network performance as load conditions change.

If the application rate is less than the load, the VMS will not switch. It will, however, set up SHOD (Single Hop on Demand) if the application requires it.

Load switching is an automatic switching function where the system detects variations in data rate and will switch from STDMA to SCPC based on bandwidth requirements. In SCPC mode, additional switching as a result of load variation is determined by the parameter settings that are made here.

Load switching is controlled by both the Hub and the Remote, and thus related commands appear in both windows. The initial switch for a Remote is determined by the Hub Burst Controller. Once the Remote is swiched into SCPC mode, subsequent Load switch requests (Step Up, Step Down) are made by the Remote modem.

Click in the **Enable Load Switching** check box to activate this feature.

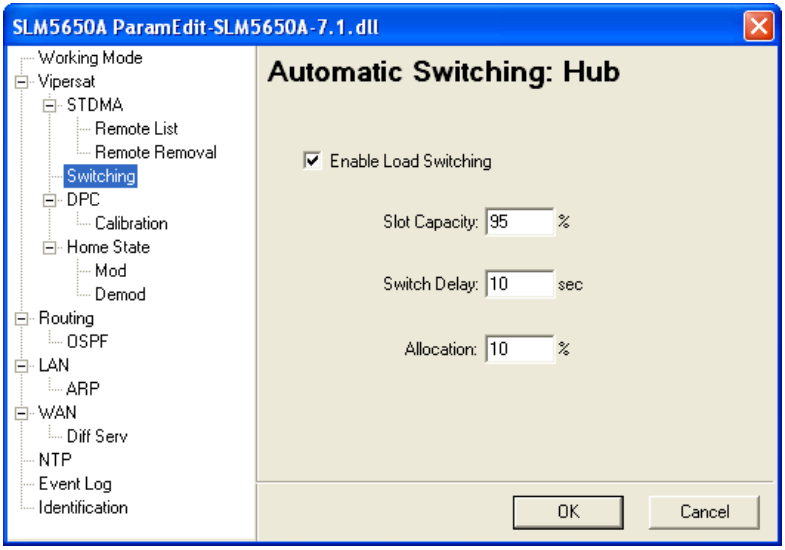


**Figure 2-11** Automatic Switching: Hub dialog

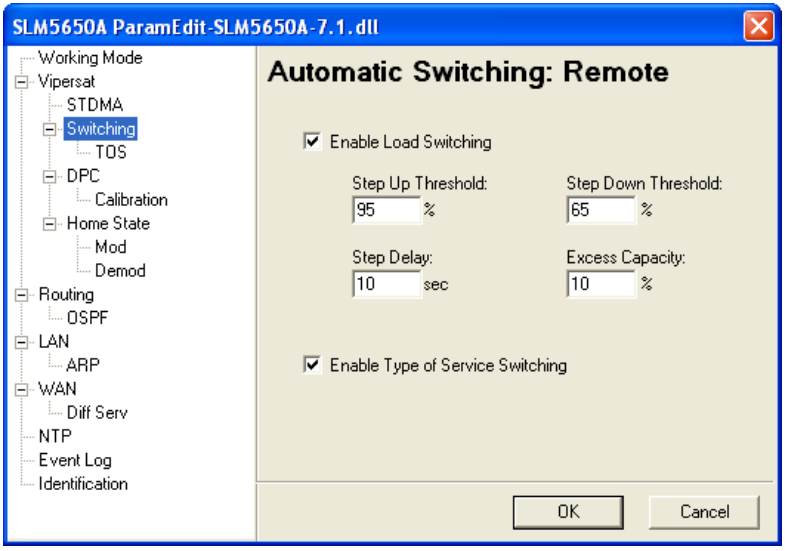


**Figure 2-12** Automatic Switching: Remote dialog

## Slot Capacity

*This field appears for Hub modems only.*

The **Slot Capacity** field allows setting the threshold or level of slot-capacity at which the transmission switches from STDMA mode to SCPC mode.

Typically the default setting will be sufficient, but there may be unique network configurations which require modifying the STDMA slot capacity value.

**Tip:** The VMS provides the means for setting the high and low switch rate limits for each Remote. Refer to the *VMS User Guide* for details.

## Switch Delay

*This field appears for Hub modems only*.

In order to minimize unnecessary switching from STDMA to SCPC due to transient conditions, such as a temporary spike in network traffic for example, the **Switch Delay** field is used to set a delay, in seconds, before a switch occurs.

Typically the default value will be sufficient, but this value can be changed to accommodate a unique network configuration or application.

## Allocation

*This field appears for Hub modems only*.

The **Allocation** field allows adding a fixed percentage to the channel bandwidth request to accommodate additional bandwidth requirements which may occur after a switch is made from STDMA to SCPC mode. This setting provides a means to balance known future bandwidth requirements for the channel against efficient bandwidth utilization.

Typically, the default value will be sufficient and need not be changed unless it is known that there will be a larger bandwidth requirement after the switch. In this case, the allocation value can be increased.

## Step Up Threshold

*This field appears for the Remote modem only*.

The **Step Up Threshold** establishes the percentage of bandwidth use that will trigger a switch up from the present SCPC rate to a higher rate to ensure that there is sufficient bandwidth available for current conditions.

Typically, the default value will be sufficient. Note that this value must be greater than the value specified for the Step Down Threshold.

## Step Down Threshold

*This field appears for the Remote modem only*.

The **Step Down Threshold** establishes the percentage of bandwidth use that will trigger a switch down from the present SCPC rate to a lower rate to ensure efficient bandwidth usage for current conditions.

Typically the default value will be sufficient. Note that this value must be less than the value specified for the SCPC Step Up Threshold.

### Step Delay

*This field appears for the Remote modem only*.

The **Step Delay** feature provides a switching delay period to ensure that a premature switch up or down in the SCPC rate does not occur due to a temporary rise or fall in traffic.

### Excess Capacity

*This field appears for the Remote modem only*.

During each SCPC Step Up switch, the excess capacity data rate value entered by this command is added to the new SCPC data rate. This excess is added each time an SCPC Step Up switch occurs. This setting makes additional bandwidth available for when the demand arises while minimizing Step Up switching events.

## ToS (Type of Service)

This menu item appears under Switching when the Unit Role is **Remote**, and is used to define and make modifications to the ToS switching rules.

Type of Service (ToS) is defined by an eight bit field within an IP packet header that is used to set up per-hop-based QoS rules for prioritizing packets. Because the ToS field remains untouched by most encryption methods, ToS switching provides an alternative means of SCPC switching when encryption prevents the detection of SIP and H.323 protocols.

ToS detection occurs in the Remote modem which only looks at traffic that is passed in the LAN-to-WAN (Remote to Hub) direction. Once the ToS Switch Detection feature is enabled, the Remote modem will send a switch request to the VMS when a packet stamped with the ToS is detected. The request contains the destination IP address of the ToS stamped packet, the desired SCPC rate, and the VMS Switch Type (policy #). If available hardware and bandwidth exist, the VMS will establish the SCPC carrier automatically.

ToS switch detection is controlled by the Remote, and thus appears only in the *Automatic Switching: Remote* dialog where it is Enabled via a check box (figure 2-12).

ToS switch rules are configured by clicking on the **TOS** menu item that appears for Remote modems, as shown in figure 2-13.

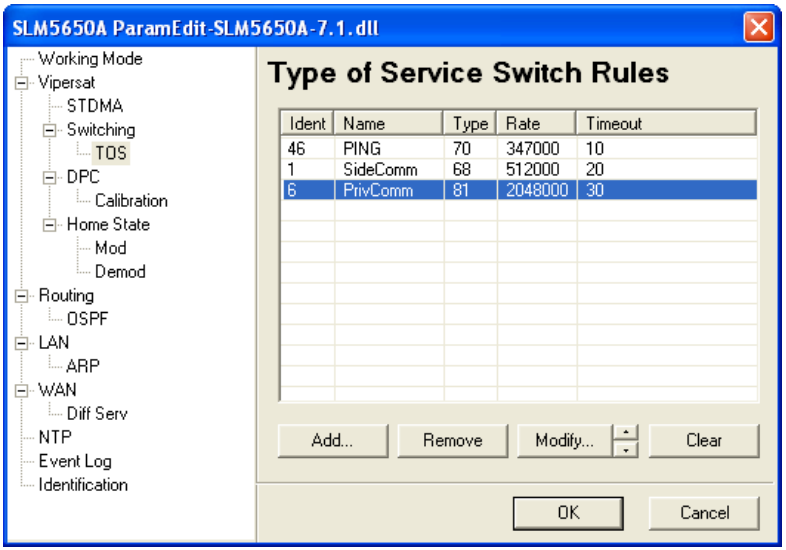


**Figure 2-13** TOS Switch Rules dialog

Click on the **Add** button to add a new ToS rule, using the dialog shown in figure 2-14.

- **Name** – Enter a user-defined text label for circuit identification.
- **Identifier** – Enter an integer value in the range of 1 to 63. Entering a value of **0** will result in no switch.
- **Switch Type** – Enter an integer value in the range of 64 to 254 at the prompt to inform the VMS what switching policy to use. Entering a value of **0** will result in no switch.
- **Switch Rate** – Enter the desired data rate for this service type. Valid entries are from 0 to 155000000 bps. This setting will override the VMS set policy value.
- **Timeout** – This timer monitors the defined packet flow. Once data stops for the duration of the timer setting, the link state will be restored to the Home State condition for this Remote. Valid entries are from 1 to 60 seconds.

