



**TELINDUS**

# **USER and REFERENCE MANUAL**

**Crocus HDSL**

**USER and REFERENCE MANUAL**

Version: 3.2

170429

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This equipment, for safety and hygiene purposes, complies with the specific provisions contained in *ARAB/RGPT 54 quater 3.1* (RD 20 06 1975, Art.1, Section X, Accident Prevention Policy).

## Safety requirements

The interfaces on the Crocus HDSL should only be connected to circuit types as listed below.

Port	Interface	Circuit
screw connector	line	TNV-1
RJ45	onboard G703	SELV
subD	management	SELV

Carefully read the safety instructions at the beginning of *Chapter 2 - Installing and connecting the Crocus HDSL*, page 7.

## Statements



<http://www.telindus.com/products/conformity/>



Hereby, TELINDUS declares that this Crocus HDSL is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.



Bij deze, verklaart TELINDUS dat deze Crocus HDSL is in overeenstemming met de essentiële vereisten en andere relevante bepalingen van Richtlijn 1999/5/EC.



Par la présente, TELINDUS déclare que ce Crocus HDSL est en conformité avec les exigences essentielles et autres articles applicables de la Directive 1999/5/EC.



Hiermit, TELINDUS erklärt daß dieser Crocus HDSL ist in Fügsamkeit mit den wesentlichen Anforderungen und anderen relevanten Bereitstellungen von Direktive 1999/5/EC.



Mediante la presente, TELINDUS declara que el Crocus HDSL cumple con los requisitos esenciales y las demás prescripciones relevantes de la Directiva 1999/5/CE.



A TELINDUS declara que o Crocus HDSL cumpre os principais requisitos e outras disposições da Directiva 1999/5/EC.



Col presente, TELINDUS dichiara che questo Crocus HDSL è in acquiescenza coi requisiti essenziali e stipulazioni attinenti ed altre di Direttivo 1999/5/EC.



Με το παρόν, η TELINDUS δηλώνει ότι αυτό το Crocus HDSL είναι συμμορφούμενο με τις βασικές απαιτήσεις και με τις υπόλοιπες σχετικές διατάξεις της οδηγίας 1999/5/EC.



# Declaration of Conformity

issued according to ISO/IEC Guide 22 and EN45014 under the sole responsibility of the manufacturer

Hereby, TELINDUS nv/sa, manufacturer represented by the authority indicated below, declares that the product:

## Product name

CROCUS HDSL FAMILY

provided that it is installed, maintained and used in the application for which it is intended for, with respect of the “professional practices”, relevant installation standards and manufacturer’s instructions is in conformity to all applicable essential requirements of all applicable directives and conform to the following product specifications:

- EN60950 : 1992 (A1+A2+A3) Class I
- EN55022 : 1994 (A1+A2:1997) Class B
- EN50082-1 : 1992

This declaration is based on the conformity assessment procedure as described in annex II of the **R&TTE** Council Directive **1999/5/EC**.

The product may be connected to the following interface(s):

- X.21
- G.703
- V.35
- V.36
- RS-530

Additional information: This product is conform to the **ETSI** Technical Standard **TS 101 135 V1.5.1**  
The product has been tested in a typical configuration.  
The technical file is kept at the manufacturer’s premises:  
Geldenaaksebaan 335 • B-3001 Leuven • Belgium.

Leuven, 15 May 2000

**Kris Adriaensens**

**R&D Director**

Authority name, function and signature



<b>Statement:</b>	The Crocus HDSL may be used provided that it is installed, maintained and used in the application which it is intended for, with respect to the professional practice, relevant installation standards and manufacturer's instructions (see also CE declaration of conformity).
<b>Destination of use:</b>	The Crocus HDSL allows 2 Mbps data transfer via standard twisted pair cables according to ETSI TS 101 135 V1.5.1.
<b>Interfaces:</b>	The Crocus HDSL may be connected to the following interfaces:  X.21, G.703, V.35, V.36, RS-530.
<b>In case of problems:</b>	Should you doubt or encounter problems with the Crocus HDSL, please contact your dealer for advice.



<b>Verklaring:</b>	De Crocus HDSL mag gebruikt worden op voorwaarde dat het wordt geïnstalleerd, onderhouden en gebruikt voor de toepassing waarvoor het ontworpen is, met betrekking tot het professioneel gebruik, de relevante installatie richtlijnen en de richtlijnen van de fabrikant (zie ook de CE verklaring van conformiteit).
<b>Toepassingsgebied:</b>	De Crocus HDSL laat een data transfer toe van 2 Mbps over standaard twisted pair draden in overeenstemming met ETSI TS 101 135 V1.5.1.
<b>Interfaces:</b>	De Crocus HDSL mag aangesloten worden op de volgende interfaces:  X.21, G.703, V.35, V.36, RS-530.
<b>Bij problemen:</b>	Indien u twijfelt of problemen hebt met de Crocus HDSL, contacteer uw verdeler voor advies.



<b>Déclaration:</b>	Le Crocus HDSL peut être employé à condition qu'il soit installé, entretenu et utilisé dans la fonction pour laquelle il a été conçu, en suivant les règles de pratique professionnelles, les standards d'installation d'application et les instructions du fabricant (voyez aussi la déclaration CE de Conformité).
<b>Domaine d'utilisation:</b>	Le Crocus HDSL permet le transfert de données à 2 Mbps sur des câbles à paires torsadées conformes à ETSI TS 101 135 V1.5.1.
<b>Les interfaces:</b>	Le Crocus HDSL peut être connecté aux interfaces suivantes:  X.21, G.703, V.35, V.36, RS-530.
<b>En cas de problèmes:</b>	En cas de doute ou si vous rencontrez des problèmes avec le Crocus HDSL, veuillez demander conseil à votre revendeur



<b>Erklärung:</b>	Der Crocus HDSL darf benutzt werden, vorausgesetzt, er wird installiert, unterhalten und in der Funktion benutzt für die er entwickelt wurde, in dem die Regeln der Berufsausführung, sowie die vorgeschriebenen Installationsstandards und die Anweisungen des Fabrikanten berücksichtigt werden (siehe hierzu die Konformitätserklärung der EG).
<b>Anwendungsbereich:</b>	Der Crocus HDSL erlaubt 2 Mbps Datenübertragung über übliches verdrehtes Leitungspaar kabel nach ETSI TS 101 135 V1.5.1.
<b>Verbindung:</b>	Der Crocus HDSL darf an die folgende Schnittstellen angeschlossen werden:  X.21, G.703, V.35, V.36, RS-530.
<b>Bei Problemen:</b>	Wenn Sie zweifeln sollten oder Problemen mit dem Crocus HDSL begegnen sollten, bitte verständigen Sie Ihren Händler für Rat.



<b>Declaración:</b>	El <b>Crocus HDSL</b> puede usarse con tal de que sea instalado, mantenido y usado en la aplicación para la cual ha sido destinado, con el respeto de las prácticas profesionales, normas de la instalación pertinentes e instrucciones del fabricante (también vea declaración de CE de Conformidad).
<b>Destino de uso:</b>	El Crocus HDSL permite los datos transfieren a una velocidad de 2 Mbps vía el par trenzado cablegrafía normal según ETSI TS 101 135 V1.5.1.
<b>Interfaces:</b>	El Crocus HDSL puede ser conectado a los siguientes interfaces:  X.21, G.703, V.35, V.36, RS-530.
<b>En el Caso de Problema:</b>	Si duda o encuentra problemas con el <b>Crocus HDSL</b> , por favor pida el consejo de su distribuidor.



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<b>Declaração:</b>	O Crocus HDSL poderá ser fornecido, instalado, mantido e utilizado para a o fim a que se destina, desde que respeite o cumprimento de todos os standards de instalação e directivas do fabricante (consultar declaração de Conformidade da UE).
<b>Declaração de Utilização:</b>	O Crocus HDSL permite dados transferem com uma velocidade de 2 Mbps por cabos de par trançados normais de acordo com ETSI TS 101 135 V1.5.1.
<b>Interfaces:</b>	O Crocus HDSL poderá ter os seguintes interfaces:  X.21, G.703, V.35, V.36, RS-530.
<b>Problemas:</b>	Em caso de dúvida ou se forem detectados problemas com o Crocus HDSL, contactar o seu fornecedor para aconselhamento.

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<b>Dichiarazione:</b>	Il Crocus HDSL può essere usato a condizione che sia installato, mantenuto ed usato nella applicazione per la quale è destinato, con rispetto delle pratiche professionali, degli standard di installazione attinenti e delle istruzioni del costruttore (vedere anche la dichiarazione CE di Conformità).
<b>Destinazione di uso:</b>	Il Crocus HDSL permette trasferimento dei dati ad una velocità di 2 Mbps via paio torto cavi standard secondo ETSI TS 101 135 V1.5.1.
<b>Interfacce:</b>	Il Crocus HDSL può essere collegato agli le seguenti interfacce:  X.21, G.703, V.35, V.36, RS-530.
<b>In Caso di Problema:</b>	In caso di dubbi o problemi di incontro col Crocus HDSL, per favore contatti il Suo rivenditore per consiglio.

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## Preface

### Organization of this manual

This manual contains three main parts.

Part	This part ...
User manual	shows you how to install and connect the Crocus HDSL.
Reference manual	gives more detailed information on the Crocus HDSL. It contains a complete description for lookup purposes.
Annexes	gives additional information.

The following table gives an overview of the chapters in the user manual.

Chapter	This chapter ...
1	introduces the Crocus HDSL.
2	explains how to install and connect the Crocus HDSL. It also describes the front panel LED indicators.
3	introduces and describes the tools with which the Crocus HDSL can be configured. It is in this chapter that the attributes of the Crocus HDSL are introduced. It also shows how to connect the Crocus HDSL to the Telindus Maintenance Application.
4	teaches you the basics to configure the Crocus HDSL, in a step-by-step manner.

The following table gives an overview of the chapters in the reference manual.

Chapter	This chapter ...
5, 6, 7, 8	describes the configuration, status, performance and alarm attributes, respectively.
9	displays and labels the different elements of the Telindus Maintenance Application subsystem picture.
10	gives a firmware download procedure.
11	uncovers the available diagnostic test functions.
12	summarizes the technical specifications of the Crocus HDSL.
13	explains how to replace the fuses.

The following table gives an overview of the annexes.

Annex	This annex ...
Annex A	displays an overview of all the DIP switches of the Crocus HDSL.
Annex B	gives a list of abbreviations.
Annex C	shows ordering information.

## Conventions used in this manual








### Typographical conventions

The following typographical conventions are used in this manual:

The format ...	is used to indicate ...
Normal	normal text.
<i>Italic</i>	<ul style="list-style-type: none"> <li>new or emphasized words</li> <li>file names and directory paths, e.g. <i>C:\Program Files\TMA\bin\Tma.exe</i></li> <li>references to other parts in the manual, e.g. <i>Refer to Chapter xx - Technical specifications.</i></li> </ul>
Narrow	objects and attributes of the containment tree of a device.
<u>Blue underlined</u>	a hyperlink to a web site, e.g. <a href="http://www.telindus.com">http://www.telindus.com</a>

### Icons

The following icons are used throughout the manual.

Icon	Name	Description
	Remark	Useful information or tips.
	Caution	Read the text that follows carefully in order to avoid damage to the device.
	Warning	Read the text that follows carefully in order to avoid injury.
	DIP switch	A configuration attribute which can be set with the DIP switches.
	Basic TMA parameter	A basic attribute which can be found in the Telindus Maintenance Application.
	Advanced TMA parameter	An advanced attribute which can be found in the Telindus Maintenance Application.
	Action	An action which can be executed with the Telindus Maintenance Application.

## **Firmware version**

This manual describes the features, containment tree and attributes of the Crocus HDSL firmware version T2114/01200 (TT) and T2115/00900 (CV).

## **Your feedback**

Your satisfaction about this purchase is an extremely important priority to all of us at Telindus. Accordingly, all electronic, functional and cosmetic aspects of this new unit have been carefully and thoroughly tested and inspected. If any fault is found with this unit or should you have any other quality-related comment concerning this delivery, please submit the Quality Comment Form on our web page <http://www.telindus.com/products/telindus.phtml>.

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# User manual



# 1. Introduction to the Crocus HDSL

This chapter gives an introduction to the Crocus HDSL. The following table gives an overview of this chapter.

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## 1.1 Crocus HDSL features

The Crocus HDSL (High bit rate Digital Subscriber Line) is a baseband modem for E1 digital subscriber lines or private copper networks. It is designed to cover long distances at 2 Mbps over unshielded twisted pairs without the need for expensive repeaters or pair selection. Therefore, the Crocus HDSL re-enhances the value of the installed copper base to a large extent. Furthermore, the Crocus HDSL offers:

- 2 or 3 pair operation (compliant to ETSI ETR 152)
- a flexible data interface adaptation through modular interfaces (RS530, V35, V36, X21, G703, 10baseT Bridge and IP Router)
- extended management possibilities for configuration and inspection purposes
- easy self-test and link-test functions
- flash memory for easy firmware updating
- different powering possibilities (230/115 Vac, 48 Vac or -48 Vdc)
- remote powering possibility
- central site high density card nest solution for up to 30 modems.

## 1.2 Crocus HDSL product overview

Before a detailed product overview is given, the following table explains the difference between a Table Top (TT) and a Card Version (CV):

Version	Specific property	Powering options
Table Top (TT)	This is a stand-alone version of the Crocus HDSL modem.	<ul style="list-style-type: none"> <li>• 230/115 Vac</li> <li>• 48 Vac or –48 Vdc</li> <li>• also exists as Remote Power model (RP Source and Sink)</li> </ul>
Card Version (CV)	<p>This is a card version of the Crocus HDSL modem. This card is inserted in a 19" card nest (CN4).</p> <p>A Card Version Twin incorporates two Crocus HDSL modems on one card. A Card Version Single only one.</p>	<ul style="list-style-type: none"> <li>• powered through the CN4 card nest</li> <li>• also exists as RP Source (by adding a CN4 RP add-on chassis)</li> </ul>

Table 1.1: Table Top (TT) and Card Version (CV) differences

The different Crocus HDSL products are:

Type	Version	Specific property
Crocus HDSL 2P F	TT	Is a 2 Mbps baseband modem which is able to cover long distances over 2 unshielded twisted pair cables.
	CV	Integrates two HDSL 2P F modems on one card (Twin version).
Crocus HDSL 3P F	TT	Increases the covering range of the HDSL 2P F with 15%. This because 3 unshielded twisted pair cables are used.
	CV	Offers a single HDSL 3P F modem in card version.
Crocus HDSL 2P DP F	TT	Is a HDSL 2P F Dual Port modem. It has an onboard G703 interface and the possibility to add a modular data interface (hence dual port).
Crocus HDSL 3P DP F	TT	Is a HDSL 3P F Dual Port modem. It has an onboard G703 interface and the possibility to add a modular data interface (hence dual port).

Table 1.2: Crocus HDSL product overview



Note that ...

- all Crocus HDSL modem types are available as a Table Top version.
- the Crocus HDSL xP DP does not exist in a Card Version.
- the Crocus HDSL 2P F CV only exists in a Twin version.
- the Crocus HDSL 3P F CV only exists in a Single version.

### 1.3 DTE interface overview

A complete range of plug-in DTE interface modules makes the Crocus HDSL ideal for interfacing with almost any application. Not only traditional serial interfaces such as V35, V36, RS-530 and X21, but also G703 and direct Ethernet 10BaseT connections with integrated bridge or router functionality are available.

The following table gives you an overview of which interfaces can be used in which Crocus HDSL type:

Crocus HDSL xP		Crocus HDSL xP Dual Port	
Interface name	Interface type	Interface name	Interface type
RS530	transparent (2 Mbps) or Nx64 kbps (up to 2 Mbps)	RS530	Nx64 kbps (up to 2 Mbps)
V35	transparent (2 Mbps) or Nx64 kbps (up to 2 Mbps)	V35	Nx64 kbps (up to 2 Mbps)
V36	transparent (2 Mbps) or Nx64 kbps (up to 2 Mbps)	V36	Nx64 kbps (up to 2 Mbps)
X21	transparent (2 Mbps) or Nx64 kbps (up to 2 Mbps)	X21	Nx64 kbps (up to 2 Mbps)
Bridge	transparent (2 Mbps) or Nx64 kbps (up to 2 Mbps)	Bridge	Nx64 kbps (up to 2 Mbps)
Router	transparent (2 Mbps) or Nx64 kbps (up to 2 Mbps)	Router	Nx64 kbps (up to 2 Mbps)

Table 1.3: DTE interface overview

All these DTE interface modules can be exchanged in only a few seconds.



A Crocus HDSL xP Dual Port can be configured to act as a regular Crocus HDSL xP (i.e. without the Dual Port functionality). In that case, the modular interfaces used in the Crocus HDSL xP can also be used in the Crocus HDSL xP Dual Port.

## 1.4 CN4 card nest

The Telindus CN4 card nest is based on a standard card nest which fits in a standard 19" rack. The CN4 card nest can hold up to 15 cards. It can be powered with:

- -48 Vdc (no power modules required)
- 230/115 Vac (one or two power module(s) required)
- both -48 Vdc and 230/115 Vac (for back-up purposes).

