Management of iDSL ports with the 3092 and 1082 System

Introduction – The iDSL DACS with End-to-End Management

The Model 3092 iDSL DACS system links up to 24 individual iDSL circuits to multiple E1 WAN uplink ports with complete any-to-any DS0 switching DACS. This iDSL DACS combines dual-redundant power supplies, a time-slot cross-connect multiplexer, and a centralized management system into a 1U chassis. The subscriber side connects to industry standard iDSL modems for 64/128/144 kbps service over a single pair. The WAN links accept T1 or E1 network connections and by using the built-in digital cross connect, the Model 3092 grooms with full flexibility any DS0 (64kbps) channel to any other DS0 channel.

Each 64/128/144 kbps iDSL port requires only a single pair of wires for reliable data transmission at ranges in excess of 5.5 km. The 2B1Q line encoding ensures spectral compatibility within existing voice/data bundles. Each WAN port terminates T1/E1 with the any-to-any DS0 mapping. The entire system can be managed through SNMP/HTTP-based management screens.

The Model 3092 offers multiple local and remote management options to aide in operation and deployment. Locally, the RS2323 console port allows VT-100 style access. For remote management access, TELNET, SNMP and HTTP/WEB are offered. All of these management methods are available within the unit and do not require external hardware or software. The Model 3092 will seamlessly integrate into an existing NMS system (e.g. HPOpenView) while supporting local

1082/CPE Configuration for Remote Management - Plug and Play

Introduction

The Patton Model 1082 series iDSL CPE modems are manageable either by internal DIP switches or via the EOC (Embedded Operations Channel) from the centrally installed 3092 DACS. The 1082 is

placed in Plug-&-Play mode by setting the internal DIP switches to Plug-&-Play operation, also known as SNMP Management mode.

The CPE 1082's data rate is automatically set by selecting how many DS0's (64 kbps time slots) are mapped within the 3092. Three data rates may be selected, 64, 128, or 144 kbps and occupy either 1, 2, or 3 DS0's. Thus the 3092 settings automatically set the far DTE rate. No CPE adjustment is required.

In addition to selecting the iDSL modem link data rate, other management features facilitate endpoint network health. For example, collection of statistical data, enabling various test loops, and monitoring for alarms on each link.

For the initial configuration and installation of the 3092, the network administrator uses local management connections first via the RS-232 control port for setting the IP address. Then a direct local connection to the Ethernet port is used to access the HTTP web management pages. A standard browser like IE4 or Netscape available on all PC's today is used to view any and all the web management pages for completing the 3092 configuration in the simplest and quickest way.

Since the Ethernet port with its IP address can connect to any IP network, the entire system—the 3092 and all of the 1082 iDSL CPE modems—are manageable from any location having IP connectivity. The implication is that if it connects to the world-wide IP network known as the Internet, management may be done comfortably and reliably from any world-wide location with only a PC and a web browser. No proprietary software is required so that the training time for network administrators, managers and operators is minimized.
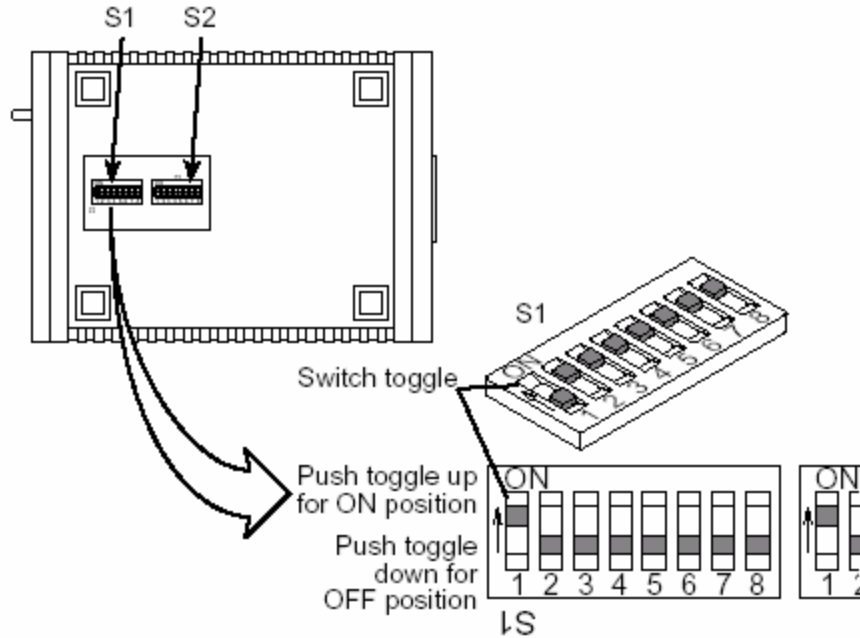
1082 Configuration

Deploying the 1082 is simple:

- Set the DIP switches to the Plug-&-Play mode (for SNMP Management Mode)

- Connect the DSL twisted pair connection, the DTE serial port connection, and finally the power connection.

- Configure the 3092 for the level of service (data rate) desired.

The DIP switches are accessible from the bottom of the CPE units as follows.