After field entry, clicking the **Add** button will update the ToS Switch Rules table with the new configuration. Note that the Add Type of Service Rule dialog remains open after adding a rule so that additional rules can be added easily. Click the **Close** button to return to the ToS dialog.

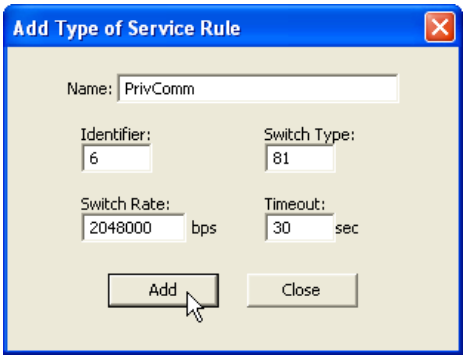


**Figure 2-14** Add TOS Rule dialog

When one or more rules that appear in the list are selected, the **Remove** and **Modify** buttons become active.

The **Clear** button is used to clear all rules from the list.

## DPC

Dynamic Power Control (DPC) is a Vipersat feature that acts to regulate the transmit power of the Vipersat satellite modem, such that the specified receive signal level ($E_b/N_0$) for the Vipersat unit(s) receiving the transmission is met. DPC is driven by the receiver demod, which periodically notifies the transmitting modem of the current $E_b/N_0$ value that it is receiving.

The Dynamic Power Control dialog for a Hub or Remote operating in STDMA mode is displayed in figure 2-15. Note that for an *Expansion unit*, only the first three fields appear in the DPC dialog, and there is no Calibration menu item.

Before enabling DPC, the operator should verify that a demodulator at another terminal is receiving from this modulator, and that there is a working communications channel from that receiving station back to the modulator terminal (In-Band communications). Additionally, since DPC potentially controls the full power range of the modulator's output power, it is recommended that the terminal be commissioned and calibrated before usage.

**Tip:** The DPC feature will not function unless the Outbound IP address is defined in the STDMA dialog for the Hub BC modem. See page 2-14.

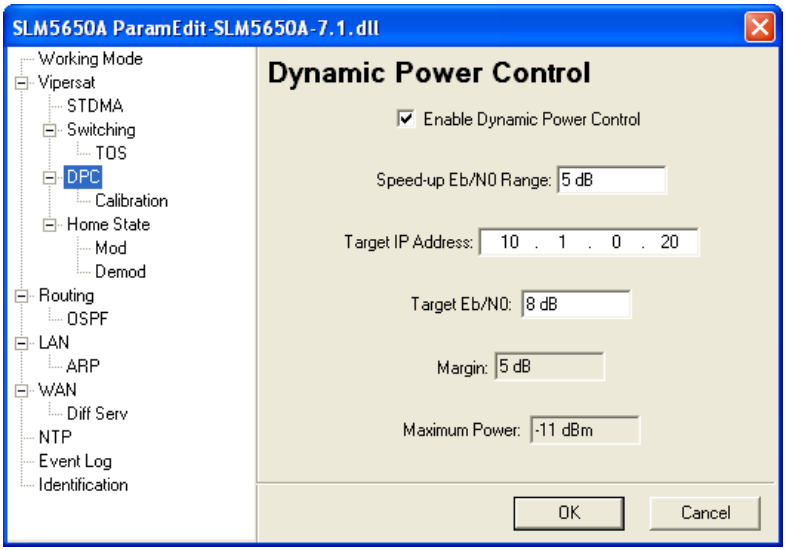


**Figure 2-15** Dynamic Power Control dialog

## Enable Dynamic Power Control

Activate the check box to **Enable Dynamic Power Control** for this unit. The SLM-5650A is shipped with this feature turned off (Disabled) to allow entrance link levels calibration during terminal setup.

## Speed-Up Eb/N0 Range

The **Speed-Up Eb/N0 Range** parameter provides a means of decreasing the power adjustment period when an excessive delta occurs between the $E_b/N_0$ receive level and the target value. This ensures that an optimal receive level is maintained.

Normally, the DPC message is sent every 30 seconds from each terminal in the network. Should the received $E_b/N_0$ level at the demodulator ever fall outside the specified range, the terminal increases its message send rate to every 10 seconds until the receive level is again within the range set value. This provides a speed-up loop to rapidly regain link quality.

The default value for this parameter is 3 dB.

## Target IP Address

The **Target IP Address** identifies the modem that is transmitting to this SLM-5650A, and will be receiving the DPC messages that provide the current $E_b/N_0$ value for this unit. Typically, all Remotes will specify the Hub modem that is supplying the TDM outbound. The Outbound IP address is sent out to all

STDMA Remotes via the Burst Map, and the DPC Target for these Remotes is automatically mapped to that address.

Manually entering the Target IP Address is only necessary for modems that are SNMP managed Out-of-Band and will be utilizing the DPC feature. For In-Band modems, the target addresses are handled automatically by the VMS.

The STDMA Burst Controller is not permitted to specify a DPC Target because the demodulator is receiving multiple bursts very rapidly from all Remotes in the group and is unable to utilize DPC to control the transmit power of the Remote modems. However, the transmit power of the Burst Controller adjusts to meet the target $E_b/N_0$ value for the Remotes in the group.

## Target Eb/N0

The **Target Eb/N0** is the desired operating receive level for closed loop servo control, and is set in the transmit modem. This is the value used for comparison with the actual $E_b/N_0$ from the receiving modem. This information is processed by the transmitting terminal for output power level adjustment as necessary.

The default value for this parameter is 10 dB.

## Margin

The DPC **Margin** value is the offset between the current power level and the upper power limit for the waveform. *This parameter field is read only* in this dialog, and reflects the input setting made by the operator during modem configuration for DPC with either the Web GUI or the CLI.

## Maximum Power

The commissioning of a satellite terminal must comply with the calculated link budget that is conducted before terminal installation. Using these calculations, the maximum transmit power level permitted for the modulator(s) based on link/satellite parameters can be determined. This is the value set by the **Maximum Power** parameter.

*This parameter field is read only* in this dialog, and reflects the result of the Max Power calculation that is performed by the operator during modem configuration for DPC using either the Web GUI or the CLI.

## Calibration

This menu item appears under DPC (*except for Expansion units*), and is used to view the parameters relating to the calibration of the power control function. The **Maximum Data Rate**, **Maximum Coding Rate**, and **Maximum Modula-**

**tion** values are the highest achievable values as determined from the link budgetary calculations performed for this site.

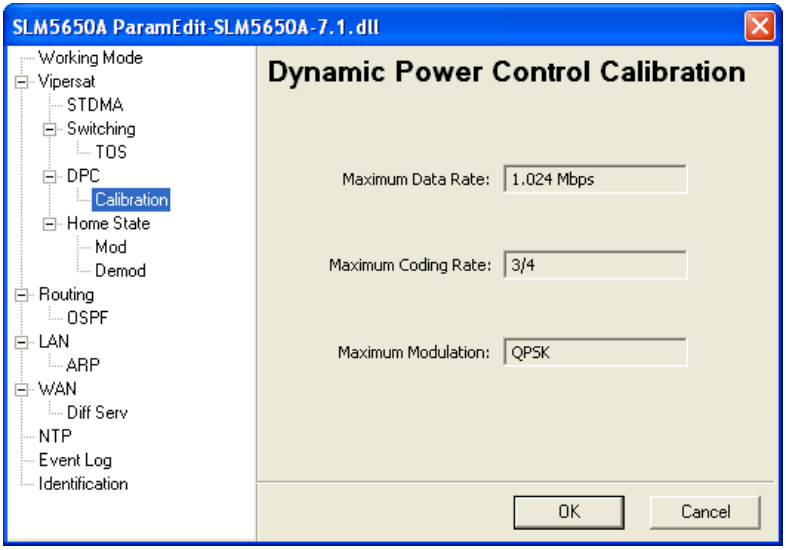


**Figure 2-16** DPC Calibration dialog

*These parameter fields are read only* in this dialog, and reflect the input settings made by the operator during modem configuration for DPC with either the Web GUI or the CLI.

## Home State

A SLM-5650A's Home State consists of those parameters which provide a known RF configuration that the unit will return to, either as the result of a command by the VMS, or as it comes back on line from a reset or a power cycle. These Home State settings are typically selected so that the SLM-5650A goes to a configuration which is optimum for its function in the network.

Click on the **Home State** menu item to access the **Enable** check box (figure 2-17).

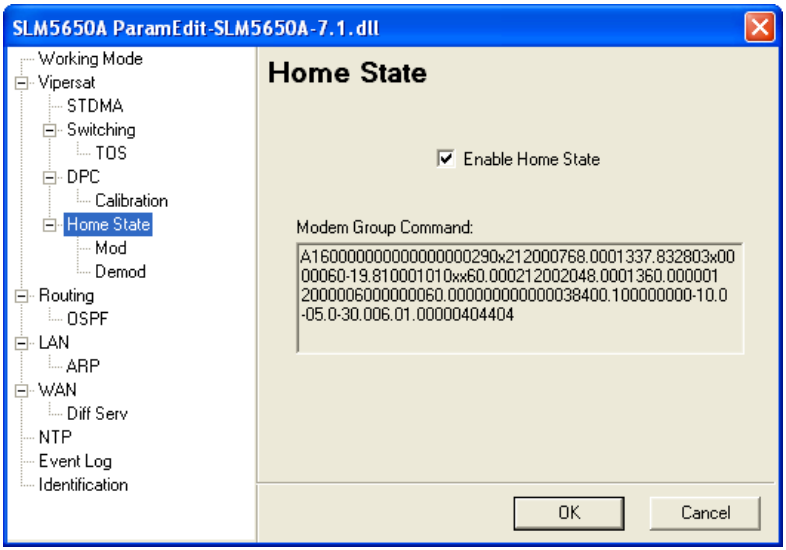


**Figure 2-17** Home State dialog

A superset of the Home State called the Modem Group Command (MGC) is displayed here, containing every base modem parameter including Vipersat.