The CN4 card nest supports the complete Crocus range.

For more information on the CN4 card nest, refer to the CN4 manual.

## 1.5 Management overview

The Crocus HDSL can be configured on three levels:

- A set of DIP switches is provided, setting the basic configuration for the Crocus HDSL. Most DIP switch settings can be overruled by the Telindus Maintenance Application.
- The Telindus Maintenance Application (TMA) is a free Windows® based software package which enables the user to maintain the Crocus HDSL. All configuration, status and performance attributes can be accessed for both the local and remote modem.
- The Crocus HDSL can be connected to an Orchid 1003 LAN management concentrator. This allows a number of management solutions like management under HP OpenView®.

## 2. Installing and connecting the Crocus HDSL

First this chapter gives some important safety instructions. Then it explains how to install and connect the Crocus HDSL TT and CV.



You are advised to read this chapter in a sequential manner, from the beginning to the end, without skipping any part. By doing so, your Crocus HDSL will be completely installed and ready for configuration when you reach the end of this chapter.

The following table gives an overview of this chapter.

Section	Title	Page
2.1	Safety instructions	8
2.2	Unpacking	8
2.3	Selecting a site	9
2.4	Installation and connection precautions	9
2.5	Connecting the Crocus HDSL Table Top	10
2.6	Connecting the Crocus HDSL Card Version	16
2.7	Front panel LED indicators	20

## 2.1 Safety instructions



### **IMPORTANT SAFETY INSTRUCTIONS**

Unplug the unit from the wall power outlet or remove it from the card nest before installing, adjusting or servicing.

The safety of this product depends upon the third pin (ground pin) of the 3-wire grounding type plug. Do not defeat this safety feature. If the power outlet at your site only has 2 pins, please consult a qualified electrician.



### **ACHTUNG! WICHTIGE SICHERHEITSINSTRUKTIONEN**

Vor sämtlichen Arbeiten am Gerät (Installation, Einstellungen, Reparaturen etc.) sollten Sie den Netzstecker aus der Steckdose ziehen.

Die Sicherheit dieses Gerätes ist abhängig von dem dritten Kontakt (dem Erdungspin) des 3-poligen Steckers. Beachten Sie unbedingt diesen Sicherheitsstandard. Sollten Sie nur eine ältere 2-polige Steckdose zur Verfügung haben, lassen Sie diese von einem Elektriker gegen eine 3-polige Steckdose austauschen.



### **SAFETY WARNING**

To avoid damage to the unit, please observe all procedures described in this chapter.



### **SICHERHEITSBESTIMMUNGEN**

Um eine Beschädigung des Gerätes zu verhindern, beachten Sie bitte unbedingt die Sicherheitsbestimmungen, die in diesem Abschnitt beschrieben werden.

Ensure that the unit and its connected equipment all use the same AC power and ground, to reduce noise interference and possible safety hazards caused by differences in ground or earth potentials.

## 2.2 Unpacking

Rough handling during shipping causes most early failures. Before installation, check the shipping carton for signs of damage:

- If damaged, please place a claim with the carrier company immediately.
- If undamaged, do not dispose of it in case you need to store the unit or ship it in the future.

## 2.3 Selecting a site



### **WARNING**

Always place the unit on its feet without blocking the air vents.

Do not stack multiple units directly onto each other, as stacking can cause heat build-up that could damage the equipment.



### **ACHTUNG**

Stellen Sie das Gerät niemals seitlich, sondern nur auf den Füßen auf und achten Sie darauf, daß die Lüftungsschlitze an der Seitenverkleidung frei bleiben.

Stapeln Sie nicht mehrere Geräte direkt übereinander, dies kann zu einem Hitzestau führen.

Install the unit in an area free of extreme temperatures, humidity, shock and vibration. Position it so that you can easily see and access the front panel and its control indicators. Leave enough clearance at the back for cables and wires. Position the unit within the correct distances for the different accesses and within 2m of a power outlet.

## 2.4 Installation and connection precautions



### **ESD WARNING**

The circuit boards are sensitive to electrostatic discharges (ESD) and should be handled with care. It is advisable to ensure an optimal electrical contact between yourself, the working area and a safety ground before touching any circuit board. Take special care not to touch any component or connector on the circuit board.



### **EMC WARNING**

#### **EMC compliant installation**

The complete Crocus family and the CN4 card nest are fully EMC compliant. Because of the modular structure of the CN4 card nest, all unused slots (power slots, modem slots and interface slots) have to be covered with the appropriate blanking modules at installation time.

To ensure compliance with EMC directive 89/336/EEC, shielded cables or ferrite beads have to be used.



### **NOTE**

This unit may be powered by an IT power system.



### **ANMERKUNG**

Das Gerät kann gespeist werden durch ein IT power System.

## 2.5 Connecting the Crocus HDSL Table Top

This section explains how to connect the Crocus HDSL TT. The following table gives an overview of this section.

Section	Title	Page
2.5.1	Table Top connections	11
2.5.2	Connecting the power supply	12
2.5.3	Voltage selection – 230/115 Vac	13
2.5.4	Signal and protective ground interconnection	13
2.5.5	Connecting the lines to the Table Top	14
2.5.6	Inserting the DTE interface in the Table Top	15

### 2.5.1 Table Top connections

All the connections have to be made at the back of the Crocus HDSL Table Top. The following figures give a rear view of the Crocus HDSL TT.

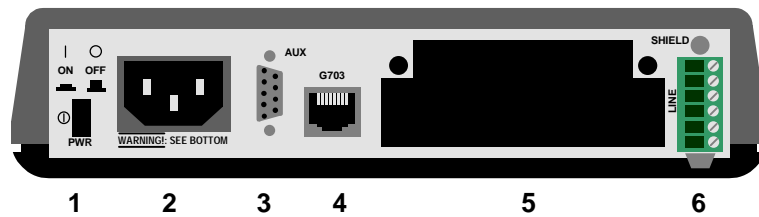


Figure 2.1: Rear view of the Crocus HDSL TT Dual Port – 230/115 Vac model

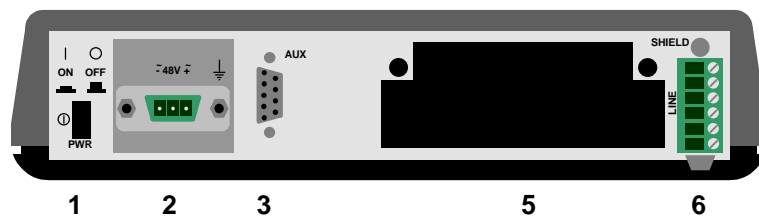


Figure 2.2: Rear view of the Crocus HDSL TT – 48 V model

The following table labels the different parts located at the rear of the Crocus HDSL.

Number	Part
1	power switch
2	power inlet
3	auxiliary connector
4	onboard G703 interface connector (Dual Port model only)
5	DTE interface slot
6	line connector

Table 2.1: Rear view of the Crocus HDSL TT – parts table

## 2.5.2 Connecting the power supply

The following table explains how to connect the power supply. The Crocus HDSL TT exists in two different models:

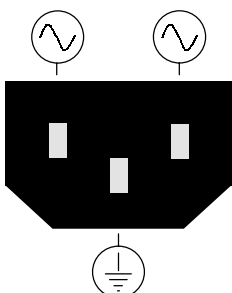
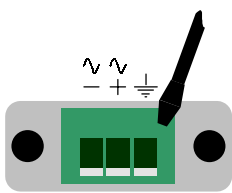
TT model	Connector type	Connecting the power supply
230/115 Vac	standard IEC power supply connector 	For a 230/115 Vac model, connect the standard IEC power supply connector to the power inlet. Refer to <i>Figure 2.1: Rear view of the Crocus HDSL TT Dual Port – 230/115 Vac model</i> .
-48 Vdc or 48 Vac	48 V power supply connector 	For a 48 V model, a power supply connector is delivered with the Crocus HDSL: <ul style="list-style-type: none"> <li>For a -48 Vdc connection, the + and - indications are with respect to each other, not to ground level. This means that for a standard -48 Vdc connection, the ground has to be connected to +, while the negative voltage has to be connected to the -.</li> <li>For a 48 Vac connection, the power supply has to be attached to the connectors indicated with ~.</li> </ul> When the 48 V power supply connector is wired, connect it to the power inlet. Refer to <i>Figure 2.2: Rear view of the Crocus HDSL TT – 48 V model</i> .

Table 2.2: Connecting the power supply

### 2.5.3 Voltage selection – 230/115 Vac

You can switch between 230 Vac and 115 Vac operation with the voltage selection switch SW3. The position of the switch on the TT motherboard is indicated on the figure below.



The default position of this switch is 230 Vac.

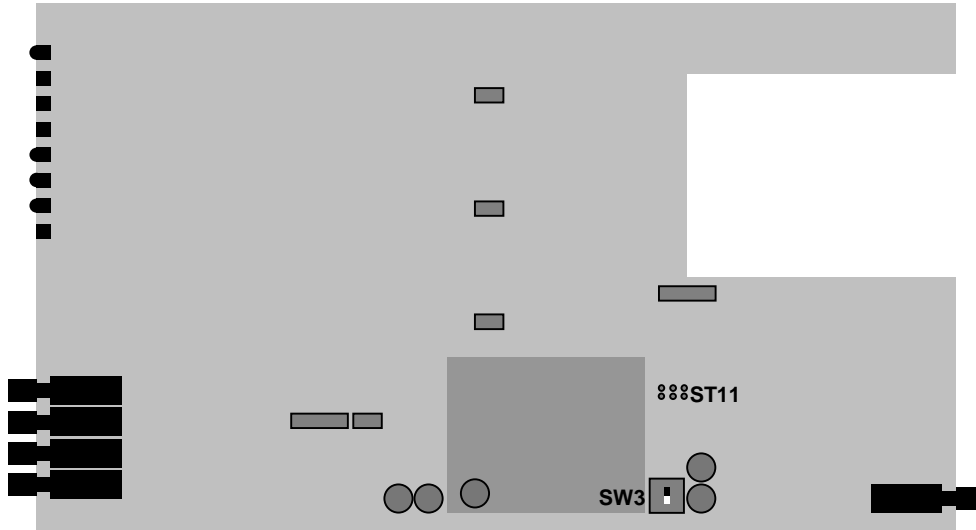


Figure 2.3: Position of SW3 and ST11 on the TT motherboard

### 2.5.4 Signal and protective ground interconnection

With strap ST11, you can configure the interconnection between signal ground and protective ground (earth). For the position of ST11 on the TT motherboard, refer to *Figure 2.3: Position of SW3 and ST11 on the TT motherboard*.

Strap settings	Connection	Description
	disconnected	As default, the signal ground is disconnected from the earth. This avoids problems which might occur when the earth potential of the modem and the connected application is not the same. In such a situation earth current loops may induce distortion on the transmitted data, resulting in transmission errors.
	connected through 100 ohms resistor	Sometimes you might want to connect the <i>modem earth</i> to the <i>application earth</i> although both earth potentials are not the same. (E.g. to avoid a big difference between both earth potentials.) To avoid that high earth currents are generated, you can make this connection through a 100 ohms resistor.
	directly connected	<p>Sometimes it is not possible to connect the application directly to the earth. In that case you can earth the application through the modem by connecting the modem to the earth and setting strap ST11 in position 3.</p> <p>Also the opposite situation might occur: it is not possible to earth the modem. In that case you can earth the modem through the application by connecting the application to the earth and setting strap ST11 in position 3.</p>

Table 2.3: Signal and protective ground interconnection

2.5.5 Connecting the lines to the Table Top

At the back of the TT, a line connector is provided. The following table explains how to connect the line pair to the line connector:

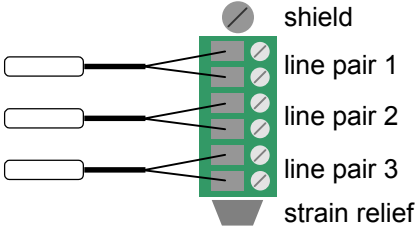
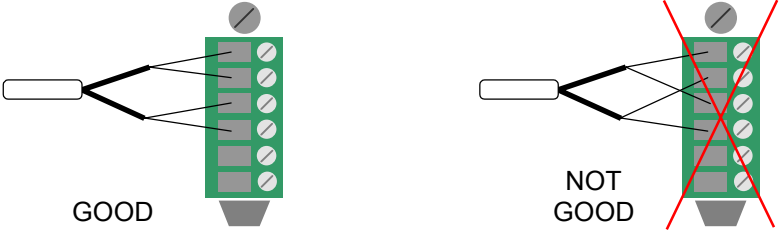
Part	Action	Figure
shield	Connect the shielding of the line pair to the shield screw.	
line pair x	Connect a line pair as follows:  1. Slide the wires of the line pair in the connector positions as indicated in the figure.  2. Fasten the line connector screws.  Depending you have a Crocus HDSL 2P or 3P, you have to connect two or three line pairs.	
strain relief	Use the strain relief to secure the connected line cable.	

Table 2.4: Connecting the line pairs

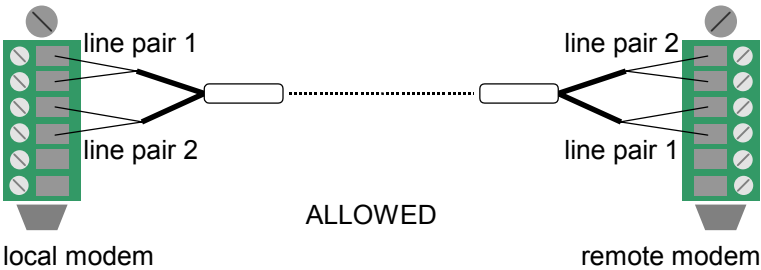
Line connection rules

Keep the following two rules in mind when connecting line pairs to the modem.

1. Make sure that both wires of one line pair are connected to the same line connector position.



2. It is allowed to connect a line pair to line connector position 1 on the local modem and to line connector position 2 on the remote modem.



## 2.5.6 Inserting the DTE interface in the Table Top

At the back of the TT, an empty slot is provided in which you can insert the desired DTE interface module without opening the housing.

To insert the DTE interface in the TT, proceed as follows:

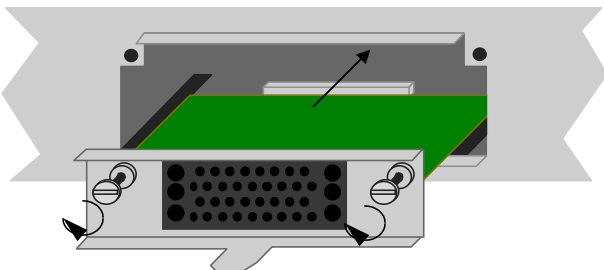
Step	Action
1	<p>Gently slide the DTE interface on the two inner slides into the empty slot.</p> <p>The following figure shows this procedure:</p> 
2	When nearly inserted, press tight.
3	Lock both screws.
4	When the DTE interface is present, connect the application.

Table 2.5: Inserting the DTE interface in the TT



If you pull out a DTE interface module and replace it by another module, then the modem reboots.

## 2.6 Connecting the Crocus HDSL Card Version

This section explains how to connect the Crocus HDSL CV. The following table gives an overview of this section.

Section	Title	Page
2.6.1	Inserting the Card Version in the CN4 card nest	17
2.6.2	Connecting the lines to the Card Version	18
2.6.3	Inserting the DTE interface in the Card Version	19

### 2.6.1 Inserting the Card Version in the CN4 card nest

The Crocus HDSL CV consists of a stuffed print, provided with a front panel. The CV has to be inserted in the CN4 card nest. Most connections to this card are performed via 3 DIN-connectors on the back of the card:

- the middle connector for power supply, line and management connections
- the two extreme connectors for interface connections.

To insert the CV in the CN4 card nest, proceed as follows:

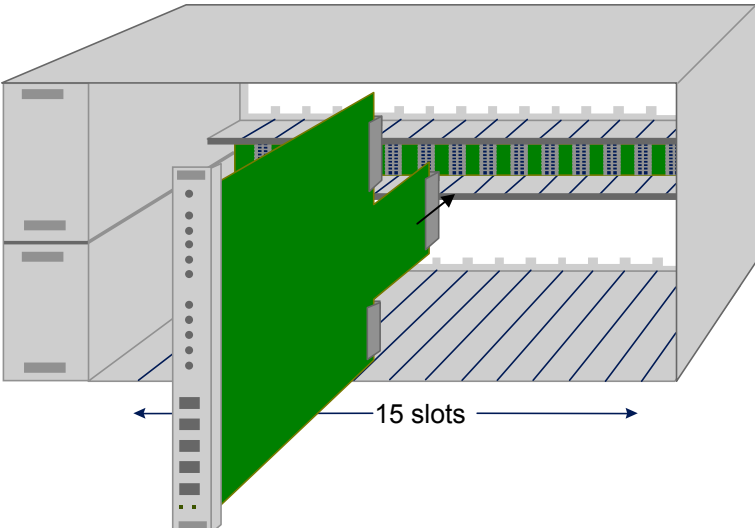
Step	Action
1	<p>Gently slide the CV on the two inner slides into an available slot.</p> <p>The following figure shows this procedure:</p> 
2	When nearly inserted, press tight.
3	Lock both screws.