The DIP switch definitions DIP Switch S1 are:

S1 Summary Table		
Position	**Function**	**Factory Default**
S1-1 **S1-2**	**SNMP Management Mode for Plug-&-Play** **(or Data Rate)**	**ON Plug-&-Play** **ON Plug-&-Play**
S1-3	DSR during Local Line Loop	ON DSR on
S1-4	Reserved	ON
S1-5	Async/Sync Data Format	Off
S1-6	Tx Clock Source	ON Internal Clk
S1-7	Tx Clock Source	ON Internal Clk
S1-8	Response to RDL Request	ON Enable

The DIP switch definitions DIP Switch S2 are:

S2 Summary Table		
Position	**Function**	**Factory Default**
S2-1	**19.2 or 144 kbps Enable (or SNMP Management Mode for Plug-&-Play)**	**ON Plug-&-Play**
S2-2	Front Panel Switch Disable	Off
S2-3	Response to LAL from DTE	Off
S2-4	Not Assigned	Off
S2-5	Not Assigned	Off
S2-6	Response to RDL from DTE	ON Enabled
S2-7	Compability Mode	Off
S2-8	Not Assigned	off

3092 DACS with Full-featured Management

The 3092 iDSL DACS may be configured either before or after the deployment of the CPE modems. Each DSL link is independently configured for the requirements of the specific remote site. The two steps are

1. Assigning the DS0 mapping (in the **DS0 Mapping** menu) of the 64 kbps time slots to each iDSL Link. The data rate of the CPE 1082 modem is automatically selected by choosing the number of time slots (1, 2, or 3) mapped to the E1 egress port. Example: If only 1 DS0 time slot is selected, the remote CPE operates at a DTE rate of 64 kbps.

2. Activating the iDSL link (in the **iDSL** menu) for each port ready for operation. Select "Activate" for the <u>Desired iDSL State</u> and clicking on "Submit Query."

Beyond configuration and activation of the iDSL data links, link monitoring is critical for maintaining suitable levels of performance. One significant aspect in maintaining performance levels is to identify problems before they are critical or, if critical, to be notified promptly for proper corrective action. To meet this system management need, the 3092 continuously tracks essential performance criteria, summarizes the error statistics for each port, and offers the capability to initiate numerous test modes and configure alarms to alert under poor performance as defined by the network administrator.

The web screen above is a portion of the Port Information Page for one of the iDSL ports. Here is a description of the parameters.

- iDSL Port Current State displays the state of the iDSL link. The states are *deactivate, initializing, reset, hardware failure, local loop-back, remote loop-back, data mode* and *line down.*

- iDSL Port Connected Time shows the total time in seconds which the iDSL port has been connected to the CPE's remote modem.

- iDSL Port Flap Counter indicates the number of times that the iDSL modem circuit has gone down and back up. Each time the modem circuit goes down and back up is one flap. It may be reset to zero when desired.

- Desired iDSL State is a user configurable parameter in order to *deactivate, activate,* or *reset* the iDSL modem circuit.

- Test Mode Select is user controlled for initiating a test loop on the iDSL circuit. The available test loops are *no loop, local loop, remote loop* or *line loop.*

- Line Down Alarm Severity allows the user to configure the severity of the alarm indication when the modem line is down. The severity levels are *minor, major, minor self-clearing, major self-clearing* or *ignoring* any alarm conditions.

- Bit Error Alarm Severity is the configuration of alarm severity based on bit errors. The threshold for this alarm is set by configuring the following parameters:

  o Errored Seconds Alarm Threshold is the number of errored seconds that will occur before an alarm alert is indicated. An errored second occurrence is when 1 to 81 errors occur in one second. An error is defined either when the CRC does not match the calculated CRC or when the line is linked up but lacking synchronization.

  o Severely Errored Seconds Alarm Threshold is the number of severely errored seconds that occur before an alarm alert is indicated. When more than 82 CRC errors occur in one second, it is considered as a severely errored second. The counter for severely errored seconds is not incremented when a second is considered Unavailable.

  o Unavailable Seconds Alarm Threshold is the number of seconds that the iDSL link is unavailable before an alarm alert is indicated. Unavailable indicates the iDSL port is activated but no available for data transmission.

- The iDSL Port Error Statistics are summarized on the same web screen for the current 15 minute interval. Going to the History web page provides a summary of error statistics for the previous 24 hour period in 15 minute intervals.

Each iDSL port includes all the previous information for managing the entire system on a link-by-link basis. Interpreting the information provides the network administrator with the tools and data to maintain the highest level of performance for each end-user and resolve immediate problems in a timely manner when necessary.

SNMP-based Management for Open Standards Platforms -- HPOpenView

SNMP is an open standard which operates with various open management platforms to access all the management parameters in the managed equipment. HPOpenView is one of the most popular management platforms using SNMP for developing a management system for the equipment of various manufacturers. Other commonly used platforms are Solstice or CastleRock. By compiling the MIBS for the desired system, the system can read information from the equipment or command it to change the selected configuration parameters. The 3092 can be managed via HPOpenView or another similar system for a custom management system. The 1082 CPE modems do not require their own MIBS because the 3092 accesses all configuration, statistical and management information via each iDSL links EOC channel in the 3092 as described earlier.