The Home State consists of both the modulator parameters and the demodulator parameters. Click on the **Mod** and **Demod** menu items for configuration.

## Mod

The transmit parameter settings for the **Modulator** home state are shown in figure 2-18.

Note that the valid range for the Data Rate will vary depending on the Modulation Type and Coding Rate.

When operating in Vipersat mode, the Coding Type must be set to **Turbo** and Coding Rates of 1/2, 2/3, and 1/1 are not valid.

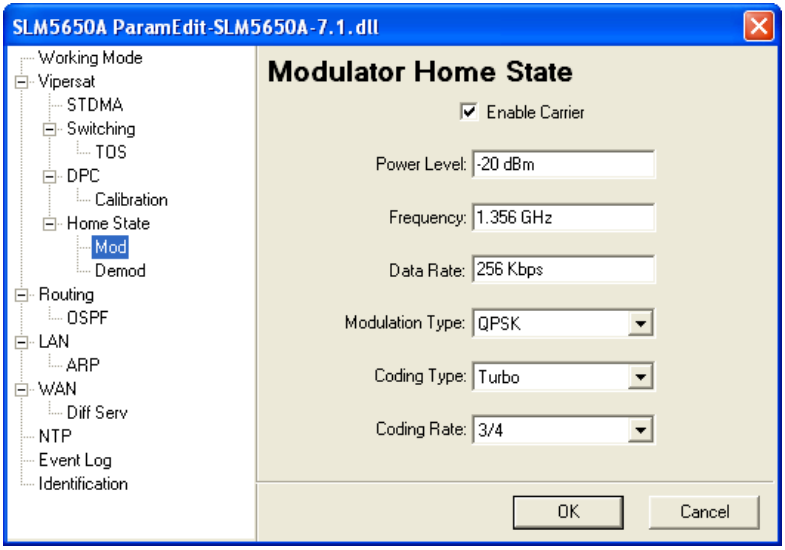


**Figure 2-18** Modulator Home State dialog

## Demod

The receive parameter settings for the **Demodulator** are shown in figure 2-19.

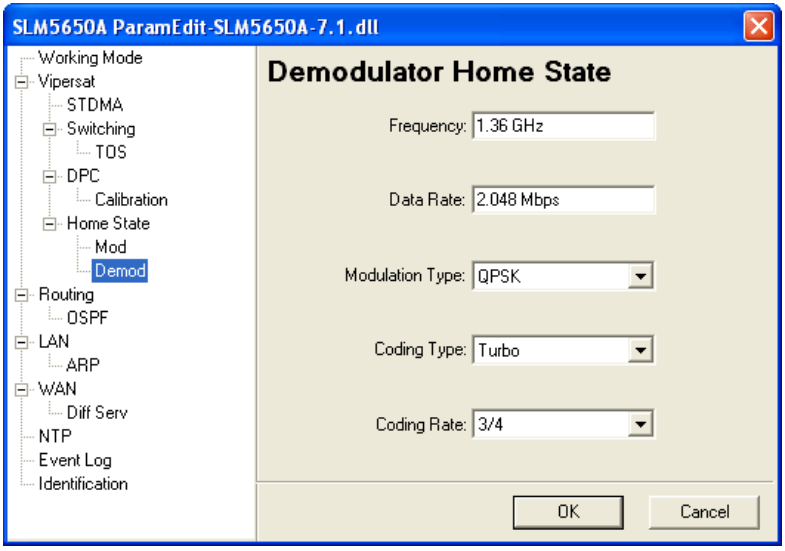


**Figure 2-19** Demodulator Home State dialog

Note that the valid range for the Data Rate will vary depending on the Modulation Type and Coding Rate.

When operating in Vipersat mode, the Coding Type must be set to **Turbo** and Coding Rates of 1/2, 2/3, and 1/1 are not valid.

# Routing

## Routing in a Vipersat Network

SLM-5650A Modem Routers operating in Vipersat mode do not use the Multi-point, Point to Point, or Bridge network modes described in the *SLM-5650A Installation and Operation Manual*. There is no HDLC address in a Vipersat network; instead, the SLM-5650A role designation — Hub or Remote, Expansion unit or not — determines routing rules that prevent multicast loops. This simplifies the configuration of a Vipersat network.

Because satellite networks are often used as extensions for access to services such as the Internet or the PSTN, they lend themselves quite readily to private addressing. For example, to provide Internet access to the satellite network, only the Hub requires a public IP address in order for the entire satellite network that is controlled by the Hub to have access to the Internet backbone. Utilizing Network Address Translation (NAT), the administrator can effectively address the network using a minimum number of static route statements.

**Example**:

The IP address 172.16.0.0 is the private address network number for class B networks. If there is a router at the Hub with a connection to the Internet, the operator can define the local network as a class B. If the operator splits the Class B in half and points the upper half toward the satellite there will be over 16,000 usable addresses at the Hub as well as at the Remotes.

By putting the one route statement “Remotes 172.16.128.0/17 WAN to LAN” in the TDM Hub modem, and by using the route statement “GW 0.0.0.0/0 LAN to WAN” at each of the Remote modems, the network will successfully route packets. The Remotes can then be subnetted as class C networks or below. Additional routers at the Remotes can be added for unusually large sites, allowing an additional layer of NAT without requiring any more explicit routing within the Vipersat Modem Routers.

Refer to the *SLM-5650A Installation and Operation Manual* for additional information on entering routes.

## Creating the Static Routes

The following procedure outlines the basic route structure that the target SLM-5650A will require for its role in the network. One of the key routes that must be created is a default gateway address for routing the data traffic that is received by the unit.

1. From the tree menu, select **Routing** to open the Static Routes dialog.

   The static routing configuration for a typical Hub unit is shown in figure 2-20.

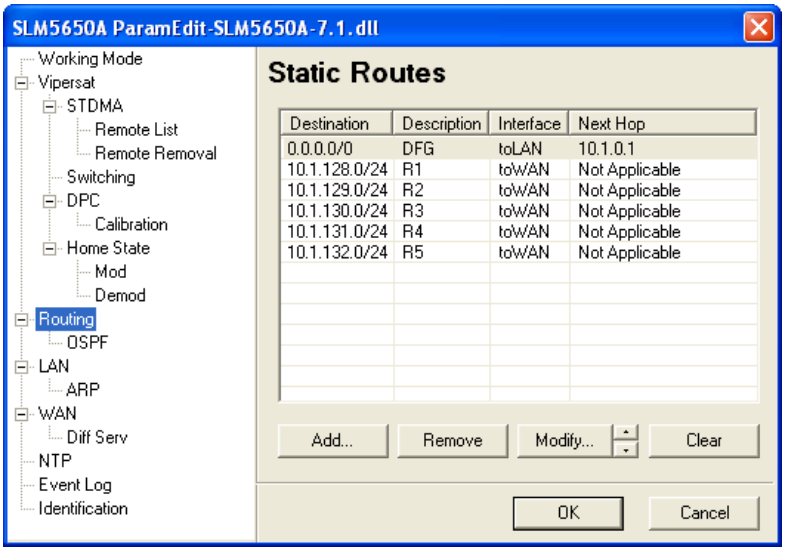


**Figure 2-20** Static Routes: Hub dialog

2. Click on the **Add** button to create the first route that will define the default gateway (figure 2-21).

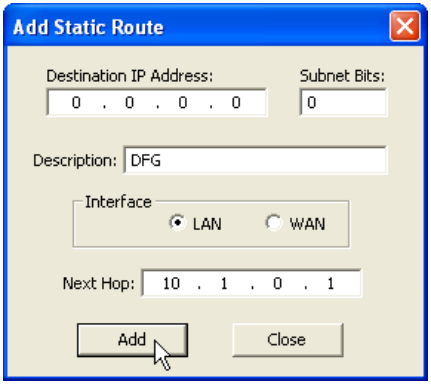


**Figure 2-21** Add Static Route dialog

In a Hub configuration, the default route will typically point to a router on the same LAN as the SLM-5650A Hub unit. In the above figure, that router is specified as the Next Hop address 10.1.0.1.

In a Remote configuration, the default route will typically point to the satellite modem (WAN) used for communications back to the Hub.

3. Enter the **Destination IP Address**, the number of **Subnet Bits** in the subnet mask, the **Description** of the route (GW), the route **Interface** (LAN or WAN), and either the **Next Hop** address (LAN interface) or the **HDLC Address** (WAN interface). The system administrator can supply this information, if necessary.

   In a Hub role, for example, enter the name of the route (e.g., **DFG**), enter **0.0.0.0** for the destination IP address and **0** for the mask, select **LAN** for Ethernet interface, then enter the **IP address** of the appropriate router or modem for the next hop.

   If this Hub unit is providing the TDM outbound, a route statement or statements defining satellite communications with the Remote units must be entered as well. One option is to enter a single super-route that will handle satellite communications with all of the remote subnets.