Table 2.6: Inserting the CV in the CN4 card nest

For EMC reasons the cards all fit closely to each other. Therefore, you will experience that inserting the last card in a completely filled up rack happens to be more stiffly. To fill up an entire rack, it is best to proceed as follows:

Step	Action
1	Insert card 1 up to 14 in slot 0 up to 13 of the CN4 card nest.
2	Fasten the screws of card 1 up to 14.
3	Insert the last card in slot 14 of the CN4 card nest.
4	Fasten the screws of the last card.

Table 2.7: Filling an entire CN4 card nest

## 2.6.2 Connecting the lines to the Card Version

The line connector for the CV is provided at the back of the CN4 card nest. The following table explains how to connect the line pair to the line connector:

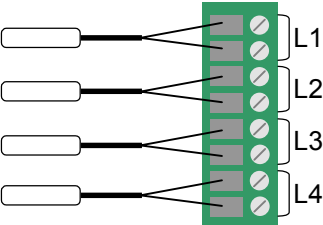
Indication	Action	Figure
L1	<p>Depending you have a 2P or 3P CV, connect the following line pair:</p> <ul style="list-style-type: none"> <li>• Crocus HDSL 2P F CV: line pair 1, modem A</li> <li>• Crocus HDSL 3P F CV: line pair 1</li> </ul> <p>To connect the line pair proceed as follows:</p> <ol style="list-style-type: none"> <li>1. Slide the wires of the line pair in the connector positions as indicated in the figure.</li> <li>2. Fasten the line connector screws.</li> </ol>	
L2	<p>Depending you have a 2P or 3P CV, connect the following line pair:</p> <ul style="list-style-type: none"> <li>• Crocus HDSL 2P F CV: line pair 2, modem A</li> <li>• Crocus HDSL 3P F CV: line pair 2</li> </ul> <p>To connect the line pair see above.</p>	
L3	<p>Depending you have a 2P or 3P CV, connect the following line pair:</p> <ul style="list-style-type: none"> <li>• Crocus HDSL 2P F CV: line pair 1, modem B</li> <li>• Crocus HDSL 3P F CV: line pair 3</li> </ul> <p>To connect the line pair see above.</p>	
L4	<p>Depending you have a 2P or 3P CV, connect the following line pair:</p> <ul style="list-style-type: none"> <li>• Crocus HDSL 2P F CV: line pair 2, modem B</li> <li>• Crocus HDSL 3P F CV: not used</li> </ul> <p>To connect the line pair see above.</p>	

Table 2.8: Parts of the CN4 line connector

For more information on how to connect the line pairs to the CN4 card nest, refer to the manual of the CN4 card nest.

For the line connection rules, refer to *Section 2.5.5 - Connecting the lines to the Table Top*.

### 2.6.3 Inserting the DTE interface in the Card Version

At the back of the CN4 card nest, two empty slots are provided in which the desired DTE interface module can be inserted without extracting the card from the card nest. The upper interface slot is used for modem A and the lower interface slot is used for modem B.

To insert the DTE interface in the CN4 card nest, proceed as follows:

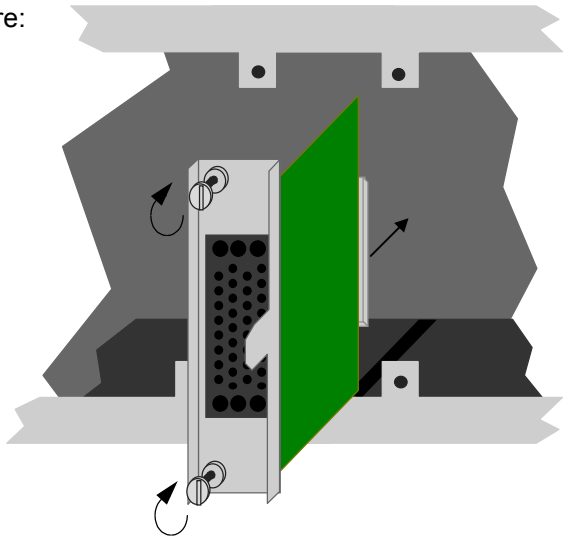
Step	Action
1	<p>Gently slide the DTE interface on the two inner slides into an available slot.</p> <p>The following figure shows this procedure:</p> 
2	When nearly inserted, press tight.
3	Lock both screws.
4	When the DTE interface is present, connect the application.

Table 2.9: Inserting the DTE interface in the CV



If you pull out a DTE interface module and replace it by another module, then the modem reboots.

## 2.7 Front panel LED indicators

This section gives an overview of the front panel LEDs and what they indicate. The following table gives an overview of this section.

Section	Title	Page
2.7.1	Introduction to the front panel LEDs	21
2.7.2	Power LED	23
2.7.3	Test LED	23
2.7.4	Error LED	23
2.7.5	Transmit data LED	24
2.7.6	Signal quality LED	24
2.7.7	Receive data LED	25

### 2.7.1 Introduction to the front panel LEDs

When all the connections are made and the Crocus HDSL is powered, the LEDs on the front panel reflect the actual status of the modem.

The figure below show the front panel LED indicators of the Crocus HDSL TT and CV.

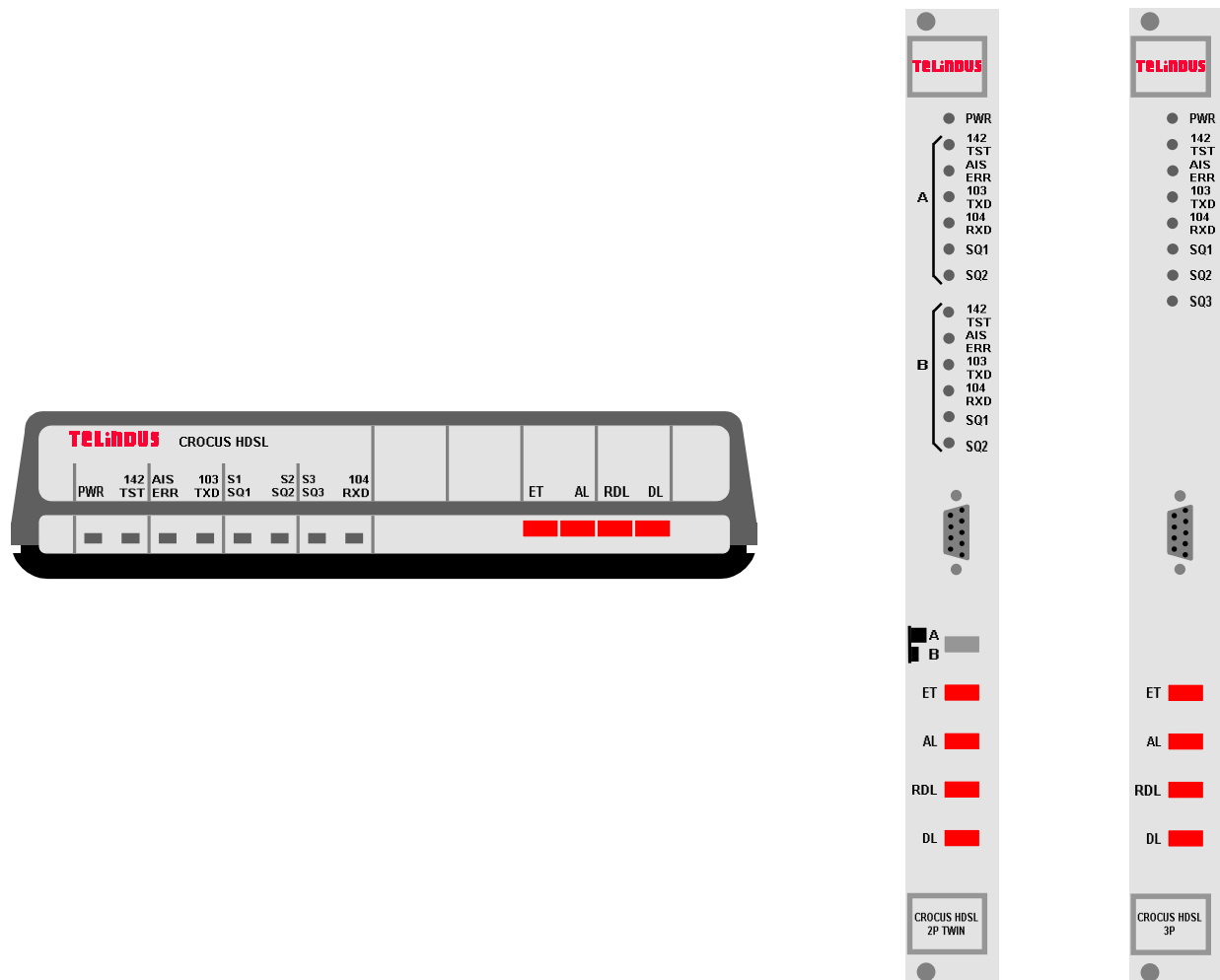


Figure 2.4: Front panel LED indicators of the Crocus HDSL TT and CV

*Continued on next page*

*Introduction to the front panel LEDs (continued)*

The following table lists the front panel LED indicators with their corresponding label and colour.

Front panel LED indicator	Label	Colour
power LED	PWR	green
test LED	142 TST	red
error LED	AIS ERR	red
transmit data LED	103 TXD	orange
signal quality LED	SQx	green / orange / red
receive data LED	104 RXD	green

Table 2.10: Label and colour of the front panel LED indicators

For some front panel LED indicators (TST, AIS ERR and SQ) different status modes exist. These status modes can be distinguished by the way the LED is lit up:

LED duty cycle	LED status
0 %	off
20 %	flashing
50 %	blinking
100 %	continuously on

Table 2.11: The status modes of the front panel LED indicators

## 2.7.2 Power LED

This LED indicates that the Crocus HDSL is connected to the power supply and is switched on.

## 2.7.3 Test LED

This LED indicates whether the Crocus HDSL is in normal operation or in test condition (ET, AL, RDL, DL or a combination of them). Four different status modes can be distinguished:

LED status	Description
off	No test is active.
continuously on	A front panel or interface test is active.
blinking	A test initiated by the management system is active.
flashing	A front panel or interface test has been terminated by the management system.

Table 2.12: Test LED status explanation



Termination of an active test by the management system is necessary to prevent hang-up situations caused by accidental activation of a test. Once the test indicator starts flashing, all active test conditions should be removed first, before initiating a new test session.

## 2.7.4 Error LED

This LED indicates an error has occurred. Three different status modes can be distinguished:

LED status	Description
off	No error has occurred.
continuously on	There are two possibilities: <ul style="list-style-type: none"> <li>The modem its internal error test pattern generator / detector (ET) is active, and the has received bit errors.</li> <li>If a G703 interface is used, it indicates an Alarm Indication Signal (AIS) has been detected on the incoming G.704 transmit data. This means that the application has detected an error, and it communicates this to the interface by setting all data bits to 1 (which is the AIS condition).</li> </ul>
flashing	Alarm signaling is active and an alarm has been detected.  For more information on alarm signaling, refer to <i>Section 5.2 - Crocus HDSL configuration attributes</i> .


Table 2.13: Error LED status explanation

## 2.7.5 Transmit data LED

This LED monitors the data sent by the application (Data Terminal Equipment) to the DTE interface module of the Crocus HDSL.

### Important remark

If you use a G703 interface but no application is connected to it, then the TXD LED will always be *on*.

 Note that the data is monitored after it went through the DTE interface circuitry. Some interfaces (G703, Bridge and Router) will add framing information which will activate the TXD LED even if no real user data is being transmitted.

## 2.7.6 Signal quality LED

This LED indicates whether the central modem is in synchronization with the remote modem. It also gives an indication of the signal quality on the line pair. Four different modes can be distinguished:

LED status	Description
green + blinking	A training cycle between central and remote modem is in progress.
green	Signal quality is excellent and the data link is present. (See below for more information on signal quality.)  If you execute an AL test, then the SQ LED is also green. However, in that case it is no indication of the signal quality on the line.
orange	Signal quality is mediocre but the data link is still present. (See below for more information on signal quality.)
red	This indicates ... <ul style="list-style-type: none"> <li>• either that the signal quality is so bad that the data link is lost</li> <li>• or that the line pair has broken in two somewhere</li> <li>• or that the line pair is not connected to the Crocus HDSL.</li> </ul> In other words, the line is completely out of synchronization.

Table 2.14: Signal quality LED status explanation

*Continued on next page*

*Signal quality LED (continued)***Signal quality**

The signal quality is calculated based on the noise margin of the line. The total noise margin range is divided into four:

- starting from 1, being the worst signal quality
- up to 4, being the best signal quality.

The bicolour signal quality LED has a green and red component of which the intensity can range from 0 up to 255. Depending on the noise margin value (1 up to 4), the LED is driven as follows:

Noise margin	SQ LED		
	Green component intensity	Red component intensity	Resulting colour
1	128	255	orange
2	192	192	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">↓</div> transitional state </div>
3	255	128	
4	255	0	green

**2.7.7 Receive data LED**

This LED monitors the data sent to the application (Data Terminal Equipment) by the DTE interface module of the Crocus HDSL.



Note that the data is monitored before it went through the DTE interface circuitry. Some interfaces (G703, Bridge and Router) used on the remote side will add framing information which will activate the RXD LED even if no real user data is being received.

### 3. Configuration tools of the Crocus HDSL

The next chapter, *Chapter 4 - Step-by-step configuration*, describes *how* to perform a basic configuration of the Crocus HDSL. This chapter describes the *tools* with which this basic configuration can be performed. There are two tools with which the Crocus HDSL can be configured:

- the DIP switches
- the Telindus Maintenance Application (TMA).

The following table gives an overview of this chapter.

Section	Title	Page
3.1	Configuration with the DIP switches	27
3.2	Configuration with TMA	32

## 3.1 Configuration with the DIP switches

The first tool with which the Crocus HDSL can be configured are the DIP switches. This section locates the DIP switches on the TT and CV motherboard and gives the procedure to change the settings. The following table gives an overview of this section.

Section	Title	Page
3.1.1	Introduction to the DIP switches	27
3.1.2	DIP switches of the Table Top	28
3.1.3	DIP switches of the Card Version	30

### 3.1.1 Introduction to the DIP switches

DIP switch configuration is useful for quick *on site* configuration. It is also the only way to perform a basic configuration when no computer is available. Some disadvantages of using the DIP switches over the use of the Telindus Maintenance Application as configuration tool are:

- configuration by means of DIP switches can be discursive
- the housing has to be opened (TT) or the card has to be extracted from the CN4 card nest (CV)
- only the basic configuration attributes can be set
- status, performance and alarm monitoring is not possible
- the remote modem can not be configured from the central side.



---

Most DIP switch configuration settings can be overruled by TMA configuration settings.

---

### 3.1.2 DIP switches of the Table Top

The figure below shows the position of the DIP switches on the TT motherboard.

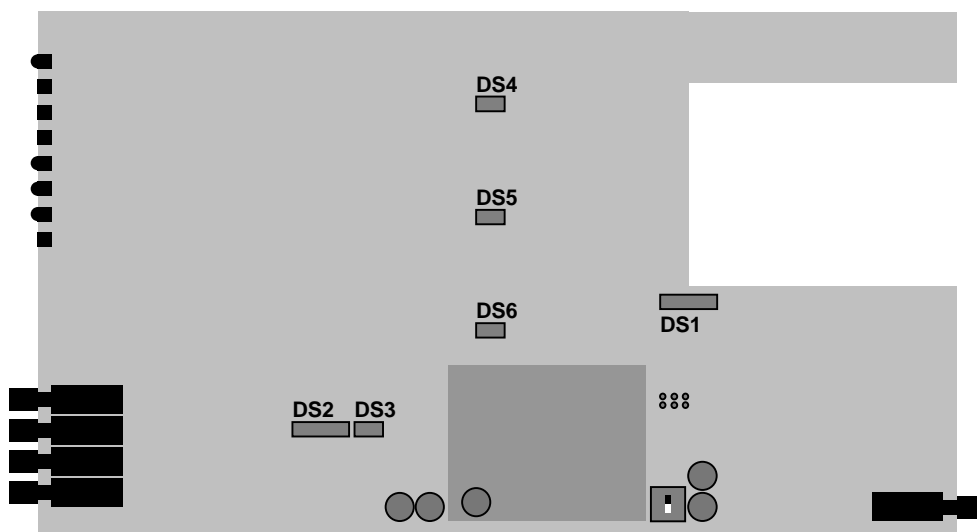


Figure 3.1: Position of the DIP switches on the TT motherboard

DIP switch bank	Description
DS1	This DIP switch bank is used to enable or disable dual port operation. DS1 is only present on a Dual Port model (Crocus HDSL xP DP F).
DS2	This DIP switch bank is used to perform a basic configuration of the Crocus HDSL TT.  With this DIP switch bank the configuration attributes concerned with clocking, software mode and initial settings can be set.
DS3	This DIP switch bank is used to perform a basic configuration of the Crocus HDSL TT.  With this DIP switch bank the configuration attributes concerned with the training channel and remote powering can be set.
DS4, DS5, DS6	These DIP switches are <i>not</i> user changeable. The mandatory setting is off.