4. Click on the **Add** button to add the new route to the table.

When one or more routes that appear in the list are selected, the **Remove** and **Modify** buttons become active.

The **Clear** button is used to clear all routes from the list.

5. When all routes have been defined, click on **OK** to save the settings.

## OSPF

The Vipersat OSPF (Open Shortest Path First) feature in the Comtech SLM-5650A modem/router provides for dynamic routing functionality. Route changes from the Hub are broadcast to the Remotes via a dedicated WAN-to-WAN multicast address. Route changes from a Remote are unicast to the Hub. Static routes that are manually entered into the route table by the operator are separate from these dynamic routes and are not managed as part of the OSPF system.

The support for OSPF functionality in the SLM-5650A modem causes routers that are external and connected to the Vipersat satellite network to “see” the entire SLM-5650A network as if it were a single router.

Click on the **OSPF** menu item that appears under Routing (*except for Expansion units*) to access and configure the Open Shortest Path First settings for this unit, as shown in figure 2-22.

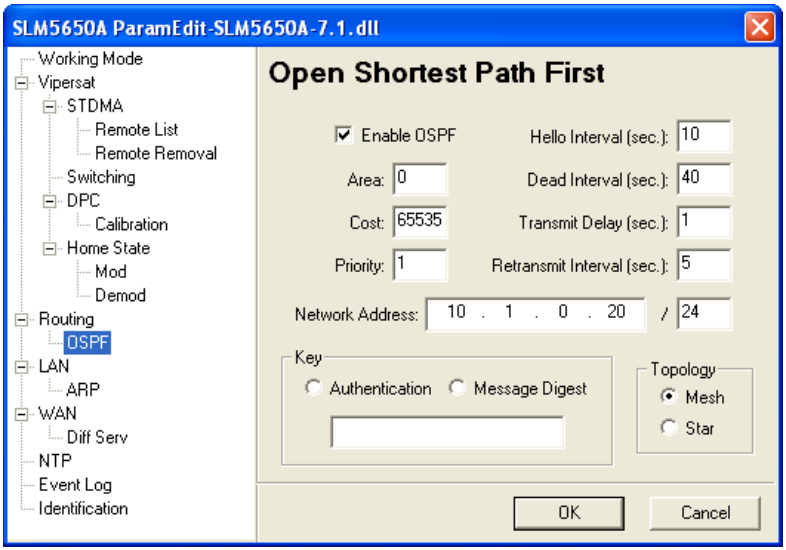


**Figure 2-22** Open Shortest Path First dialog

With the exception of Topology (Mesh/Star), the parameters on this page are used to configure the standard implementation of OSPF.

To activate the OSPF feature for this modem, click in the **Enable OSPF** check box and set the parameter fields as described below. For the majority of networks, the default settings are recommended.

NOTE

**Note:** For systems that are already operating with OSPF, activation of any parameter changes will result in a momentary stopping and re-starting of the OSPF process.

### Network Address

The **Network Address** parameter specifies the IP address of the network at this site. This is the network to be monitored for OSPF changes.

### Area

This parameter specifies the OSPF **Area** for this network. The default value is 0 (backbone). Range is 0-4294967295.

### Retransmit Interval

The **Retransmit Interval** is the timer value for retransmitting Database Description and Link State Request packets. The default value is 5 seconds. Range is 1-65535.

### Transmit Delay

The **Transmit Delay** parameter sets the time period before transmitting the LSA. The default value is 1 second.

### Cost

The **Cost** setting represents the link cost for the specified interface. This value is embedded in the router's LSA metric field and used for SPF calculation.

Default value is 65535. Range is 1-65535.

### Hello Interval

The **Hello Interval** parameter is the timer value for sending the Hello packet on the specified interface. This is a periodic handshake and 'keepalive' message that establishes and tests the link up/down status to determine neighbor reachability.

Default value is 10 seconds. Range is 1-65535.

### Topology

The **Topology** parameter identifies the network type for the specified interface, **Star** or **Mesh**. Note that this setting is only applicable to Hub routers; therefore, this field only appears when the Working Mode is set to either *Vipersat Hub* or *Multipoint Hub*.

In Star mode, route changes at each Remote are only updated in the Hub. In Mesh mode, route changes at each Remote are updated in the Hub as well as distributed to all of the other Remotes.

**Caution:** Setting the Topology for Mesh may require a larger number of routes, with the possibility of exceeding the limit of 270 total routes per modem/router.

### Priority

The higher the value for this setting, the more eligible the router will be to become the Designated Router. The **Priority** is also used for determining a Backup Designated Router. A value of zero (0) eliminates the router from being eligible for the DR or the BDR.

Default value is 1. Range is 0-255.

### Dead Interval

The **Dead Interval** parameter is a timer value used for specifying the period after which a non-responding neighbor is considered dead. Note that this setting must be the same for all routers attached to a common network.

Default value is 40 seconds. Range is 1-65535.

### Authentication Key

Setting the **Authentication Key** requires that all OSPF packets be authenticated, guaranteeing that only trusted routers will be allowed to propogate routing information. This can only be set when the Message Digest Key is not used.

A simple password of up to eight characters can be specified.

### Message Digest Key

The **Message Digest Key** is a security key used to create the message digest, and serves as both CRC (for file integrity) and cryptographic hash function / security encryption (128-bit). This can only be set when an Authentication Key is not used.

Allows a cryptographic password of up to 16 characters to be specified. Note that, if the key type is not first specified, entering a string in the password field will cause this key to be used by default.

### Timeout Function

The Hub maintains a map list of all active Remotes (those sending Hellos).

Each router (SLM-5650A) maintains a counter of missed Hellos for each router (SLM-5650A) at the other end of the WAN (satellite link). This counter is reset to zero (0) upon receipt of a Hello. If the number of missed Hellos multiplied by the *Hello Interval* exceeds the *Dead Interval*, the counter is terminated, that router is removed from the Hub's map list, and any routes that originated from that SLM-5650A are deleted. If/when a subsequent Hello is received from this same modem/router, it is treated as a first Hello and the handshake protocol is initiated once again.

# LAN

Click on the **LAN** menu item to access and configure the local area network settings for this unit, as shown in figure 2-23.

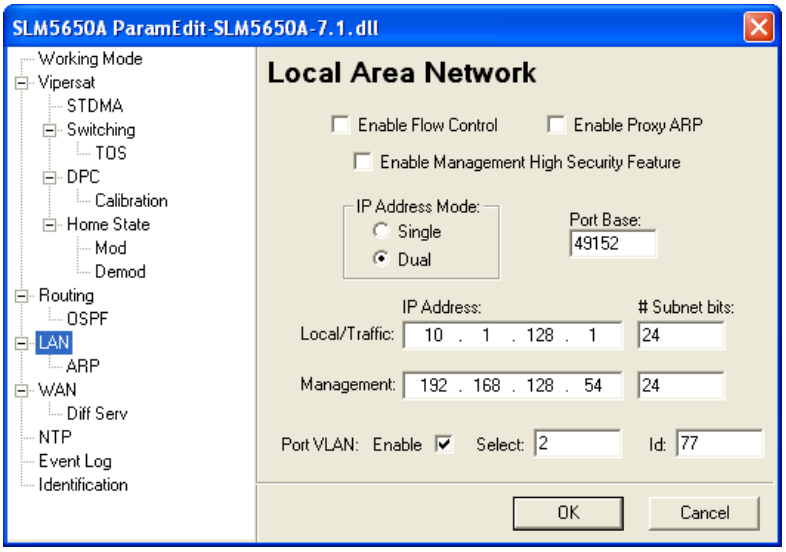


**Figure 2-23** Local Area Network dialog

### Enable Flow Control

Ethernet **Flow Control** allows TCP to manage limited network bandwidth and/or data rate send/receive disparities. With flow control enabled, the receiving host will send a PAUSE frame (IEEE 802.3) to temporarily halt the data transmission when its buffer is overwhelmed. This parameter allows the user to enable or disable the receipt or transmission of PAUSE frames to control the transmit rate.

The SLM-5650A NP interface monitors the QoS queue depths and determines when to send the PAUSE frames for management of data flow traffic.

### Enable Proxy ARP

**Proxy ARP** (Address Resolution Protocol) is a technique by which a device on a given network answers the ARP queries for a network address that is not on that network. Enabling the Proxy ARP feature turns this functionality on in the SLM-5650A which will perform as the proxy between the LAN and the satellite WAN.

### Enable Management High Security Feature

This parameter is used to set the security level to either *Low* (unchecked) or *High* (checked). A High security setting will block CLI and Web GUI modem access, thus preventing unauthorized remote connections.

**Caution:** Once this parameter is *enabled* and activated in the modem, neither the CLI nor the Web GUI can be used to *disable* High Security. Disabling must be performed using the modem's front panel.

### Port Base

The **Port Base** sets the starting IP port addressing for all VMS messages. Changing this address base will affect the entire network requiring configuration changes to all modems. Leave this setting at default 49152 to avoid unnecessary configuration changes. Altering this setting is necessary ONLY if network port addressing is in contention.

### IP Address Mode

The SLM-5650A can be configured for either **Single** or **Dual** IP address mode:

- Choosing *Single* mode sets the modem to accept all traffic—data, VMS, and management—that utilizes the Local IP Address of the Network Processor card for this modem. The Management IP address is ignored.
- Selecting *Dual* mode requires that data and VMS traffic be directed to the Local address, while CLI and Web GUI communications must utilize the Management address of the NP card. This provides additional security for remote connections.