Table 3.1: DIP switches of the TT

*Continued on next page*

*DIP switches of the Table Top (continued)*

To change the DIP switch settings of the TT, proceed as follows:



Step	Action
1	Switch the modem off.
2	<b>Disconnect the modem from the mains.</b>
3	Unscrew the four screws located at the bottom of the modem.
4	Lift the cover from the modem.
5	Change the DIP switch settings.
6	Replace the cover and close tight.
7	Fasten the four screws located at the bottom of the modem.
8	Reconnect the modem to the mains.
9	Switch the modem on.

Table 3.2: Changing the DIP switch settings of the TT

### 3.1.3 DIP switches of the Card Version

The figure below shows the position of the DIP switches on the CV motherboard.

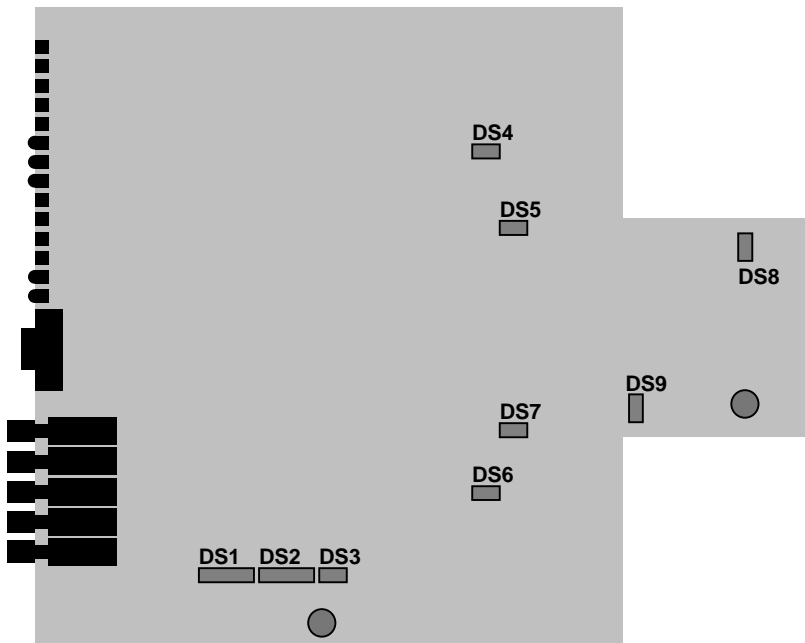


Figure 3.2: Position of the DIP switches on the CV motherboard

DIP switch bank	Description
DS1	<p>This DIP switch bank is used to perform a basic configuration of modem B of the Crocus HDSL 2P F CV (Twin version). DS1 is not present on the Crocus HDSL 3P F CV (Single version).</p> <p>With this DIP switch bank the configuration attributes concerned with clocking, software mode and initial settings can be set.</p>
DS2	<p>This DIP switch bank is used to perform a basic configuration of ...</p> <ul style="list-style-type: none"> <li>modem A of the Crocus HDSL 2P F CV (Twin version).</li> <li>the Crocus HDSL 3P F CV (Single version).</li> </ul> <p>With this DIP switch bank the configuration attributes concerned with clocking and initial settings can be set.</p>
DS3	<p>This DIP switch bank is used to perform a basic configuration of both the Crocus HDSL 2P and 3P F CV.</p> <p>With this DIP switch bank the configuration attributes concerned with the training channel can be set.</p>
DS4, DS5, DS6, DS7	<p>These DIP switches are <i>not</i> user changeable. The mandatory setting is off.</p>
DS8, DS9	<p>These DIP switch banks have to be configured when using the CV in a remote power configuration (with the CN4 RP add-on chassis).</p>

Table 3.3: DIP switches of the CV

*Continued on next page*

*DIP switches of the Card Version (continued)*

To change the DIP switch settings of the CV, proceed as follows:

Step	Action
1	Remove the card from the CN4 card nest.
2	Change the DIP switch settings.
3	Place the card in the CN4 card nest.

Table 3.4: Changing the DIP switch settings of the CV

## 3.2 Configuration with TMA

The second tool with which the Crocus HDSL can be configured is the Telindus Maintenance Application (TMA). This section explains how to connect to a Crocus HDSL with TMA. It also gives an introduction to the attributes of the Crocus HDSL. The following table gives an overview of this section.

Section	Title	Page
3.2.1	Introduction to TMA	32
3.2.2	Connecting to a Crocus HDSL with TMA	33
3.2.3	Introduction to the attributes of the Crocus HDSL	36

### 3.2.1 Introduction to TMA

TMA is a free Windows<sup>®</sup> software package that enables you to maintain the Crocus HDSL, i.e. to access its *configuration* attributes and look at *status*, *performance* and *alarm* information. It runs on Windows 95<sup>®</sup>, Windows 98<sup>®</sup> and Windows NT<sup>®</sup> platforms. TMA offers a number of advantages over the use of the DIP switches:

- configuration by means of DIP switches can be discursive
- there is no need to open the housing (TT) or to extract the card from the CN4 card nest (CV)
- not only the basic, but also the advanced configuration attributes are accessible
- status, performance and alarm monitoring can be performed
- the remote modem can be configured from the central side.

Summarized, TMA is an excellent tool for complete management of the Telindus access devices. Not only the local but also the remote modem can be managed. When using TMA in combination with a network management system such as HP OpenView<sup>®</sup>, complete networks can be managed from one central site.

Consult the TMA user manual to install it and get acquainted with the TMA user interface.



You will need a new version of the model file distribution if changes have been made to the attributes of the Crocus HDSL. The most recent model files can always be downloaded from the Telindus web site at <http://www.telindus.com/telindus.phtml>. Go to the category *Products & Services* and select the subcategory *Telindus Access Products*.

### 3.2.2 Connecting to a Crocus HDSL with TMA

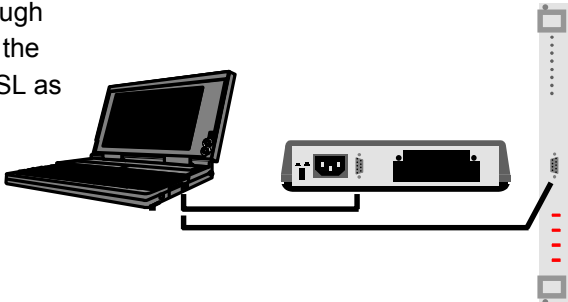

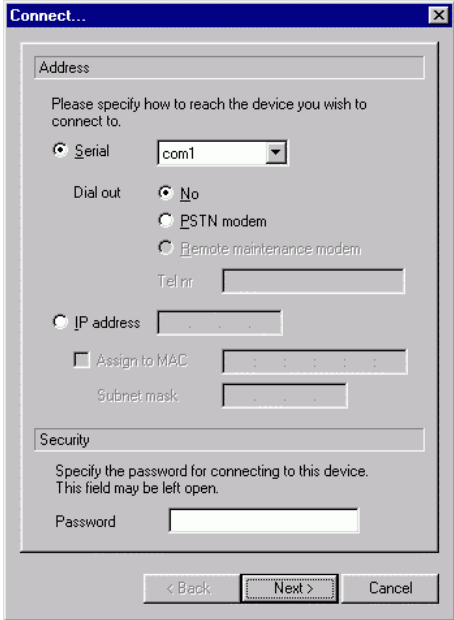
This section explains how you can connect to the Crocus HDSL using TMA.

There are two ways to establish a connection with TMA to the Crocus HDSL:

- over a serial connection, through the auxiliary connector of the Crocus HDSL.
- over an IP or a serial connection, through the Orchid 1003 LAN

#### Connecting through the auxiliary connector

To establish a link between TMA and the Crocus HDSL through the auxiliary connector, proceed as follows:

Step	Action
1	<p>Connect the COM port of your PC through a straight DB9 male-female cable with the auxiliary connector of your Crocus HDSL as shown in the following figure:</p> 
2	Start TMA.
3	<p>In the TMA window, either ...</p> <ul style="list-style-type: none"> <li>• select from the menu bar: <u>C</u>onnect → <u>D</u>evice...</li> <li>• or press the shortcut key: Ctrl+N</li> <li>• or press on the <i>Connect to device</i> button: </li> </ul> <p>The <i>Connect device</i> window is being displayed as in the following figure:</p> 
4	<p>Configure the following parameters in this window:</p> <ul style="list-style-type: none"> <li>• the COM port where the Crocus HDSL is connected to</li> <li>• if a password has previously been configured on the device then also fill in the password field.</li> </ul>
5	If the necessary parameters are filled in, press the <i>Next &gt;</i> button.

*Continued on next page*

## Connecting to a Crocus HDSL with TMA through the auxiliary connector (continued)


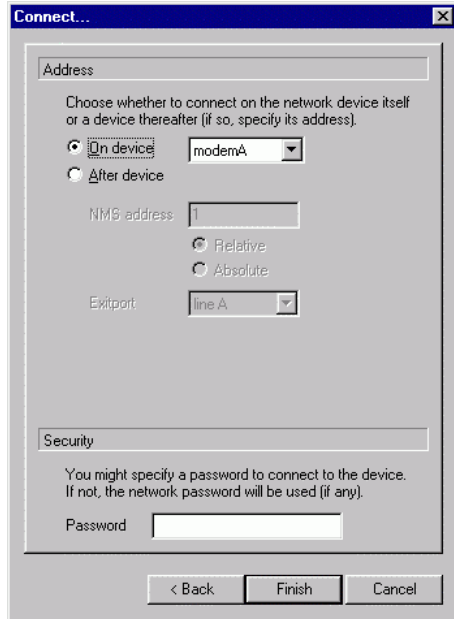

Step	Action
6	<p>In the TMA window, either ...</p> <ul style="list-style-type: none"> <li>select from the menu bar: <u>C</u>onnect → <u>S</u>elect device...</li> <li>or press the shortcut key: Ctrl+D</li> <li>or press on the <i>Select device</i> button: </li> </ul> <p>The <i>Select device</i> window is being displayed as in the following figure:</p> 
7	<p>Two situations can be distinguished depending on establishing a connection to a Crocus HDSL TT or CV:</p> <ul style="list-style-type: none"> <li>For a Crocus HDSL TT, the following applies: <ul style="list-style-type: none"> <li>In order to connect to the local Crocus HDSL TT, choose <u>O</u>n device.</li> <li>In order to connect to the remote Crocus HDSL, choose <u>A</u>fter device and enter relative NMS address 1 or higher.</li> </ul> </li> <li>For a Crocus HDSL CV, select the following: <ul style="list-style-type: none"> <li>In order to connect to the local Crocus HDSL CV, choose <u>O</u>n device and select modem A or modem B.</li> <li>In order to connect to the remote Crocus HDSL choose <u>A</u>fter device, enter relative NMS address 1 or higher and select modem A or modem B.</li> </ul> </li> </ul> <p> You can connect to a remote modem only if the data link is up.</p>
8	If the necessary parameters are filled in, press the <i>Finish</i> button.
9	After a couple of seconds, the attributes of the selected Crocus HDSL appear in the TMA window.

Table 3.5: Connecting to a Crocus HDSL with TMA through the auxiliary connector

**Important remark**

Suppose that both modem A and B of a Crocus HDSL 2P CV (Twin) have a password. In that case, if you want to connect with TMA to modem B ...

- first enter the password of modem A in the *Connect device* window (see step 3)
- then enter the password of modem B in the *Select device* window (see step 6).

*Continued on next page*

*Connecting to a Crocus HDSL with TMA (continued)*

**Connecting through the Orchid 1003 LAN**

On central locations with many access devices, the Crocus HDSL can be connected to an Orchid 1003 LAN concentrator device. In this case the Orchid 1003 LAN is a proxy device for the Crocus HDSL. The IP address related to the Crocus HDSL is defined on the Orchid 1003 LAN.

Refer to the manual of the Orchid 1003 LAN for more information on the configuration and management capabilities of this device.

### 3.2.3 Introduction to the attributes of the Crocus HDSL

This section gives an introduction to the attributes of the Crocus HDSL. It introduces terms such as containment tree, group, object, attribute, value and action.

#### Containment tree terminology

The following figure depicts the TMA window containing the Crocus HDSL containment tree.

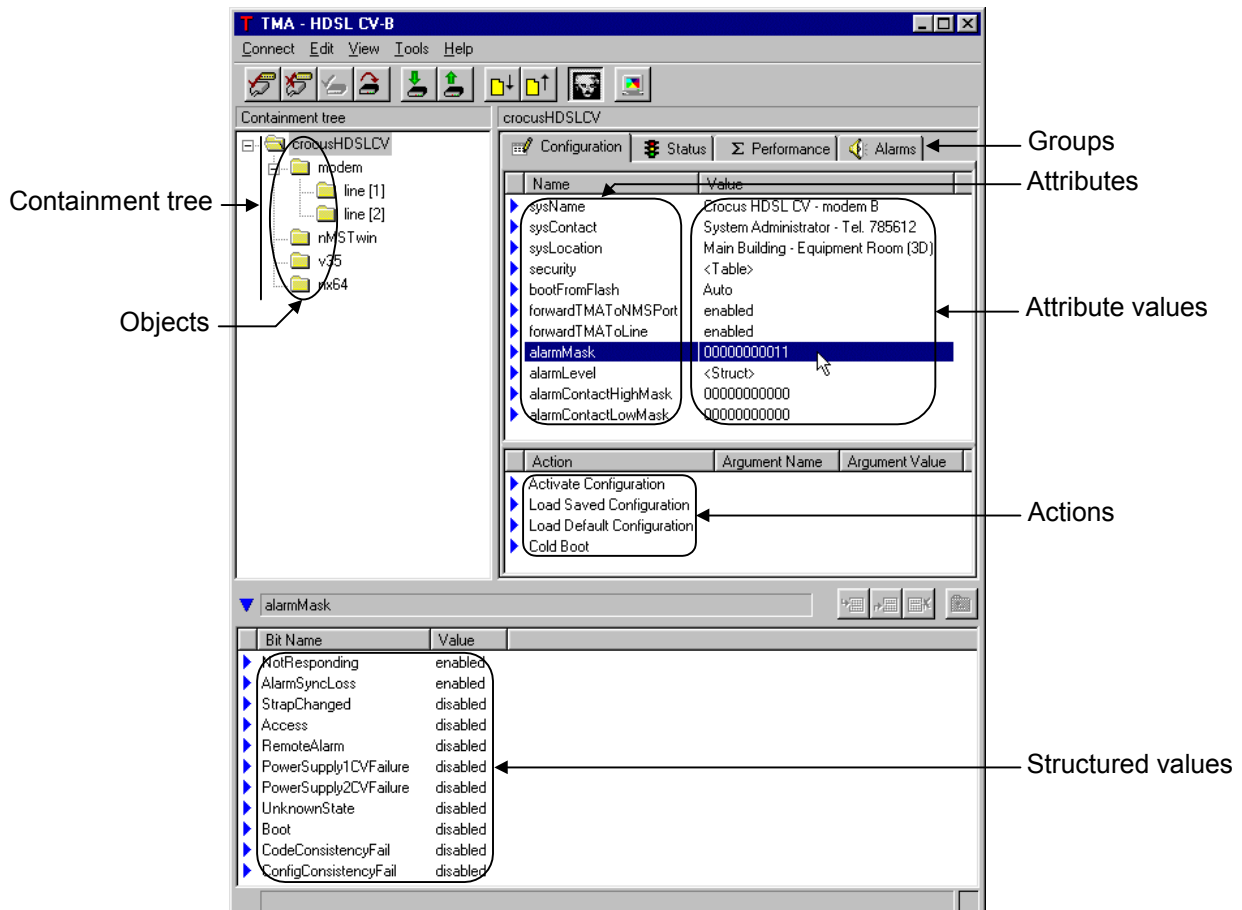


Figure 3.3: TMA window containing the Crocus HDSL containment tree

*Continued on next page*

The following table explains the terminology associated with the containment tree.

Term	Description
containment tree	<p>The containment tree represents the hierarchical structure of the Crocus HDSL. It is composed of a number of objects that are ordered in a tree. This tree resembles a Windows® directory structure:</p> <ul style="list-style-type: none"> <li>• it is also a leveled structure, with nodes which can be expanded or reduced</li> <li>• the containment tree objects can be compared with file folders</li> <li>• the objects contain attributes like file folders contain files.</li> </ul>
object	<p>An object represents a physical interface, an application or a combination of both. Each object has its own set of attributes.</p> <p>Example:</p> <p>The top object <code>crocusHDSL</code> contains the sub object <code>modem</code>. On its turn, the sub object <code>modem</code> contains several sub objects <code>line[]</code>. These objects contains all the attributes concerning the line pairs. E.g. the status attribute <code>lineAttenuation(dB)</code>.</p>
attribute	<p>An attribute is a parameter related to a certain object. It has a certain value.</p> <p>Example:</p> <p>The object <code>modem</code> contains the <code>channel</code> attribute, which has the values <code>central</code> and <code>remote</code>.</p>
value	<p>An attributes has a certain value which:</p> <ul style="list-style-type: none"> <li>• can be changed in case of a configuration attribute (provided you have write access)</li> <li>• is read only in case of a status, performance and alarm attribute.</li> </ul> <p>Example:</p> <p>The configuration attribute <code>channel</code> can be set to the value <code>central</code> or <code>remote</code>.</p>
structured value	<p>Some attribute values contain underlying values: a structured value. These values are displayed in the structured value window. If an attribute contains structured values then a bit string, <code>&lt;Table&gt;</code> or <code>&lt;Struct&gt;</code> is displayed after the attribute.</p> <p>Example:</p> <p>The <code>alarmLevel</code> attribute contains a structured value which displays alarms and their corresponding priority level.</p>
group	<p>Groups assemble a set of attributes related by functionality. There are four groups in TMA, which correspond with the four tabs in the attribute window:</p> <ul style="list-style-type: none"> <li>• configuration</li> <li>• status</li> <li>• performance</li> <li>• alarms.</li> </ul>
action	<p>A group in combination with an object may have actions assigned to them. These actions are displayed in the action window.</p> <p>Example:</p> <p>The Force Full Retrain action only appears when the object <code>modem</code> is selected in combination with the group <code>performance</code>.</p>

Table 3.6: Containment tree terminology

*Continued on next page*

*Introduction to the attributes of the Crocus HDSL (continued)***Where can you find an overview of all the attributes?**

The reference part of this manual explains all the attributes of the Crocus HDSL. One chapter describes one group of attributes:

- chapter 5 describes the configuration attributes
- chapter 6 describes the status attributes
- chapter 7 describes the performance attributes
- chapter 8 describes the alarm attributes.