  Note that this mode is also utilized when operating in a redundant configuration; both the online modem and the offline modem must be set for Dual IP addressing. For more information on using the SLM-5650A in redundancy configurations, refer to the pertinent redundancy switch *Installation and Operation Manual*.

Specify the **Local/Traffic IP Address** and subnet mask to be used for the NP card for this modem.

When using *Dual* mode, also specify an independent **Management IP Address** and subnet mask to be used for the NP card for this modem.

### Port VLAN

Enabling the **Port VLAN** feature assigns a specific Ethernet port on the SLM-5650A for use by a specific VLAN independent of the user or system that is attached to the port. All users attached to the port should be members of the same VLAN.

Specify the port for VLAN assignment in the **Select** field (from 1 to 4).

Specify the identity of the VLAN in the **Id** field (2 to 4095).

## ARP

Address Resolution Protocol (ARP) is a low-level protocol used to map IP addresses (Network Layer) to physical MAC addresses (Link Layer) contained on the Ethernet hardware of routers and workstations.

Click on the **ARP** menu item to set static address resolution protocol translations (figure 2-24). Here, an ARP mapping table can be created and modified. Note that, because the Editor is displaying a static modem config file, dynamic ARP table entries do not appear in this dialog.

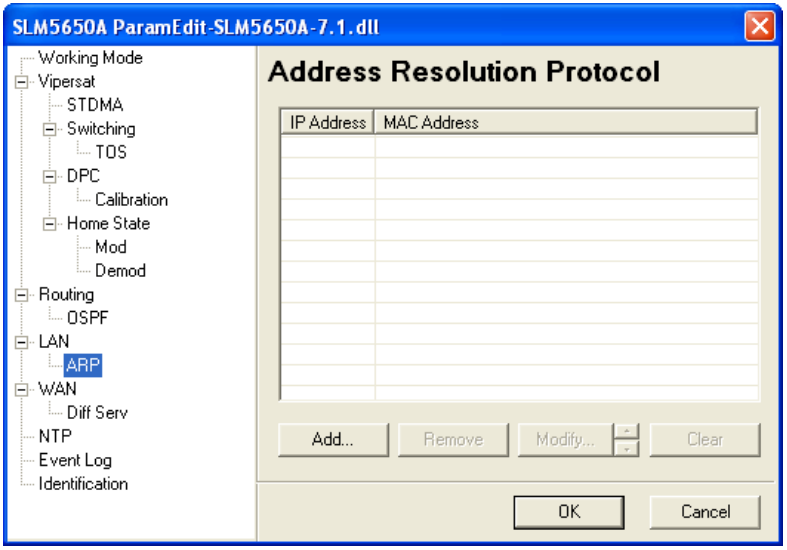


**Figure 2-24** Address Resolution Protocol dialog

Click on the **Add** button to add an entry to the table.

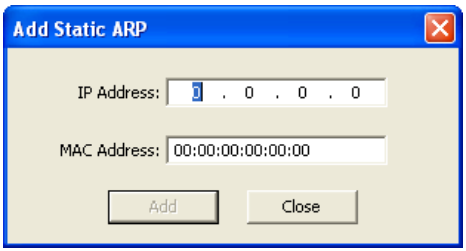


**Figure 2-25** Add Static ARP dialog

When one or more entries that appear in the list are selected, the **Remove** and **Modify** buttons become active.

The **Clear** button is used to clear all entries from the list.

# WAN

The **WAN** menu item is used to set Quality of Service parameters for the wide area network, and to specify the IP address to be used for multicasting internal messages over the satellite network.

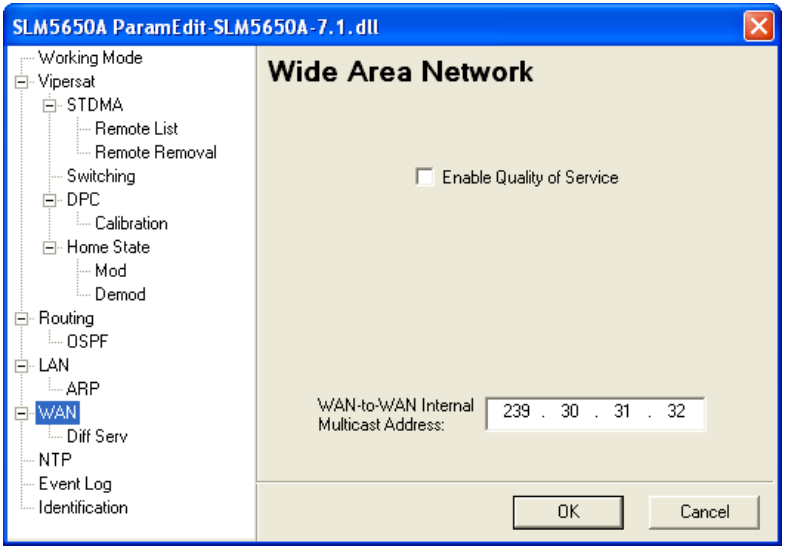


**Figure 2-26** Wide Area Network dialog

## WAN-to-WAN Internal Multicast Address

This multicast address is utilized by the Hub modem units for passing internal messages to the Remotes. Note that these messages are transmitted only over the satellite (WAN) network; they are never passed over the LAN.

One example of this feature is the enhanced performance of return path SCPC switching that results when an assigned Hub expansion unit sends a switching trigger message to the Remote that has issued the switch request.

### OSPF Application

In networks utilizing the OSPF routing protocol, this address serves for the multicasting of dynamic route changes that are passed from the Hub to all of the Remotes.

This parameter must be set to the same address for all modem units in the network. The default setting is 239.30.31.32.

# Quality of Service

For network modems utilizing QoS, activate the **Enable Quality of Service** check box, then click on the **Diff Serv** sub-menu item to configure the Per-Hop Behavior categories.

## Differentiated Services Code Point (DSCP)

The Comtech EF Data implementation of DiffServ uses all six bits of the DSCP (the first six bits of the ToS field in the IP Header) to define the Per-Hop Behavior categories, as shown in table 2-2. There are seven categories for defining Per-Hop Behavior: Class Selector 6, Expedited Forwarding, Assured Forwarding Class 1 through 4, and Default.

**Table 2-2** Differentiated Services, DSCP

| Per-Hop Behavior | Sevice Rate (Kbps) | DSCP | SLM-5650A Priority |
|---|---|---|---|
| Default | Best Effort | 000 000 | 4 |
| Assured Forwarding – Class 1 | Best Effort | 001 xx0 | 3 |
| Assured Forwarding – Class 2 | Variable | 010 xx0 | 3 |
| Assured Forwarding – Class 3 | Variable | 011 xx0 | 3 |
| Assured Forwarding – Class 4 | Variable | 100 xx0 | 3 |
| Expedited Forwarding | 2048.000 | 101 110 | 2 |
| Class Selector 6 | 2048.000 | 110 000 | 1 |

The SLM-5650A will prioritize the traffic based upon the DSCP Class Selector Precedence. The Precedence value, also referred to as the Class, is determined from the three most significant bits in the DiffServ field. The Drop Probabilities are determined by the three least significant bits (note that the LSB is always 0).


**Note:** All traffic that does not have the DSCP Class Selector Precedence defined (000 000) will be placed in the Default Queue and have a Precedence of 0 (lowest priority).

Typically, DiffServ is implemented using exclusively Class Selector DSCP or exclusively Expedited and Assured Forwarding DSCP. The SLM-5650A is fully DiffServ compliant and will work with either DiffServ implementation or with a combination of both.

Select the desired PHB category by clicking on the tab appearances in the Diff Serv dialog (figure 2-27).

The **Service Rate** and **Maximum Queue Depth** parameters are common to all categories and are described below.

### Service Rate

This sets the bandwidth level for the Service Rate to be applied to user-defined classes of traffic flows.

For the top two Per-Hop Behavior categories—*Class Selector 6* and *Expedited Forwarding*—this value represents the maximum average bandwidth guaranteed for the traffic flow and is preset to the channel rate.

For the *Assured Forwarding Classes*, this value represents the minimum average bandwidth guaranteed for the traffic flow and is configurable for Classes 2, 3, and 4.

The two lowest categories—*AFC1* and *Default*—are preset for Best Effort.

### Maximum Queue Depth

This sets the maximum threshold for the average queue depth (buffer) for a particular traffic class, beyond which all packets are dropped. The default setting is the maximum value.

The following pages present the various DSCP PHB category dialogs and accompanying parameter configuration information.

## Class Selector 6

Class Selector Code Points are a set of reserved Per-Hop Behaviors that have a DSCP format of ‘xxx000’, where the three LSBs are 0. **Class Selector 6** (CS6) is so named because it has a Precedence value of 6 (110).

CS6 is the highest priority level in the DiffServ hierarchy for the SLM-5650A and is used exclusivly for management messages.

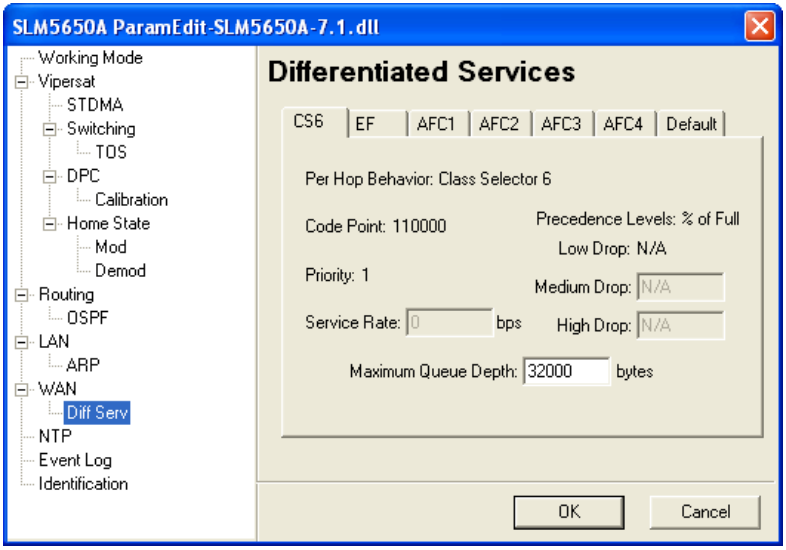


**Figure 2-27** Class Selector 6 dialog

Set the **Maximum Queue Depth**, in bytes, to be used for this Class (range 1500-64000).

## Expedited Forwarding

This class of traffic, forwarded with minimal latency, defines premium service and is recommended for real time traffic applications such as VoIP and video applications.

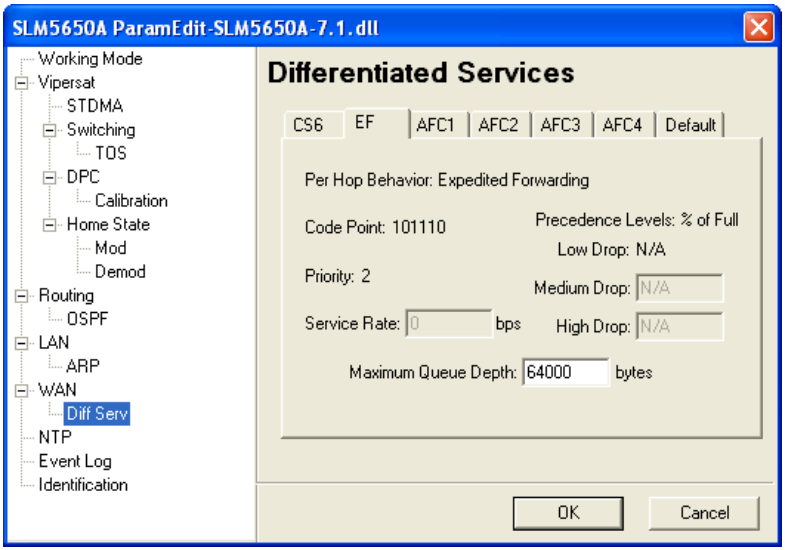


**Figure 2-28** Expedited Forwarding dialog

Set the **Maximum Queue Depth**, in bytes, to be used for this Class (range 1500-64000).

## Assured Forwarding

The **Assured Forwarding** PHB category serves general use traffic flows. This group defines four service levels (Class 1 through Class 4) and also uses the last three bits of the DSCP to define the Drop Probability or Precedence (Low, Medium, or High). The Drop Precedence determines which packets will most likely be dropped during periods of over congestion, similar to Weighted Random Early Detection (WRED). As a result, each of the four AF service levels also have three Drop Precedence levels for which the SLM-5650A provides 12 separate queues.

An IP packet that best conforms to the flow criteria is assigned a Low drop precedence, and thus has a higher probability of delivery during congestion than a packet with a Medium (less conformance) or High (non-conformance) drop precedence. The Low drop precedence level is preset to 100% of full to prevent these packets from being dropped prior to the queue reaching its capacity. Medium and High levels are configurable.

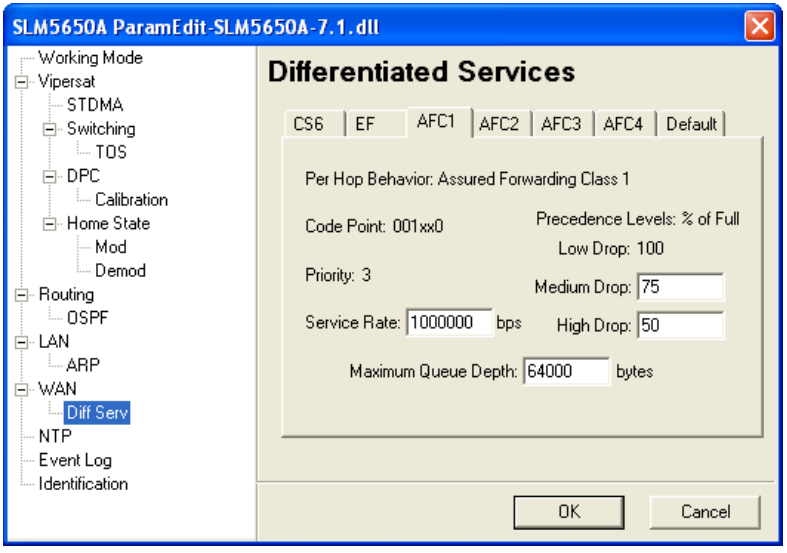


**Figure 2-29** Assured Forwarding dialog

For Class 1 through 3, set the **Service Rate** (0 to Tx Data Rate, bps) and the **Maximum Queue Depth** (1500-64000).

Specify the Precedence Levels for **Medium Drop** (20-90, % full) and **High Drop** (10-80, % full).

Assured Forwarding Class 4 is pre-configured and the parameter fields are not editable.

## Default

**Default** is pre-configured; the parameter fields for this Class are not editable.

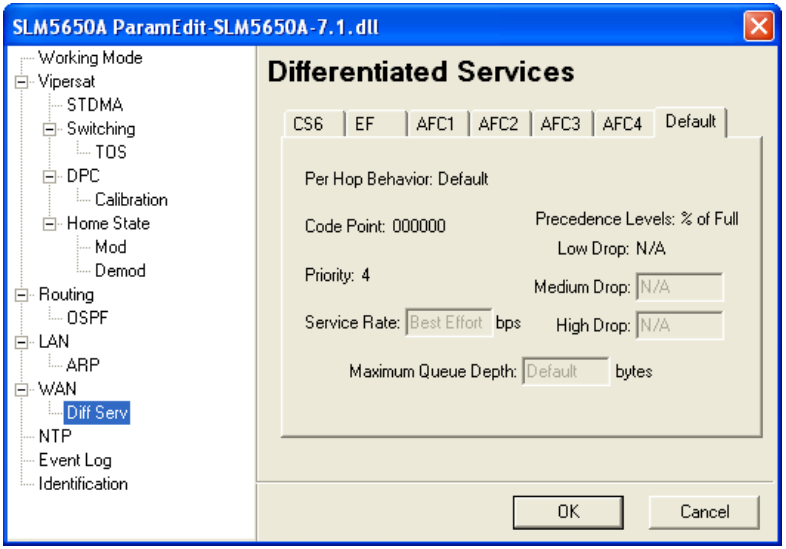


**Figure 2-30** Default dialog

# NTP

The Network Time Protocol (NTP) settings are configured by clicking on the **NTP** menu item (figure 2-31).

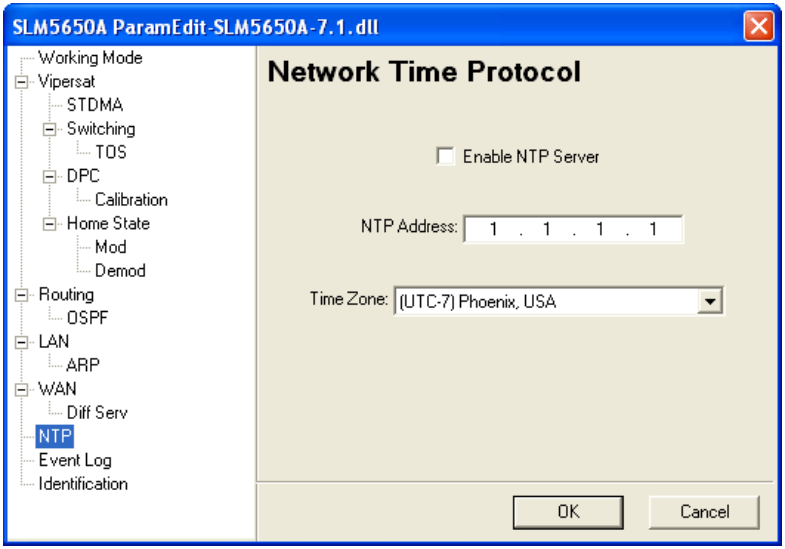


**Figure 2-31** Network Time Protocol dialog

To automatically synchronize with the Internet time, activate the check box for **Enable NTP Server**, then enter the **NTP Address** and the **Time Zone** for the modem location.

# Event Log

Click on the **Event Log** menu item to access the logging level selection. (figure 2-32).