Within a chapter, the objects and their underlying attributes are discussed in a sequential manner. I.e. from top to bottom, as they appear in the attribute window.

*Continued on next page*

*Introduction to the attributes of the Crocus HDSL (continued)***The Crocus HDSL containment tree**

The following table lists the different objects of the Crocus HDSL containment tree.

Object	This object contains ...
crocusHDSLTT/CV	the general system attributes. It is the top object in the containment tree.
modem	the modem attributes, i.e. attributes related to the data pump.
line[ ]	the line pair attributes. In case of a Crocus HDSL 2P the containment tree contains two line[ ] objects. In case of a Crocus HDSL 3P it contains three line[ ] objects.
nMS(Twin)	the network management attributes. For a CV Twin this object is called nMSTwin.
<interface>	the DTE interface attributes. The name of this object depends on the type of DTE interface. E.g. v35 in case of a V35 interface, g703 in case of a G703 interface, ...
nx64	the interface speed of an Nx64k DTE interface. This object is only present when an Nx64k interface is used.
g703Onboard	the onboard G703 interface attributes. This object is only present in case of a Dual Port modem.
powerOffDetection	the power-off detection mechanism attributes. This object is only present in case of a non-remote powering modem.
remPowerSource[ ]	the RP source attributes. This object is only present in case of a Remote Power Source modem.
remPowerSourceCV[ ]	the RP source CV attributes. This object is only present in case of a CV which is configured for remote powering.
remPowerSink	the RP sink attributes. This object is only present in case of a Remote Power Sink modem.
remPowerWetting[ ]	the RP wetting current attributes. This object is only present in case of a Remote Power Source modem and when it is strapped for wetting current operation.
remPowerWettingCV[ ]	the RP wetting current CV attributes. This object is only present in case of a CV which is configured for wetting current.
dualPowered	the dual powered attributes. This object is only present in case of a Dual Power modem.

Table 3.7: Objects of the Crocus HDSL containment tree

## 4. Step-by-step configuration

This chapter describes in a step-by-step method how to perform a basic configuration on Crocus HDSL. It also explains how DIP switch configuration tables and TMA attribute strings should be interpreted.



You are advised to read this chapter in a sequential manner, from the beginning to the end, without skipping any part. By doing so, your Crocus HDSL will be completely configured and ready for use when you reach the end of this chapter.

The following table gives an overview of this chapter.

Section	Title	Page
4.1	Reading the configuration settings	41
4.2	Configuring the Crocus HDSL	43
4.3	Remote powering for the Card Version	59
4.4	Activating the configuration	60



For a complete overview of the DIP switch settings of the Crocus HDSL, refer to *Annex A: DIP switch configuration tables*.

For a complete overview of the attributes of the Crocus HDSL, refer to the Reference manual.

## 4.1 Reading the configuration settings

As this chapter explains the basic configuration of the Crocus HDSL, a lot of DIP switch configuration tables and TMA attribute strings are displayed in it. To enable you to read this information in a correct way, this section explains the structure of such tables and strings.

### Reading a DIP switch configuration table

A DIP switch configuration table has the following layout:


	<b>DIP switch name</b>	<b>TT DS2 no. 2P CV-A/B DS2/1 no. 3P CV DS2 no.</b>	<b>Setting</b>	<b>Function</b>
	initial settings	8	<b>on</b>	Load flash memory configuration.
			off	Use DIP switch configuration.
1	2	3	4	5

Figure 4.1: DIP switch configuration table layout

The following table explains the DIP switch configuration table layout.

Number	This position displays ...
1	the DIP switch icon. It indicates that the table which follows is a DIP switch configuration table.
2	the DIP switch name.
3	for each modem version: <ul style="list-style-type: none"> <li>on which DIP switch bank the switch can be found</li> <li>the position of the switch on this DIP switch bank.</li> </ul> The abbreviations mean the following: <ul style="list-style-type: none"> <li>TT DS2 no. 8: Table Top, DIP switch bank number 2, switch position number 8</li> <li>2P CV-A/B DS2/1 no. 8:               <ul style="list-style-type: none"> <li>2 pair Card Version, modem A, DIP switch bank number 2, switch position number 8</li> <li>2 pair Card Version, modem B, DIP switch bank number 1, switch position number 8</li> </ul> </li> <li>3P CV DS2 no. 8: 3 pair Card Version, DIP switch bank number 2, switch position number 8</li> </ul>
4	the possible settings of the DIP switch: on and off. The default setting is printed in <b>bold</b> .
5	the function associated with the corresponding DIP switch setting.

Table 4.1: Information in the DIP switch configuration table

*Continued on next page*

*Reading the configuration settings (continued)*

### Reading a TMA attribute string

A TMA attribute string has the following layout:

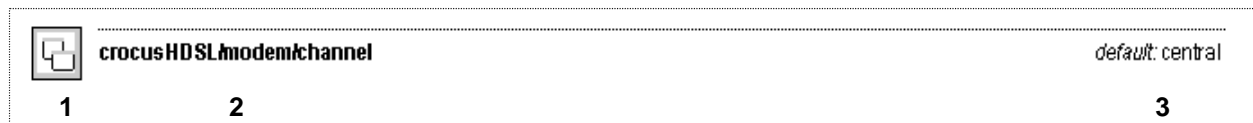


Figure 4.2: TMA attribute string layout

The following table explains the TMA attribute string layout.

Number	This position displays ...
1	<p>the TMA attribute icon. It indicates that the string which follows is a TMA attribute string. Two different TMA attribute icons exist:</p> <ul style="list-style-type: none"> <li>• a basic attribute icon</li> <li>• an advanced attribute icon</li> </ul> <p>For more information refer to <i>Preface – Conventions used in this manual</i></p>
2	<p>the attribute name and its position in the containment tree.</p> <p>In the figure above, the string <code>crocusHDSL/modem/channel</code> means the following:</p> <ul style="list-style-type: none"> <li>• the attribute name is <code>channel</code></li> <li>• this attribute is located in the sub object <code>modem</code></li> <li>• this sub object is located in the top object <code>crocusHDSL</code>.</li> </ul>
3	the default value of a configuration attribute.

Table 4.2: Information in the TMA attribute string

## 4.2 Configuring the Crocus HDSL

This section explains how to perform a basic configuration on the Crocus HDSL.



Because what follows are the basic configuration settings of the Crocus HDSL, you are advised to read them all carefully to enable you to establish a data link successfully.

The following table gives an overview of this section.

Section	Title	Page
4.2.1	Initial settings	44
4.2.2	Channel	45
4.2.3	RTS control	46
4.2.4	Clocking	47
4.2.5	G703 interface – framing	50
4.2.6	Nx64k interface – time slots	51
4.2.7	Nx64k interface – auto speed	54
4.2.8	Onboard G703 interface	56
4.2.9	Onboard G703 interface – framing	58

### 4.2.1 Initial settings

The location of the initial settings DIP switch is:



DIP switch name	TT DS2 no. 2P CV-A/B DS2/1 no. 3P CV DS2 no.	Setting	Function
initial settings	8	on	Load flash memory configuration.
		off	Use DIP switch configuration.

The initial settings DIP switch is used to define which configuration is read when booting the Crocus HDSL.

- If *on* is selected, the Crocus HDSL loads the configuration which is stored in the flash bank. If the Crocus HDSL is used for the first time, the flash bank contains the default configuration.
- If *off* is selected, the Crocus HDSL loads the configuration as it is set with the DIP switches. Attributes which can not be changed with the DIP switches are reset to their default values.



The initial settings configuration attribute can only be set with the DIP switches. It is not available in TMA.

## 4.2.2 Channel

The location of the channel DIP switch for a Crocus HDSL TT is:



DIP switch name	TT DS3 no.	Setting	Function
channel	1	on	remote
		off	central

The location of the channel DIP switch for a Crocus HDSL CV is:



DIP switch name	CV DS3 no.	Setting	Function
channel	1 (for 2P CV-B, 3P CV)	on	remote
	3 (for 2P CV-A)	off	central

The location of the channel attribute in the Crocus HDSL containment tree is:



**crocusHDSL/modem/channel**

*default: remote for TT / central for CV*

The channel attribute defines which modem is the central and which the remote modem. I.e. it determines which modem acts as master and which as slave during the synchronization procedure of the modem.

The default channel setting of a Crocus HDSL TT is *remote*, while that of a Crocus HDSL CV is *central*. Therefore there will never be a synchronization problem when a CV and a TT are used in a regular setup, the CV at the backbone side and the TT at the customer side.



If two TTs are used at each end of the data link, make sure to change the channel attribute of one of the TTs into *central*.

If two CVs are used at each end of the data link, make sure to change the channel attribute of one of the CVs into *remote*.

### 4.2.3 RTS control

The location of the `rTSControl` attribute in the Crocus HDSL containment tree is:

 `crocusHDSL/<interface>/rTSControl` *default: external*

(only for RS530, V35 and V36 interface types)

Use the `rTSControl` attribute to define which device will activate the RTS signal. Following settings are possible:

If RTS control is set to ...	the RTS signal is activated by ...	This attribute setting is used when ...
external	the application.	the application has to be in command of the RTS signal.
internal	the modem.	the application is not able to activate the RTS signal.

Normal operation requires the RTS signal (circuit 105) to be active before the modem activates its data transfer state, as indicated by the CTS signal (circuit 106). Therefore, make sure the RTS signal is activated either by the application, or by the modem.

## 4.2.4 Clocking

The location of the clocking DIP switches is:



DIP switch name	TT DS2 no. 2P CV-A/B DS2/1 no. 3P CV DS2 no.	Setting	Function
clocking	1 2 3	off off off	internal preferred
		on off off	internal alternative
		off on off	slave receive preferred
		on on off	slave receive alternative
		off off on	external

The location of the clocking attribute in the Crocus HDSL containment tree is:



crocusHDSL/<interface>/clocking

*default:* (interface dependent)

Use the clocking attribute to select a clocking mode. Following clocking modes can be selected:

Clocking scheme	Description
internal	The modem generates the transmit clock signal and sends it to the application via the TxClk circuit (circuit 114).
slave receive	The transmit clock signal is derived from the received line data. This reconstructed clock signal is sent to the application via the TxClk circuit (circuit 114).
external	The application generates the transmit clock signal and sends it to the modem via the ExtTxClk circuit (circuit 113).
external loop-back	The receive clock signal (RxClk) is the same as the external transmit clock signal (ExtTxClk).

Internal and slave receive clocking can be selected combined with preferred or alternative clocking:

Clocking scheme	Description
preferred	The application loops back the output of the TxClk circuit (circuit 114) to the ExtTxClk circuit (circuit 113). It guarantees an optimal phase relationship between the transmitted data and the transmitted clock. This because the transmission delays of the TxClk circuit (circuit 103) and the ExtTxClk circuit are exactly the same, since the outputs of both circuits originate in the application and are fed into the modem.
alternative	Does not require the TxClk (circuit 114) to ExtTxClk (circuit 113) loop-back. In this case the clock is looped back within the modem itself.



It may be necessary to use preferred clocking when delays are introduced in the communication between the DTE and the modem. Delays may occur in case of long interconnection cables or interface converters.

*Continued on next page*

*Clocking (continued)*

The following figures give an overview of all the clocking possibilities.

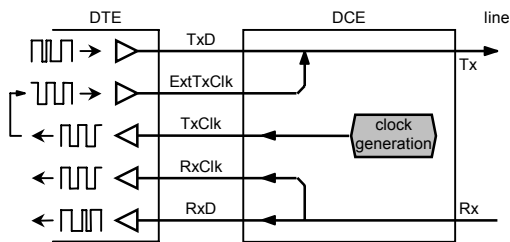


Figure 4.3: Internal preferred clocking

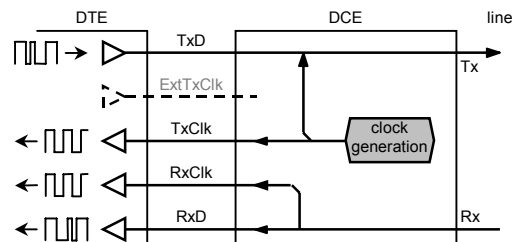


Figure 4.4: Internal alternative clocking

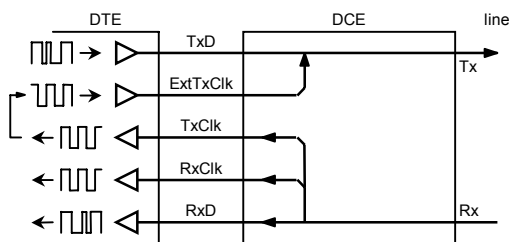


Figure 4.5: Slave receive preferred clocking

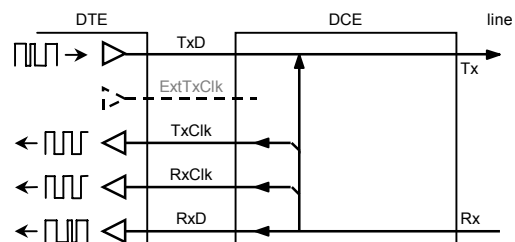


Figure 4.6: Slave receive alternative clocking

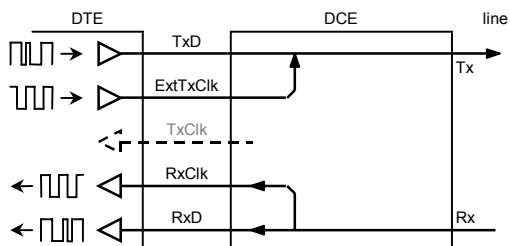


Figure 4.7: External clocking

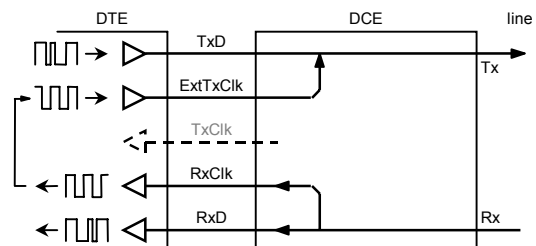


Figure 4.8: External loop-back clocking

**Some remarks on external clocking**

On interfaces that have an external clock circuit (circuit 113), the external clock is periodically sensed. This has the following advantages:

1. If you configure external clocking but no valid external clock signal is present or if it is lost, then the modem switches to internal clocking mode. If the external clock signal is present (again), then the modem goes (returns) to the external clocking mode.
2. If you configure a preferred clocking mode (e.g. internal preferred), the external clock signal is used to sample the transmit data. If no valid external clock signal is present or if it is lost, the modem switches to the alternative clocking mode (e.g. internal alternative). If the external clock signal is present (again), then the modem goes (returns) to the preferred clocking mode.

*Continued on next page*

*Clocking (continued)***Possible clocking modes versus DTE interfaces**

The clocking modes which can be used depend on the DTE interface used in the Crocus HDSL. This is shown in the following table.



DTE interface	Description
RS530, V35 and V36	<p>All the necessary clock circuits (RxClk, TxClk, ExtTxClk) are present on these interfaces. Therefore, they support all the possible clocking modes.</p> <p>The default clocking mode is internal preferred.</p>
X21	<p><b>S clock</b></p> <p>Normal X.21 operation only provides the S clock (DCE originated), which is used for both transmit and receive clocking. Therefore, the normal clock configuration would be internal alternative at one side, and slave receive alternative at the other.</p> <p>The default clocking mode is internal alternative.</p> <p><b>X clock</b></p> <p>If the X clock is present, external clocking is also possible. In that case, the S clock is only used to clock out the receive data.</p> <hr/> <p> In case of a Crocus HDSL Dual Port modem, only internal clocking is supported.</p> <hr/> <p><b>External loop-back</b></p> <p>Many applications on X.21 deny the S clock signal and sample the receive data with their X clock. However, in case S and X clock are not in phase, bit errors may occur. This is especially so when there is some jitter on the receive data signal. To solve this problem you can use the external loop-back clocking mode. In this clocking mode the receive clock is the same as the external transmit clock.</p> <hr/> <p> A setup using external loop-back clocking can only work when the remote modem or application is set to slave receive clocking.</p> <hr/>
G703	<p>The only possible clocking mode for the G703 interface is external clocking. Therefore, you can not configure the clocking mode for this interface.</p>
Bridge and Router	<p>The clocking configuration for the Bridge and the Router interfaces is always internal alternative or slave receive alternative.</p> <p>The default clocking mode is internal alternative.</p>

Table 4.3: Possible clocking modes versus DTE interfaces

## 4.2.5 G703 interface – framing

The location of the G703 interface framing attribute in the Crocus HDSL containment tree is:

 `crocusHDSL/g703/framing` *default: unframed*

A G703 interface can be set to unframed or framed mode:

Mode	Description
unframed	A 2 Mbps data stream is sent transparently over the line.
framed (G.704 framing)	Up to 31 time slots each containing a 64 kbps data stream can be sent over the line. Each 64 kbps time slot can be disabled or enabled. In framed mode, time slot 0 is reserved for synchronization and signaling.

Table 4.4: G703 interface – unframed and framed mode

## 4.2.6 Nx64k interface – time slots

The location of the timeslots attribute in the Crocus HDSL containment tree is:



`crocusHDSL/nx64/timeslots`

*default:* 00000000000000000000000000000001

The Nx64k interfaces allow you to configure the interface speed to any multiple of 64 kbps up to 2048 kbps by means of G.704 framing. Do this by means of the timeslots attribute.

### Unframed and framed mode

A Nx64k interface can be set to unframed or framed mode:

Mode	Description
unframed	A 2 Mbps data stream is sent transparently over the line.
framed (G.704 framing)	Up to 31 time slots each containing a 64 kbps data stream can be sent over the line. Each 64 kbps time slot can be disabled or enabled. In framed mode, time slot 0 is reserved for synchronization and signaling.

Table 4.5: Nx64k interface – unframed and framed mode

### Configuring the Nx64k in unframed or framed mode

To set the Nx64k interface in unframed or framed mode, proceed as follows:

Framing	Procedure
unframed	Set time slot TS0 = 1 (enabled) to enable transparent operation.
framed	<ol style="list-style-type: none"> <li>1. Set the attribute autoSpeed to disabled.</li> <li>2. Set time slot TS0 = 0 (disabled) to enable G.704 framing.</li> <li>3. Allocate the desired time slots by setting them to value 1 (enabled).</li> </ol>

Table 4.6: Configuring the Nx64k in unframed or framed mode



### Important remarks

1. If timeslot TS0 is enabled then the value of the other time slots is irrelevant, because the interface operates in transparent mode.
2. If the autoSpeed attribute is enabled, then the timeslots attribute is ignored. For more information, refer to *Section 4.2.7 - Nx64k interface – auto speed*.
2. It is best that the amount of time slots allocated on the central modem is the same as that on the remote modem.
3. A local Crocus HDSL equipped with an Nx64k interface only works with a remote Crocus HDSL also equipped with an Nx64k interface.

Some exceptions:

- A Nx64k interface can work with a G703 interface, provided the G703 interface is set to framed mode.
- A Nx64k interface can work with a non-Nx64k interface, provided the Nx64k interface is set to unframed mode.

*Continued on next page*

*Nx64k interface – time slots (continued)***Examples**

Example 1: a Nx64k interface at both sides of the link. Time slots TS6, TS12 and TS25 are enabled.

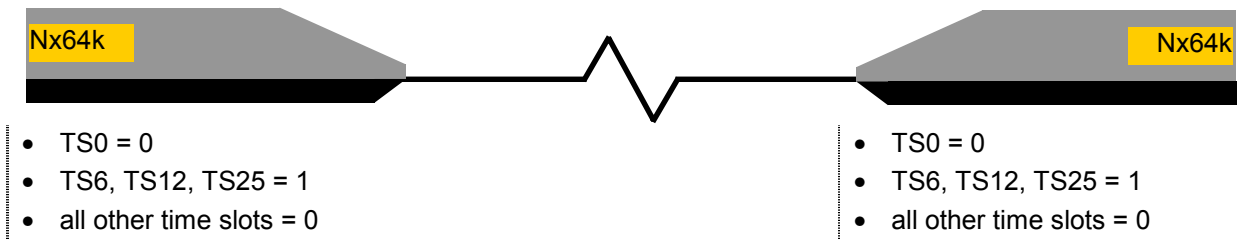


Figure 4.9: Allocating time slots – example 1

Example 2: a Nx64k interface is used on one side and a G703 interface is used on the other side of the link. When you set this G703 interface to framed mode, it will adopt the time slots as allocated on the Nx64k interface.

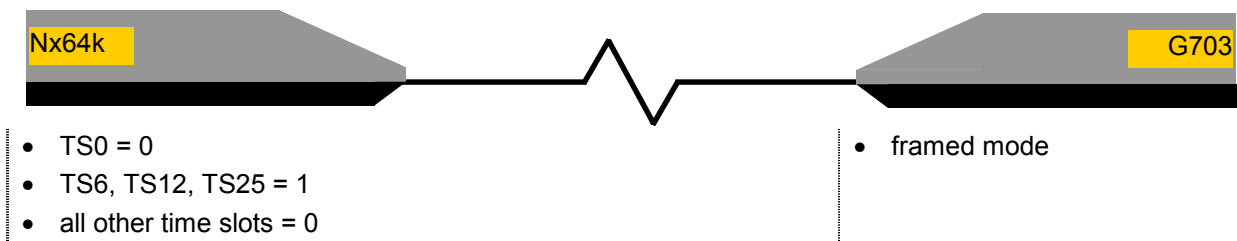


Figure 4.10: Allocating time slots – example 2

*Continued on next page*

*Nx64k interface – time slots (continued)***Nx64k time slot transposition**

If at both sides of the link a Nx64k interface is present, it is possible to perform a time slot transposition with TMA. Such a transposition is realized by disabling time slot 0 and enabling at both sides the time slots which have to be transposed. The first time slot at the local side will be put in the first time slot at the remote side, the second in the second, and so on.

Example:

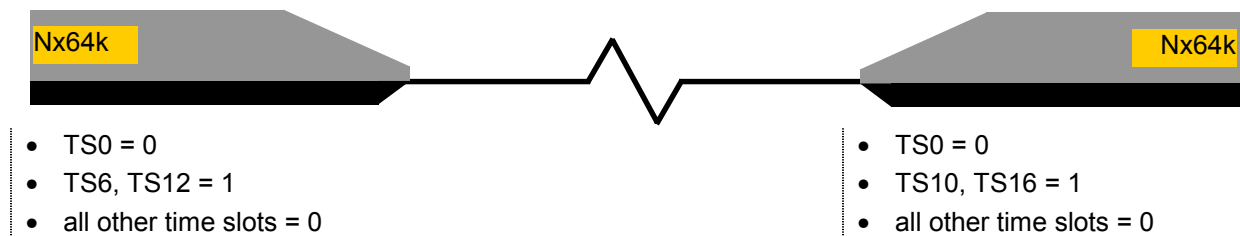
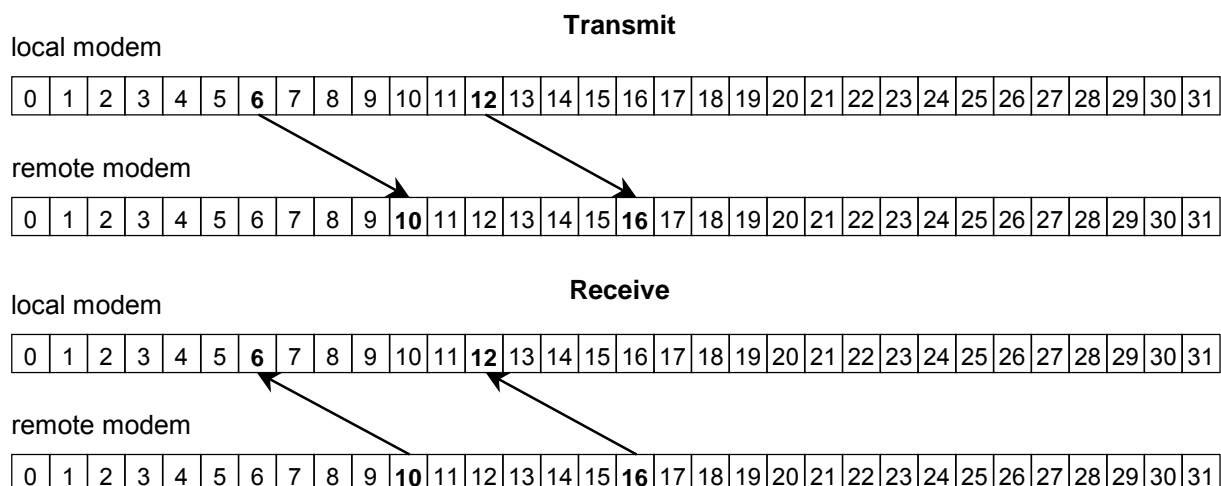


Figure 4.11: Allocating time slots – time slot transposition

In this example, TS6 of the local modem is put in TS10 of the remote modem. TS12 of the local modem is put in TS16 of the remote modem. A similar mechanism exists in the receive direction.

The following figure shows the time slot transposition mechanism:



## 4.2.7 Nx64k interface – auto speed

The location of the autospeed attribute in the Crocus HDSL containment tree is:



crocusHDSL/nx64/autospeed

*default:* enabled

You can set the Nx64k interface speed to auto speed. In that case, the modem itself determines the interface speed. It does this on the basis of the following criteria:

If the clock mode of the modem is ...	Then ...
external clocking	the modem measures the external clock frequency and adapts the Nx64k interface speed accordingly.
any clocking mode except external	the modem adopts the time slots as allocated on the Nx64k interface of the remote modem.
any clocking mode except external and both local and remote modem are set to auto speed	transparent 2 Mbps operation is selected.

The Nx64k interface speed can be any multiple of 64 kbps up to 2048 kbps. The modem first fills the high priority (also called preferred) time slots. These are the time slots that are preserved even when a line pair fails (i.e. the modem operates in fall-back). For more information on these priority time slots, refer to *Section 5.3 - Modem configuration attributes*, the fallbackStepup attribute.



If the autoSpeed attribute is enabled, then the timeslots attribute is ignored. This because auto speed implies that the modem itself, not the user, has to be able to adapt the Nx64k interface speed.

Therefore, take care when upgrading an older firmware (without the auto speed feature) to the new firmware (with auto speed feature). Especially when you have a modem setup with Nx64k interfaces in framed mode. This because the autoSpeed attribute is enabled by default, making the modem ignore the timeslots attribute.

*Continued on next page*

*Nx64k interface – auto speed (continued)***Auto Nx64k interface speed**

The following table shows which Nx64k interface speed the local modem will adopt when it is set to auto speed.

Local modem (speed / clock)	Remote modem (speed / clock)			
	auto / external	auto / internal or slave receive	fixed / external	fixed / internal or slave receive
<b>auto / external</b>	The local interface speed equals the local external clock.	The local interface speed equals the local external clock.	The local interface speed equals the local external clock.	The local interface speed equals the local external clock.
<b>auto / internal or slave receive</b>	The local interface speed equals the remote external clock.	2 Mbps (Note that you can not set both modems to slave receive clocking.)	The local interface speed equals the remote fixed speed. (This speed should match the external clock.)	The local interface speed equals the remote fixed speed.

Table 4.7: Local auto Nx64k interface speed in function of local clocking and remote speed / clocking

A *fixed* speed setting is any Nx64k interface speed setting except the *auto* setting.

**Important remarks**

1. The local and remote Nx64k interface speeds should match for proper operation.
2. In case of a fixed Nx64k interface speed with an external clock, the configured speed should match the external clock speed.
3. The auto speed feature is not supported when the application is in slave receive clocking mode.
4. If you perform an AL test on a modem which is set to auto speed and to any clocking mode except external clocking, then the Nx64k interface speed goes to 2 Mbps during the execution of the test.
5. Older firmware versions of the Crocus HDSL do not support the auto speed feature. This means that no time slot information can be exchanged. In that case, the modem that does support auto speed presumes 2 Mbps operation.

## 4.2.8 Onboard G703 interface



The onboard G703 configuration applies on Crocus HDSL Dual Port modems only.

The location of the interface DIP switches is:



DIP switch name	Dual Port TT DS1 no.								Function
	1	2	3	4	5	6	7	8	
onboard G703	on	on	off	off	off	off	off	off	enabled
interface	off	off	on	on	on	on	on	on	disabled



If the onboard G703 interface is disabled by means of the DIP switches, then make that the interface attribute in TMA is also set to disabled.

The location of the interface attribute in the Crocus HDSL containment tree is:



`crocusHDSL/g703OnBoard/interface`

*default: enabled*

A Crocus HDSL Dual Port modem offers the possibility to use the onboard G703 interface together with any Nx64k modular interface.

A typical application of the Crocus HDSL Dual Port modem is a dual voice and data service.

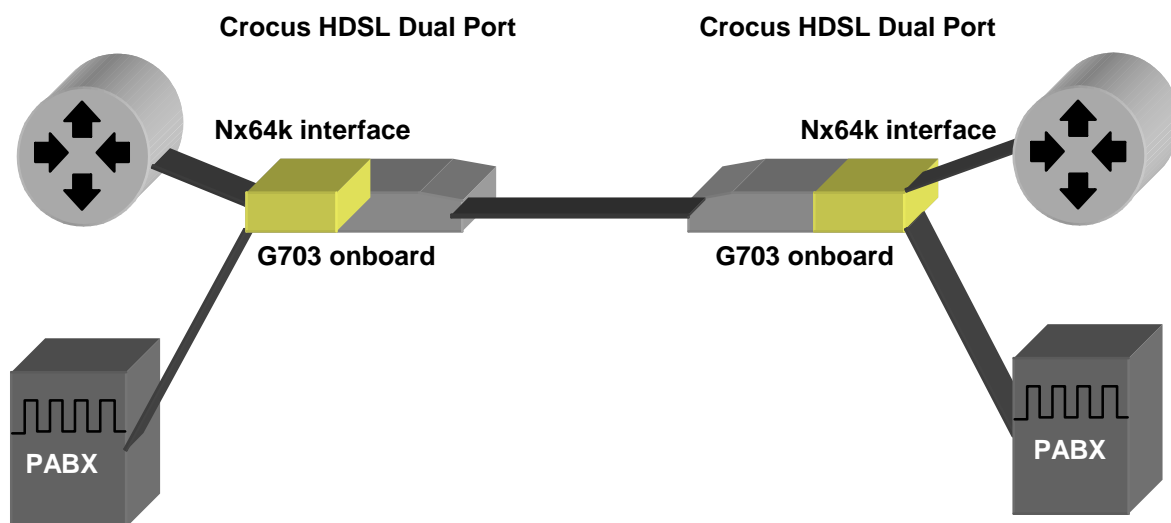


Figure 4.12: Crocus HDSL Dual Port application – dual voice and data service

*Continued on next page*

*Onboard G703 interface (continued)*

The following table shows you how the onboard G703 interface can be combined with a modular interface.


Onboard G703 interface	Modular interface	Result
disabled	present	The modem now acts as a regular Crocus HDSL. It means any interface can be used (Nx64k or non-Nx64k).
enabled	not present	Only the onboard G703 interface is operational. This can be used in framed or unframed mode.
	present	<p>The onboard G703 interface can be used in combination with any Nx64k modular interface. The time slots which are not used by the Nx64k interface are available for the onboard G703 interface.</p> <hr/> <p> <b>Important remarks</b></p> <ol style="list-style-type: none"> <li>1. A G703 modular interface can not be used in combination with the onboard G703 interface.</li> <li>2. The clocking possibilities of the modular interface are reduced to internal clocking only. You are still able to select other clocking modes, but this results in the following: <ul style="list-style-type: none"> <li>– If you select internal preferred, slave receive preferred, external or external loop-back and an external clock coming from the application has been detected, then the clocking mode is set to internal preferred.</li> <li>– In all other cases, the clocking mode is set to internal alternative.</li> </ul> </li> <li>3. If a modular X21 Nx64k interface is used, then an application has to be connected to the onboard G703 interface. This because the clock for the X21 interface is derived from this application.</li> <li>4. If you allocate the time slots on the Nx64k interface, then the onboard G703 interface fills the remaining time slots with its data. When the amount of data of the onboard G703 interface is bigger than the data capacity of the remaining time slots, data will be lost.</li> </ol> <hr/>

Table 4.8: Onboard G703 interface configuration

## 4.2.9 Onboard G703 interface – framing



The onboard G703 configuration applies on Crocus HDSL Dual Port modems only.

The location of the onboard G703 interface framing attribute in the Crocus HDSL containment tree is:



`crocusHDSL/g703OnBoard/framing`

*default: framed*

If the onboard G703 interface is enabled and no modular Nx64k interface is present in the modem its interface slot, then the onboard G703 interface can operate both in unframed or framed mode:

Mode	Description
unframed	A 2 Mbps data stream is sent transparently over the line.
framed (G.704 framing)	Up to 31 time slots each containing a 64 kbps data stream can be sent over the line. Each 64 kbps time slot can be disabled or enabled. In framed mode, time slot 0 is reserved for synchronization and signaling.