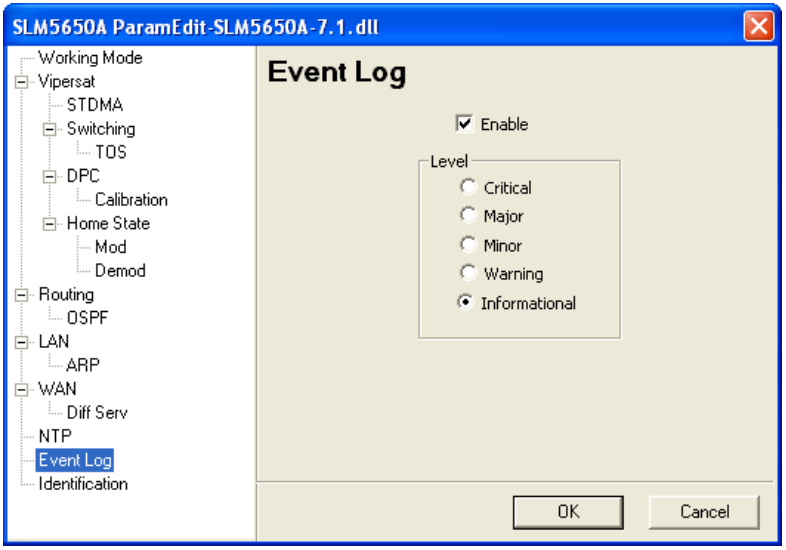


**Figure 2-32** Event Log dialog

The **Enable** selection triggers the logging mechanism for the NP Interface only. It functions as a monitoring/troubleshooting aid to help determine the health of the interface, as well as troubleshoot any issues found in the field. By enabling the logging and setting the **Level**, system events are stored and reviewable through the NP Web interface.

# Identification

Click on the **Identification** menu item to display the current modem information that provides reference data for performing an upgrade (figure 2-33).

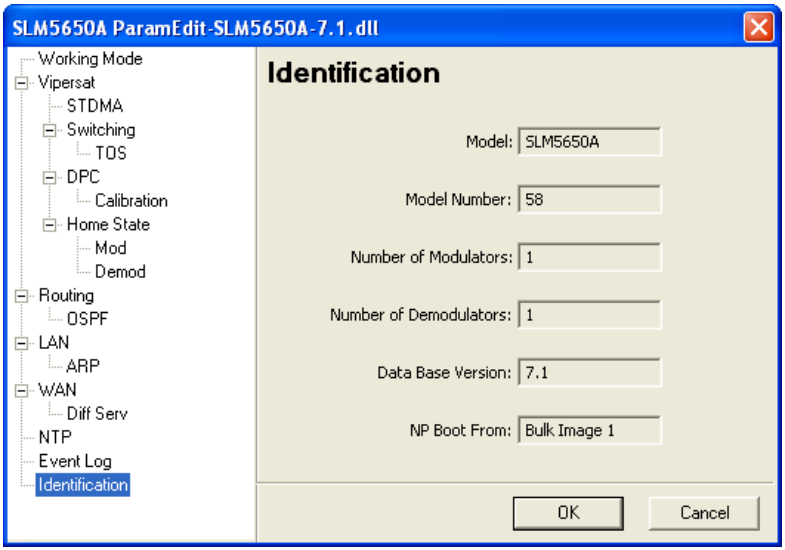


**Figure 2-33** Identification dialog

The fields in this dialog are display only and cannot be edited.

APPENDIX

# A

# GLOSSARY

## A

**ACK** A signal used in computing and other fields to indicate **ack**nowledgement, such as a packet message used in TCP to acknowledge the receipt of a packet.

**ARP** **A**ddress **R**esolution **P**rotocol – A protocol for a LAN device to determine the MAC address of a locally connected device given its IP address. See also MAC.

**ASR** **A**utomatic **S**witch **R**equest – A switch request message generated by older Vipersat modems (e.g., CDM-570/L) that is sent to the VMS to establish a new satellite link or adjust bandwidth between source and destination IP addresses.

## B

**Base Modem** The main component in a satellite communications modem that consists of a circuit board with the modem hardware and firmware and the associated interfaces.

**BER** **B**it **E**rror **R**ate (sometimes **R**atio) – A measure of the number of data bits received incorrectly compared to the total number of bits transmitted.

**BPS** **B**its **P**er **S**econd – A measure of transmission speed. See also Kb/s & Mb/s.

BPSK **B**inary **P**hase **S**hift **K**eying – A digital modulation technique in which the carrier is phase shifted +/-180 degrees (two phases). The most robust of all PSKs, but unsuitable for high data-rate applications when bandwidth is limited due to encoding just one bit per symbol.

BUC **B**lock **U**p **C**onverter – An upconverter so called because it converts a whole band or "block" of frequencies to a higher band. The IF is converted to final transmit frequency for satellite communications. The BUC is part of the satellite ODU/transceiver.

# C

C-Band A frequency band commonly used for satellite communications (and sometimes terrestrial microwave). For terrestrial earth stations, the receive frequency band is 3.7–4.2 GHz and the transmit band is 5.925–6.425 GHz. See also Ku-band.

CDD **C**omtech **D**ata **D**emodulator

CDM **C**omtech **D**ata **M**odem

CIR **C**ommitted **I**nformation **R**ate – The guaranteed minimum bandwidth assigned to a remote terminal.

CLI **C**ommand **L**ine **I**nterface – A mechanism for interacting with a computer operating system or software by typing commands to perform specific tasks.

Codecast A network coding based ad hoc multicast protocol well-suited for multimedia applications with low-loss, low-latency constraints. Because data is streamed with no verification, high delivery ratios are obtained with very low overhead.

CRC **C**yclic **R**edundancy **C**heck – A method of applying a checksum to a block of data to determine if any errors occurred during transmission over communications links.

CXR Carrier – A radio frequency transmission linking points and over which information may be carried.

# D

DAMA **D**emand **A**ssigned **M**ultiple **A**ccess – A process whereby communications links are only activated when there is an actual demand.

dBm **D**eci**b**el referenced to 1 **m**illiwatt.

DES **D**ata **E**ncryption **S**tandard – A federal standard method for encrypting information for secure transmission. The Vipersat system offers 3xDES (Triple DES) for encrypting traffic.

DHCP **D**ynamic **H**ost **C**onfiguration **P**rotocol – An Internet protocol for automating the configuration of computers that use TCP/IP.

DLL **D**ynamic **L**ink **L**ibrary – The implementation of the shared library concept in the Microsoft Windows system.

Down-stream In the direction of the network Remote site(s).

DPC **D**ynamic **P**ower **C**ontrol

DSCP **D**ifferentiated **S**ervices **C**ode **P**oint – The 6-bit field in an IP packet header that is used for packet classification purposes and is the portion of ToS that is detected by Vipersat modems.

DVB **D**igital **V**ideo **B**roadcast

DVP **D**igital **V**oice **P**rocessor – Used in packet voice applications.

# E

$E_b/N_o$ $\mathbf{E_b/N_o}$ is the ratio of $\mathbf{E_b}$ (energy per bit) and $\mathbf{N_o}$ (noise power density per Hz). The bit error rate (BER) for digital data is a decreasing function of this ratio. $\mathbf{E_b}$ is the energy of an information bit measured in Joules or, equivalently, in Watts per Hertz.

# F

FAST Code **F**ully **A**ccessible **S**ystem **T**opology Code – Designation for feature code used by Comtech EF Data for their satellite modems. The FAST method makes it easy to quickly upgrade the feature options of a modem while it is running live in the network, either on site or remotely.

FEC **F**orward **E**rror **C**orrection – A process whereby data being transmitted over a communications link can have error correction bits added which may be used at the receiving end to determine/correct any transmission errors which may occur.

Flash Non-volatile computer memory that can be electrically erased and reprogrammed.

**Forward Path** Transmission path from the Hub site to a Remote site.

**FTP** **F**ile **T**ransfer **P**rotocol – An application for transferring computer files over the Internet. See also TFTP.

# G

**G.729** ITU standard for LD-CELP (**L**ow **D**elay – **C**ode **E**xcited **L**inear **P**rediction) voice encoding at 8 kb/s.

**GIR** **G**uaranteed **I**nformation **R**ate

**Group ID** A number assigned to equipment which defines it as a member of a group when addressed by the VMS burst controller.

**GUI** **G**raphical **U**ser **I**nterface – A form of graphical shell or user interface to a computer operating system or software application.

# H

**H.323** A protocol standard for multimedia communications designed to support real-time transfer of audio (such as voice over IP) and video data over packet networks. Quality of Service is a key feature of H.323. An alternative to SIP.

**HDLC** **H**igh-Level **D**ata **L**ink **C**ontrol – A standard defining how data may be transmitted down a synchronous serial link.

**HPA** **H**igh **P**ower **A**mplifier – The amplifier used in satellite communications to raise the transmit signal to the correct power level prior to transmission to satellite.

**HTTP** **H**yper **T**ext **T**ransfer **P**rotocol – The Internet standard for **W**orld **W**ide **W**eb (**WWW**) operation.

**Hub** The central site of a network which links to a number of satellite earth sites (remotes).

# I

**ICMP** **I**nternet **C**ontrol **M**essage **P**rotocol

**IDU** **Ind**oor **U**nit – In a VSAT system, the satellite modem is referred to as the IDU.

**IF** **I**ntermediate **F**requency – In satellite systems, IF frequencies are usually centered around 70 or 140 MHz (video/TV), or 1200 MHz (L-band).

**IFL** **I**ntra-**F**acility **L**ink – The coaxial cabling used to connect the satellite ODU to the IDU. Carries the inbound and the outbound signals, and the 24 VDC for the LNB.