Table 4.9: Onboard G703 interface – unframed and framed mode

However, if a modular Nx64k interface is present in the modem its interface slot, then the onboard G703 interface automatically works in framed mode. This implies that in such a situation the `g703OnBoard/framing` attribute is ignored.



If you allocate the time slots on the Nx64k interface, then the onboard G703 interface fills the remaining time slots with its data. When the amount of data of the onboard G703 interface is bigger than the data capacity of the remaining time slots, data will be lost.

### 4.3 Remote powering for the Card Version

The DIP switch settings to enable remote powering or wetting current operation for the CV are quite straight forward. Therefore, they are mentioned in this manual and not in the Crocus HDSL Remote Power manual.

The following table shows which DIP switches of the CV should be set *off*, when the CN4 Remote Power add-on chassis is used to enable remote powering or wetting current operation.



Type	All positions of the following DIP switches should be set <i>off</i> for remote powering:
Crocus HDSL 2P CV (Twin version) modem A	DS8
Crocus HDSL 2P CV (Twin version) modem B	DS9
Crocus HDSL 3P CV (Single version)	DS8 & DS9

Table 4.10: Remote powering DIP switches on the CV

For more information on connections between the CN4 card nest and the CN4 RP add-on chassis, refer to the CN4 RP add-on chassis manual.

## 4.4 Activating the configuration

Once the basic configuration of the Crocus HDSL is made, it has to be activated.


In case of configuration with ...	do the following ...
the DIP switches	start-up the Crocus HDSL.
TMA	press the following button:  .

Table 4.11: Activating the configuration

When you configured both local and remote modem, try sending data to check whether the data link is established. If any problems occur, the status, performance and alarm attributes of the Crocus HDSL can be checked. Refer to the reference manual for more information on these attributes.



# Reference manual



## 5. Configuration attributes

This chapter discusses the configuration attributes of the Crocus HDSL. The following table gives an overview of this chapter.

Section	Title	Page
5.1	Configuration attribute overview	65
5.2	Crocus HDSL configuration attributes	67
5.3	Modem configuration attributes	75
5.4	Line configuration attributes	84
5.5	NMS configuration attributes	85
5.6	Power-off detection configuration attributes	86
5.7	Interface configuration attributes	88
5.8	Nx64k configuration attributes	96
5.9	Remote power configuration attributes	97

## 5.1 Configuration attribute overview

### > crocusHDSL

sysName  
 sysContact  
 sysLocation  
 security  
 forwardTMAToNMSPort <sup>(1)</sup>  
 forwardTMAToLine  
 bootFromFlash  
 alarmMask  
 alarmLevel  
 alarmContactHighMask  
 alarmContactLowMask  
 Action: Activate Configuration  
 Action: Load Saved Configuration  
 Action: Load Default Configuration  
 Action: Cold Boot

<sup>(1)</sup> TT only

### >> modem

retimingBuffer  
 tests  
 retrain  
 fallbackStepup  
 auxChannelMode  
 alarmMask  
 alarmLevel  
 alarmContactHighMask  
 alarmContactLowMask  
 syncLossAlarmTimeout  
 highBitErrorAlarm  
 lowBitErrorAlarm  
 nEBECountAlarm  
 fEBECountAlarm  
 chanunitMode  
 channel

### >>> line[ ]

alarmMask  
 alarmLevel  
 alarmContactHighMask  
 alarmContactLowMask

*Continued in next column*

*(continued)*

### >> nMS(Twin)

cms2Address

### >> powerOffDetection <sup>(2)</sup>

mode  
 alarmMask  
 alarmLevel  
 alarmContactHighMask  
 alarmContactLowMask

<sup>(2)</sup> non-Remote Power modem only

### >> rs530, v35, v36 <sup>(3)</sup>

rTSCControl  
 cTSDelay  
 tests  
 alarmMask  
 alarmLevel  
 alarmContactHighMask  
 alarmContactLowMask  
 clocking

### >> x21 <sup>(3)</sup>

alarmMask  
 alarmLevel  
 alarmContactHighMask  
 alarmContactLowMask  
 clocking

### >> g703 <sup>(3)</sup>

g703Coding  
 framing  
 tests  
 cRC4Insertion  
 alarmMask  
 alarmLevel  
 alarmContactHighMask  
 alarmContactLowMask

*Continued on next page*

*Configuration attribute overview (continued)***>> bridge** <sup>(3)</sup>

IANFilter  
 alarmMask  
 alarmLevel  
 alarmContactHighMask  
 alarmContactLowMask  
 clocking

**>> router** <sup>(3)</sup>

alarmMask  
 alarmLevel  
 alarmContactHighMask  
 alarmContactLowMask  
 clocking

<sup>(3)</sup> only present when the corresponding interface is used

**>> g703OnBoard** <sup>(4)</sup>

interface  
 g703Coding  
 framing  
 tests  
 cRC4Insertion  
 alarmMask  
 alarmLevel  
 alarmContactHighMask  
 alarmContactLowMask

<sup>(4)</sup> Dual Port modem only

**>> nx64** <sup>(5)</sup>

timeslots  
 autospeed

<sup>(5)</sup> Nx64k interface only

*Continued in next column*

*(continued)***>> remPowerSource(CV)[ ]** <sup>(6)</sup>

mode  
 alarmMask  
 alarmLevel  
 alarmContactHighMask  
 alarmContactLowMask

<sup>(6)</sup> Remote Power Source modem only

**>> remPowerSink** <sup>(7)</sup>

ledPowerSavingMode

<sup>(7)</sup> Remote Power Sink modem only

**>> remPowerWetting(CV)[ ]** <sup>(8)</sup>

mode  
 alarmMask  
 alarmLevel  
 alarmContactHighMask  
 alarmContactLowMask

<sup>(8)</sup> Remote Power Source modem configured for wetting current only

**>> dualPowered** <sup>(9)</sup>

ledPowerSavingMode  
 alarmMask  
 alarmLevel  
 alarmContactHighMask  
 alarmContactLowMask

<sup>(9)</sup> Dual Power modem only

## 5.2 Crocus HDSL configuration attributes



**crocusHDSL/sysName**

*default: empty*

This is a field where you can assign a name to the Crocus HDSL. The field has a limit of 64 characters.

This is a SNMP MIB2 parameter.



**crocusHDSL/sysContact**

*default: empty*

This is a field where you can fill in the name of a contact person together with information on how to contact this person. The field has a limit of 64 characters.

This is a SNMP MIB2 parameter.



**crocusHDSL/sysLocation**

*default: empty*

This is a field where you can fill in the physical location of the Crocus HDSL. The field has a limit of 64 characters.

This is a SNMP MIB2 parameter.



**crocusHDSL/security**

*default: empty*

In order to avoid unauthorized access to the network and the Crocus HDSL, you can create a list of passwords with associated access levels.

Value	Description	Default value
password	The password is a string of maximum 10 characters. A maximum of 5 passwords can be defined.	empty
accessRights	This is a bit string. Each bit corresponds with an access level.	111

The access levels which you can associate with a password are the following:

Value	Description	Default value
ReadAccess	The user is allowed to read all the attributes except the security attributes.	enabled
WriteAccess	The user can modify all the attributes except the security attributes. Moreover, the security attributes cannot be read.	enabled
SecurityAccess	The user can read and modify the security attributes.	enabled



If no passwords are created, everybody has complete access.

If you define at least one password, it is impossible to access the Crocus HDSL with TMA if you do not supply the correct password.

If you create a list of passwords, you should create at least one with write and security access. If not, you will be unable to make configuration and password changes after activation of the new configuration.

*Continued on next page*

*Crocus HDSL configuration attributes (continued)***Clearing the security table**

If you forgot your password or you forgot to create one with write and security access, then load the DIP switch configuration. As a result, the configuration attributes which can not be changed with the DIP switches are reset to their default values. Hence, the security table is cleared.

To clear the security table, proceed as follows:

Step	Action
1	Switch the modem off.
2	Set DIP switch bank DS2 position 8 to <i>off</i> .  To locate this DIP switch bank and for the DIP switch setting procedure, refer to <i>Section 3.1 - Configuration with the DIP switches</i> .
3	Switch the modem on.  ⇒ The modem loads the DIP switch configuration. All configuration attributes which can not be changed with the DIP switches are reset to their default values.
4	After the modem has finished its boot cycle, switch the modem off again.
5	Reset DIP switch bank DS2 position 8 to <i>on</i> .
6	Switch the modem on again.  ⇒ The modem loads the flash memory configuration.
7	Because most configuration attributes have been reset to their default values, you will have to reconfigure the modem. Refer to <i>Chapter 4 - Step-by-step configuration</i> .

Table 5.1: Clearing the security table

*Continued on next page*

*Crocus HDSL configuration attributes (continued)***crocusHDSL/forwardTMAtoNMSPort***default: enabled*

Disables or enables propagation of TMA management information to the NMS port. This allows you to cascade management information through the NMS port towards another modem.

**crocusHDSL/forwardTMAtoLine***default: enabled*

Disables or enables propagation of TMA management information to the line. If forwardTMAtoLine is enabled, management information is sent over the line via a dedicated management channel towards the remote modem.

**Forwarding TMA management information**

The management system has been designed to provide access not only to the local modem, but also to all remote modems in a network.

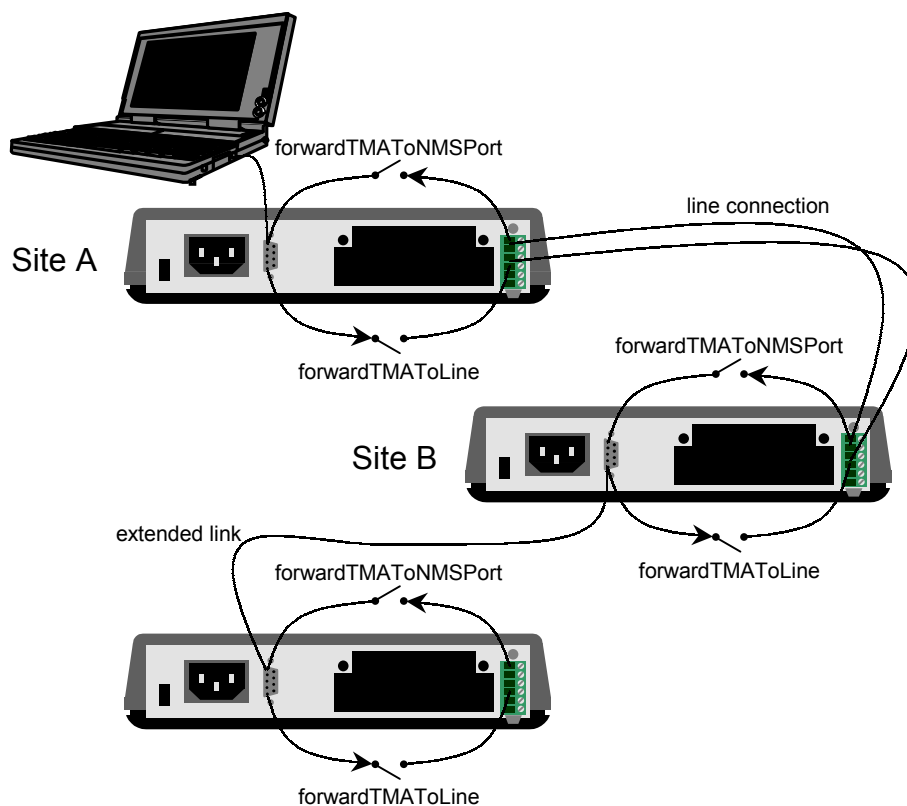


Figure 5.1: TMA access to the remote modems

Management commands and information can be propagated over the line from site A to a remote modem in site B via a dedicated management channel, if the attribute forwardTMAtoLine is enabled. If the remote modem in site B is connected (via its NMS port) to another modem, then the management information can also be propagated to this modem, if the attribute forwardTMAtoNMSPort is enabled.

*Continued on next page*

*Crocus HDSL configuration attributes (continued)***crocusHDSL/bootFromFlash***default: Auto*

The Crocus HDSL has two flash memory banks. Each flash memory can contain a complete software version, but only one can be active. You can choose from the following settings:

Value	If you boot the Crocus HDSL then ...
Flash 1	the first flash memory bank is activated.
Flash 2	the second flash memory bank is activated.
Auto	the Crocus HDSL automatically chooses the flash memory bank containing the most recent software, by comparing the version numbers of the software.



For a Crocus HDSL CV, the bootFromFlash attribute only works on modem A. Although the bootFromFlash attribute is also visible in the containment tree of modem B, but its setting is ignored.

**crocusHDSL/alarmMask**

The alarmMask attribute enables or disables for each alarm of the corresponding object, whether it is communicated to the central management system (e.g. HP OpenView®) or not.

For more information on alarms in general, refer to *Chapter 8 - Alarm attributes*.

For more information on the alarms of the crocusHDSL object, refer to *Section 8.3 - Crocus HDSL alarms*.

**crocusHDSL/alarmLevel**

With this attribute, a priority level can be assigned to each alarm of the corresponding object. The alarm level range goes from 0 to 254, where 0 is the lowest and 254 is the highest priority level.

**crocusHDSL/alarmContactHighMask**

The alarmContactHighMask attribute enables or disables for each alarm of the corresponding object, whether:

- a visual indication is generated (blinking error LED)
- an alarm signal is generated on pin 1 of the auxiliary connector (TT only)
- the alarm contacts on the CN4 card nest are driven (CV only).

**crocusHDSL/alarmContactLowMask**

The alarmContactLowMask attribute enables or disables for each alarm of the corresponding object, whether:

- a visual indication is generated (blinking error LED)
- an alarm signal is generated on pin 9 of the auxiliary connector (TT only)
- the alarm contacts on the CN4 card nest are driven (CV only).

*Continued on next page*

*Crocus HDSL configuration attributes (continued)***Alarm signaling on the TT**

Each alarm can be selected to drive the high or low alarm output pin of the auxiliary connector. A high alarm is located on pin 1 and a low on pin 9 of the auxiliary connector. The electrical characteristics are V.28 compatible:

- a positive (active) voltage indicates an alarm condition
- a negative (inactive) voltage indicates an alarm idle condition.

Except for the alarm signal, also the error LED is driven. This enables easy identification of the device that generated the alarm.

**Alarm output circuit**

Below, an example of an alarm output circuit is given.

If tensionless alarm contacts are required, it is possible to build an alarm output circuit with a minimum of hardware components and without the need for a power supply. Moreover, the amount of hardware is so small that it can be build into the cable connector itself.

The circuit makes use of a solid state relay (SSR) and can be build as a tension free *normal open* or *normal closed* contact, suitable for DC and AC current.

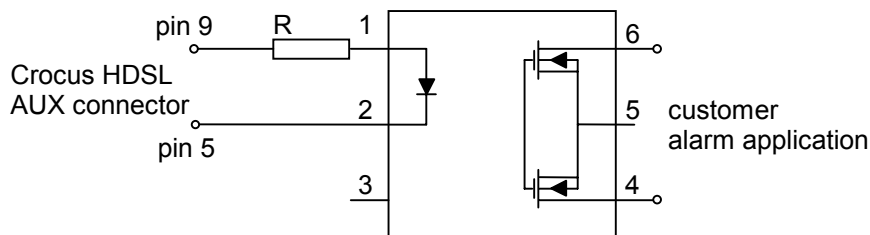


Figure 5.2: Alarm output circuit

Recommended values :

- SSR = LCA110 from Clare Corporation (normally open contact)
- SSR = LCB110 from Clare Corporation (if normally closed contact is required)
- R = 2K2 ...4K7

**Alarm signaling on the CV**

For more information on alarm signaling with the alarm contacts of the CN4 card nest, refer to the CN4 manual.

*Continued on next page*

*Crocus HDSL configuration attributes (continued)***Configuration actions**

Three types of configuration are present in the Crocus HDSL:

- the non-active configuration
- the active configuration
- the default configuration.

When configuring the Crocus HDSL with TMA, as in *Chapter 4 - Step-by-step configuration*, the following happens:

Phase	Action	Result
1	The computer running TMA is connected to the Crocus HDSL.	The non-active configuration is displayed on the screen.
2	Modifications are made on the non-active configuration.	These modifications have no immediate influence on the active configuration currently used by the Crocus HDSL.
3	All necessary modifications are carried out on the non-active configuration.	Now, the non-active configuration has to be made active.
4	Execute the Activate Configuration action.	The non-active configuration becomes the active configuration.

Table 5.2: The non-active, active and default configuration

**crocusHDSL/Activate Configuration**

If you execute this action, the editable non-active configuration becomes the active configuration.

To activate a configuration, proceed as follows:

Step	Action
1	In the TMA window, select the top object <code>crocusHDSL</code> and the group <code>Configuration</code> .
2	In the action window of TMA, click the left mouse button on <code>Activate Configuration</code> so that this action is selected.
3	Press the right mouse button and select <u>E</u> ecute.

Table 5.3: Activating a configuration



The Activate Configuration action can also be performed with the *Send all attributes to device* button: .