**Image** A binary firmware file that provides the operational code for the processor(s) in a network unit.

**IP** **I**nternet **P**rotocol – A format for data packets used on networks accessing the Internet.

**ISP** **I**nternet **S**ervice **P**rovider – A company providing Internet access.

**ITU** **I**nternational **T**elecommunications **U**nion

# K

**Kb/s** **K**ilo **b**its per **s**econd – 1000 bits/second. A measure of transmission speed. See also bps & Mb/s.

**Ku-Band** A frequency band used for satellite communications. For terrestrial earth stations the receive frequency band is in the range 10.95–12.75 GHz and the transmit frequency band is 13.75–14.5 GHz. See also C-band.

# L

**L-Band** A frequency band commonly used as an IF for satellite systems using block up/down conversion. Typically 950–1450 MHz Rx, 1250–1750 MHz Tx.

**LAN** **L**ocal **A**rea **N**etwork

**LLA** **L**ow **L**atency **A**pplication

**LNA** **L**ow **N**oise **A**mplifier – An amplifier with very low noise temperature used as the first amplifier in the receive chain of a satellite system.

LNB **L**ow **N**oise **B**lock – A downconvertor so called because it converts a whole band or "block" of frequencies to a lower band. The LNB (similar to an LNA) is part of the satellite ODU/transceiver..

LNC **L**ow **N**oise **C**onverter – A combined low noise amplifier and block down converter, typically with an L-band IF.

LO **L**ocal **O**scillator – Component used in upconverters, downconverters, and transponders for frequency translation (heterodyne) of the carrier signal.

# M

M&C **M**onitor **&** **C**ontrol

MAC **M**edia **A**ccess **C**ontrol – A protocol controlling access to the physical layer of an Ethernet network.

Mb/s **M**ega **B**its per **S**econd – 1 Million bits/second. A measure of transmission speed. See also bps & kb/s.

Modem **Mod**ulator and **dem**odulator units combined.

Multicast Transmitting a single message simultaneously to multiple destinations (group) on the IP network.

Multi-command A command that allows multiple input choices in a single command execution.

# N

NAT **N**etwork **A**ddress **T**ranslation – An Internet standard that enables a LAN to use one set of IP addresses for internal (private) traffic and a second set of addresses for external (public) traffic.

NIC **N**etwork **I**nterface **C**ontroller – The network interface for a PC/workstation that provides Ethernet connectivity. Depending on the computer, the NIC can either be built into the motherboard, or be an expansion card. Some computers (e.g., servers) have multiple NICs, each identified by a unique IP address.

NMS **N**etwork **M**anagement **S**ystem

NOC **N**etwork **O**peration **C**enter – Has access to any earth station installed using the VIPERSAT Management System (VMS). A NOC can remotely interrogate, control, and log network activities.

NP **N**etwork **P**rocessor

# O

ODU **O**ut**d**oor **U**nit – In a VSAT system, the RF components (transceiver) are usually installed outdoors on the antenna structure itself and are thus referred to as an ODU. The ODU typically includes the BUC and LNB, and is connected to the IDU/modem by the IFL cabling.

OSPF **O**pen **S**hortest **P**ath **F**irst – An open standard interior gateway routing protocol used to determine the best route for delivering the packets within an IP network. OSPF routers use the *Shortest Path First* link state algorithm to calculate the shortest path to each node in the network. The Vipersat OSPF feature in the Comtech SLM-5650A modem/router provides for dynamic routing functionality.

# P

PLDM **P**ath **L**oss **D**ata **M**essage – A packet message that is sent by older Vipersat modems (e.g., CDM-570/L) to the VMS every sixty seconds, providing status update and operating parameter information.

PSK **P**hase-**S**hift **K**eying – A digital modulation scheme that conveys data by changing the phase of a base reference signal, the carrier wave. Different PSKs are used, depending on the data rate required. Examples are binary phase-shift keying (BPSK or 2-PSK) which uses two phases, and quadrature phase-shift keying (QPSK) which uses four phases.

PSTN **P**ublic **S**witched **T**elephone **N**etwork – The world's public circuit-switched telephone network, digital and analog, and includes mobile as well as land-line voice and data communications.

# Q

**QAM** **Q**uadrature **A**mplitude **M**odulation – A digital modulation technique in which the amplitude of two carrier waves is changed to represent the data signal. These two waves are 90 degrees out of phase with each other.

**QoS** **Q**uality **o**f **S**ervice

**QPSK** **Q**uadrature **P**hase-**S**hift **K**eying – A digital modulation technique in which the carrier is phase shifted +/- 90 or +/-180 degrees. With four phases, QPSK can encode two bits per symbol—twice the rate of BPSK. However, it also uses twice the power. Also known as 4-PSK or 4-QAM.

# R

**Remote** Satellite earth site that links to a central network site (Hub).

**Return Path** Transmission path from a Remote site to the Hub site.

**RF** **R**adio **F**requency – A generic term for signals at frequencies above those used for baseband or IF.

**RFC** **R**equest **F**or **C**omment – The official publication channel for Internet standards (such as communication protocols) issued by the Internet Engineering Task Force (IETF).

**RIP** **R**outing **I**nformation **P**rotocol

**ROSS** **R**oaming **O**ceanic **S**atellite **S**erver

**RS-232** A common electrical/physical standard issued by the IEEE used for point to point serial communications up to approximately 115 kb/s.

**RTP** **R**eal-time **T**ransport **P**rotocol – A standardized packet format for delivering real-time applications such as audio and video over the Internet. Frequently used in streaming media systems, videoconferencing, and VoIP.

**Rx** **R**eceive

# S

**SCPC** **S**ingle **C**hannel **P**er **C**arrier – A satellite communications technique where an individual channel is transmitted to the designated carrier frequency. Some applications use SCPC instead of burst transmissions because they require guaranteed, unrestricted bandwidth.

**SIP** **S**ession **I**nitiation **P**rotocol – A general purpose protocol for multimedia communications, commonly used for voice over IP (VoIP) signaling. An alternative to the H.323 protocol.

**SNG** **S**atellite **N**ews **G**athering – A satellite uplink van/truck with television crew on location conducting a live report for a newscast.

**SNMP** **S**imple **N**etwork **M**anagement **P**rotocol – A protocol defining how devices from different vendors may be managed using a common network management system.

**SOTM** **S**atellite **O**n-**T**he-**M**ove – The ability of a mobile remote terminal to roam across satellite beams to preserve link integrity and to automatically connect from one satellite and/or hub to another in a global network.

**Star Topology** A network topology which, if drawn as a logical representation, resembles a star with a hub at the center.

**STDMA** **S**elective **T**ime **D**ivision **M**ultiple **A**ccess – A multiple access technique where users time-share access to a common channel with variable-sized time slots allocated on usage.

**Streamload Protocol** A proprietary Vipersat data streaming protocol.

**SUM** **S**tatus **U**pdate **M**essage – A packet message that is sent by newer Vipersat modems (e.g., SLM-5650A) to the VMS every sixty seconds, providing status update and operating parameter information.

# T

**TCP/IP** **T**ransmission **C**ontrol **P**rotocol / **I**nternet **P**rotocol – A standard for networking over unreliable transmission paths. See also UDP.

**TDM** **T**ime **D**ivision **M**ultiplexing – A method of multiplexing that provides the transmission of two or more signals on the same communication path or channel, but at different times by utilizing recurrent timeslots.

TFTP **T**rivial **F**ile **T**ransfer **P**rotocol – A simple file transfer protocol used over reliable transmission paths. See also FTP.

ToS **T**ype **o**f **S**ervice

Tx **T**ransmit

# U

UDP **U**ser **D**atagram **P**rotocol – A standard for networking over reliable transmission paths.

UDP multicast A multicast transmission using the UDP protocol.

Unicast Transmitting information/data packets to a single destination on the IP network.

Upstream In the direction of the network Hub site.

# V

VESP **V**ipersat **E**xternal **S**witching **P**rotocol – A switch-request protocol that allows external VPN equipment and Real-time proprietary applications to negotiate bandwidth requests between any two subnets on a Vipersat network. VESP is used by newer Vipersat modems (e.g., SLM-5650A) to send a switch request to the VMS to establish a new satellite link or adjust bandwidth for an existing link.

VCS **V**ipersat **C**ircuit **S**cheduler – A proprietary satellite communication scheduling system used to schedule Vipersat network resources in support of a variety of high-priority applications such as video conferencing and scheduled broadcasting.

VFS **V**ipersat **F**ile **S**treamer – A file transfer application utilizing UDP and a proprietary Streamload protocol to transmit data across the Vipersat network.

VLoad **V**ipersat **Load** Utility – A comprehensive tool for managing and distributing application, configuration, and identification information for the modem/routers in Vipersat satellite networks.

VMS **V**ipersat **M**anagement **S**ystem – A comprehensive M&C tool providing rapid and responsive control of Vipersat satellite networks. Comprised of client and server components.

VNO **V**irtual **N**etwork **O**perator – A provider of management services that does not own the telecommunication infrastructure. The Comtech Vipersat Network Products' VNO solution allows satellite space segment operators to selectively expose resources in their satellite network to other service providers, customers, or partners.

VoIP **V**oice **o**ver **IP –** The routing of voice communications over the Internet or through any IP-based network.

VOS **V**ipersat **O**bject **S**ervice – The main software service of the VMS application.

# W

Wizard A specialized program which performs a specific function, such as installing an application.

WRED **W**eighted **R**andom **E**arly **D**etection – A queue management algorithm with congestion avoidance capabilities and packet classification (QoS) providing prioritization.

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# INDEX