*Continued on next page*

*Crocus HDSL configuration attributes (continued)***crocusHDSL/Load Saved Configuration**

If you are in the progress of modifying the non-active configuration but made some mistakes, you might want to revert to the active configuration. If you execute the Load Saved Configuration action, the non-active configuration is overwritten by the active configuration currently used by the Crocus HDSL.

To reload the active configuration, proceed as follows:


Step	Action
1	In the TMA window, select the top object <code>crocusHDSL</code> and the group <code>Configuration</code> .
2	In the action window of TMA, click the left mouse button on Load Saved Configuration so that this action is selected.
3	Press the right mouse button and select <u>E</u> xecute.
4	To see the active configuration, press the <i>Retrieve all attributes from device</i> button:  .

Table 5.4: Loading the active configuration

**crocusHDSL/Load Default Configuration**

If you install the Crocus HDSL for the first time, all configuration attributes are set to their default value. If the Crocus HDSL has already been configured a number of times and you want to reconfigure it starting from scratch, it might be best to load the default configuration.

To load the default configuration, proceed as follows:


Step	Action
1	In the TMA window, select the top object <code>crocusHDSL</code> and the group <code>Configuration</code> .
2	In the action window of TMA, click the left mouse button on Load Default Configuration so that this action is selected.
3	Press the right mouse button and select <u>E</u> xecute.
4	To see the default configuration, press the <i>Retrieve all attributes from device</i> button  .
5	In the action window of TMA, click the left mouse button on Activate Configuration so that this action is selected.
6	Press the right mouse button and select <u>E</u> xecute.

Table 5.5: Loading the default configuration

*Continued on next page*

*Crocus HDSL configuration attributes (continued)***crocusHDSL/Cold Boot**

This action will reboot the Crocus HDSL while the power stays up (the Crocus HDSL also reboots if it is powered down and up again).

This implies that:

- it checks which firmware to use
- it reads the saved configuration and restarts program execution.

You can use this action, for instance, to activate new firmware.

To perform a cold boot, proceed as follows:

Step	Action
1	In the TMA window, select the top object <b>crocusHDSL</b> and the group <b>Configuration, Status, Performance or Alarms</b> .
2	In the action window of TMA, click the left mouse button on <b>Cold Boot</b> so that this action is selected.
3	Press the right mouse button and select <u>E</u> ecute. ⇒ The session between TMA and the Crocus HDSL is interrupted.
4	Reestablish a TMA session on the Crocus HDSL. ⇒ The Crocus HDSL attributes reappear on your screen.

Table 5.6: Performing a cold boot



If a Cold Boot is performed on a Crocus HDSL CV, both modem A and B are rebooted.

## 5.3 Modem configuration attributes



**crocusHDSL/modem/retimingBuffer**

*default: short*

Inside the modem, a buffer is used to reduce jitter on the transmit clock signal. The longer the re-timing, the better the jitter is reduced, but the higher the throughput delay of the link.



**crocusHDSL/modem/tests/keyboard<test>**

*default: enabled*

Use the keyboard<test> attribute to disable or enable the keyboard tests.

The keyboard tests of the Crocus HDSL are useful to trace possible problems when installing the modem. Once installed, it can be better to disable some keyboard tests. This prevents accidental initiation of a test resulting in a disturbance of the data transfer.

The available keyboard tests are:

Value	Description
keyboardET	Error Test which can be initiated by the buttons on the front panel of the modem.
keyboardAL	Analogue Loop which can be initiated by the buttons on the front panel of the modem.
keyboardRDL	Remote Digital Loop which can be initiated by the buttons on the front panel of the modem.
keyboardDL	Digital Loop which can be initiated by the buttons on the front panel of the modem.

For more information on these tests, refer to *Chapter 11 - Diagnostic tests*.



**crocusHDSL/modem/tests/detectRDL**

*default: enabled*

When set to disabled, this attribute prevents that a digital loop can be performed by a remote modem on the local modem.



When detectRDL is disabled, and a remote modem initiates a RDL test, the local modem will not go in digital loop. However, the DTE interface of the remote modem will be clamped and data transfer is interrupted.



**crocusHDSL/modem/tests/aLDuration**

*default: 00000d 00h 03m 00s*

The analogue loop (AL) test causes a contact loss between the management system and the remote modem. Therefore, this test is automatically terminated after a time-out period which is specified in aLDuration.

The time-out range goes from 00h 00m 01s up to 18h 12m 15s. Entering 00h 00m 00s disables the time-out period.

*Continued on next page*

*Modem configuration attributes (continued)***crocusHDSL/modem/tests/testPattern***default: 2exp15-1*

With this attribute seven different test patterns can be selected. The selected pattern is used when the error test (ET) is initiated. The different patterns are:

Test pattern	Description
2exp4-1	$1 + x^3 + x^4$
2exp15-1	$1 + x^{14} + x^{15}$
2exp20-1	$1 + x^{17} + x^{20}$ This test pattern is not the 2exp20-1 pattern as defined by CCITT Recommendation V.57. On the Crocus HDSL this pattern is a Quasi Random Signal Source: a 2exp20-1 pattern modified to transmit a maximum of 14 consecutive zeros.
2exp23-1	$1 + x^{18} + x^{23}$
Mark	The test pattern consists completely out of 1's.
Space	The test pattern consists completely out of 0's.
Dot	The test pattern consists of 1's alternated with 0's. E.g. 0101010101

**crocusHDSL/modem/tests/rldDestination***default: remote modem*

You can use a Crocus HDSL Repeater to increase the maximum distance between two Crocus HDSL modems. In that case, when performing RDL tests, you can specify on which device the RDL test has to be executed:

Value	Description
remote modem	The RDL test is executed on the remote modem.
repeater 1	The RDL test is executed on the first Crocus HDSL Repeater.
repeater 2	The RDL test is executed on the second Crocus HDSL Repeater. (In case of a link with two Crocus HDSL Repeaters.)

**Important remark**

1. Before an RDL test can be executed on a Crocus HDSL Repeater, the chanunitMode attribute of both the central and remote HDSL has to be set to serial swap.
2. The firmware version of the Crocus HDSL Repeater has to allow management.

*Continued on next page*

*Modem configuration attributes (continued)***crocusHDSL/modem/retrain**

The following two attributes define at what bit error rate (BER) a retrain cycle will be initiated in case the line quality deteriorates.

Attribute	Description	Range	Default
averagingPeriod (seconds)	Period, in seconds, over which the average BER value is calculated. If within this period the average BER value equals or exceeds the value entered in the threshold attribute, the modem will retrain.	1 ... 255	10
threshold	BER value which defines when the modem should retrain.	$2 \times 10^{-3} \dots 10^{-5}$	$10^{-3}$

**crocusHDSL/modem/fallbackStepup**

You can configure the modem so that it performs a fall-back or step-up when the line quality of one of the line pairs deteriorates or improves. The deactivation and reactivation of a line pair is based on a bit error rate measurement per line pair.

- Fall-back means that the modem disables the deteriorated line pair, and continues with a reduced number of line pairs.
- Step-up means the line pair is reused when the line problems are solved.



The fall-back / step-up mechanism is only possible when framing is used. I.e. when you use a ...

- G703 interface in G.704 framed mode
- Nx64k interface.

The fallbackStepup configuration attributes are:

Attribute	Description	Range	Default
autoFallbackStepup	Disables or enables the fall-back / step-up mechanism.		disabled
fallbackAveragingPeriod(seconds)	Period, in seconds, over which the average BER value is calculated in fall-back operation. If within this period the average BER value equals or exceeds the value entered in the fallbackThreshold attribute, the modem will fall back.	1 ... 255	10
fallbackThreshold	BER value which defines when the modem should fall back.	$2 \times 10^{-3} \dots 10^{-9}$	$10^{-4}$
stepupAveragingPeriod(seconds)	Period, in seconds, over which the average BER value is calculated in step-up operation. If within this period the average BER value equals or drops below the value entered in the stepupThreshold attribute, the modem will step up.	1 ... 255	10
stepupThreshold	BER value which defines when the modem should step up.	$2 \times 10^{-3} \dots 10^{-9}$	$10^{-5}$

*Continued on next page*

*crocusHDSL/modem/fallbackStepup (continued)*

### Time slot priority levels

The time slots of such a framed data stream have certain priority levels. Under normal circumstances high priority is given to the time slots on line pair 1. Medium priority time slots are those on line pair 2. Low priority time slots are those on line pair 3 (in case of a 3 pair modem only).

The mapping of the time slots on the line pairs is conform the ETSI ETR-152 recommendation.

Crocus HDSL 2 pair	
Line pair 1	Line pair 2
TS0	TS0
TS1	TS2
TS3	TS4
TS5	TS6
TS7	TS8
TS9	TS10
TS11	TS12
TS13	TS14
TS15	TS16
TS16	TS17
TS18	TS19
TS20	TS21
TS22	TS23
TS24	TS25
TS26	TS27
TS28	TS29
TS30	TS31

Crocus HDSL 3 pair		
Line pair 1	Line pair 2	Line pair 3
TS0	TS0	TS0
TS1	TS2	TS3
TS4	TS5	TS6
TS7	TS8	TS9
TS10	TS11	TS12
TS13	TS14	TS15
TS16	TS16	TS16
TS17	TS18	TS19
TS20	TS21	TS22
TS23	TS24	TS25
TS26	TS27	TS28
TS29	TS30	TS31

### Priority time slot preservation

In fall-back operation, the high priority time slots are preserved. This means that if line pair 1 would fail, the high priority time slots are moved to line pair 2.

If a Nx64k interface operating in either internal or slave receive clocking is used, the interface speed is automatically adapted when time slots are lost due to line pair failure. This guarantees communication integrity, even in case of line problems.

In order to keep the highest possible Nx64k interface speed in fall-back operation, it is recommended to allocate the high priority time slots first. In case you enabled the auto speed feature, this is done automatically.

*Continued on next page*

*Modem configuration attributes (continued)***crocusHDSL/modem/auxChannelMode***default: alarm signalling*

Using the `auxChannelMode` attribute you can determine for which purpose the auxiliary connector is used. The following table clarifies this:

Value	Description
disabled	Disables the auxiliary connector.
alarm signalling	In case an alarm occurs, the high or low alarm output pin of the auxiliary connector are driven. For more information on alarm signaling, refer to <i>Section 5.2 - Crocus HDSL configuration attributes</i> , the <code>alarmContactHighMask</code> and <code>alarmContactLowMask</code> configuration attributes.
transparent	A secondary channel can be put on the auxiliary connector. It is a transparent asynchronous 2400 bps channel.

**Secondary channel and TMA access simultaneously**

Even when using the secondary channel, the auxiliary connector can still be used to access the Crocus HDSL with TMA. However, you have to use an adapter cable.

Example:

Suppose you want to use the secondary channel of a Crocus HDSL TT and simultaneously run a TMA session. In that case, use a cable with ...

- one connector at one side, in order to connect to the auxiliary connector
- two connectors at the other side, in order to connect to ...
  - the PC running TMA
  - the application that needs the secondary channel.

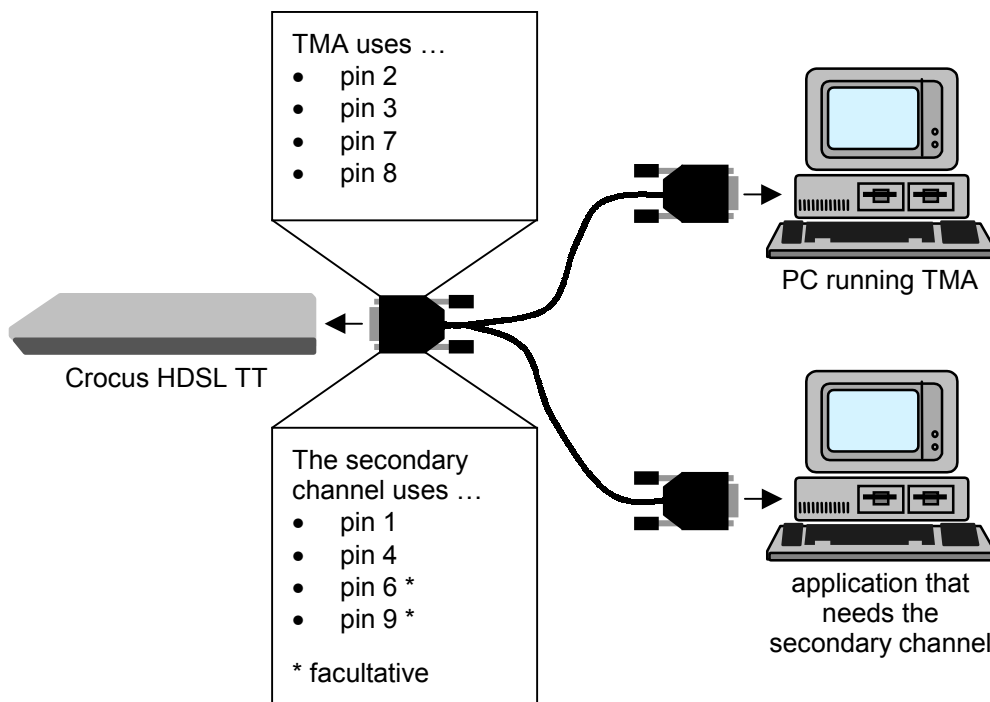


Figure 5.3: Auxiliary channel mode – a secondary channel and TMA access simultaneously

For the pin layout of the 9 pins subD auxiliary connector, refer to *Section 12.5 - Auxiliary connector*.

*Continued on next page*

*Modem configuration attributes (continued)***crocusHDSL/modem/alarmMask**

The alarmMask attribute enables or disables for each alarm of the corresponding object, whether it is communicated to the central management system (e.g. HP OpenView®) or not.

**crocusHDSL/modem/alarmLevel**

With this attribute, a priority level can be assigned to each alarm of the corresponding object. The alarm level range goes from 0 to 254, where 0 is the lowest and 254 is the highest priority level.

**crocusHDSL/modem/alarmContactHighMask**

The alarmContactHighMask attribute enables or disables for each alarm of the corresponding object, whether:

- a visual indication is generated (blinking error LED)
- an alarm signal is generated on pin 1 of the auxiliary connector (TT only)
- the alarm contacts on the CN4 card nest are driven (CV only).

**crocusHDSL/modem/alarmContactLowMask**

The alarmContactLowMask attribute enables or disables for each alarm of the corresponding object, whether:

- a visual indication is generated (blinking error LED)
- an alarm signal is generated on pin 9 of the auxiliary connector (TT only)
- the alarm contacts on the CN4 card nest are driven (CV only).

For more information on alarms in general, refer to *Chapter 8 - Alarm attributes*.

For more information on the alarms of the modem object, refer to *Section 8.4 - Modem alarms*.

**crocusHDSL/modem/syncLossAlarmTimeout**

*default: 000000d 00h 00m 10s*

Use this attribute to define how long synchronization may be lost before a synchronization loss alarm is generated.

The time-out range goes from 00m 00s up to 04m 15s.



If fall-back is enabled, then no synchronization loss alarm is generated as long as a line pair is available.

*Continued on next page*

*Modem configuration attributes (continued)***crocusHDSL/modem/highBitErrorAlarm****crocusHDSL/modem/lowBitErrorAlarm**

The Crocus HDSL permanently monitors the bit error rate (BER) of the line. When certain values are exceeded, the Crocus HDSL generates a bit error alarm. The bit error alarm is divided in two levels:

- **highBitErrorAlarm**: the BER has reached critical values. Line quality is extremely bad.
- **lowBitErrorAlarm**: the BER has not yet reached critical values, but line quality is not longer optimum.

These two configuration attributes and their underlying values define at what BER a high or low bit error alarm will be generated in case the line quality deteriorates.

The **highBitErrorAlarm** configuration attributes are:

Attribute	Description	Range	Default
averagingPeriod (seconds)	Period, in seconds, over which the average BER value is calculated.	1 ... 255	60
onThreshold	If within the averagingPeriod the average BER value equals or exceeds the value entered in the onThreshold attribute, the modem will generate a high bit error alarm.	$2 \times 10^{-3} \dots 10^{-5}$	$10^{-3}$
offThreshold	If a high bit error alarm is active, and within the averagingPeriod the average BER value equals or drops below the value entered in the offThreshold attribute, the modem will clear the high bit error alarm.	$2 \times 10^{-3} \dots 10^{-5}$	$10^{-4}$

The **lowBitErrorAlarm** configuration attributes are:

Attribute	Description	Range	Default
averagingPeriod (minutes)	Period, in minutes, over which the average BER value is calculated.	1 ... 60	10
onThreshold	If within the averagingPeriod the average BER value equals or exceeds the value entered in the onThreshold attribute, the modem will generate a low bit error alarm.	$10^{-5} \dots 10^{-9}$	$10^{-6}$
offThreshold	If a low bit error alarm is active, and within the averagingPeriod the average BER value equals or drops below the value entered in the offThreshold attribute, the modem will clear the low bit error alarm.	$10^{-5} \dots 10^{-9}$	$10^{-7}$



Avoid setting the averaging period too short. The shorter this period, the faster an alarm will be generated. As transmissions errors are statistically spread, a short averaging period could result in spurious alarms.

The low bit error rate alarm requires a longer averaging period. Therefore, the averaging period is expressed in minutes instead of seconds.

*Continued on next page*

*Modem configuration attributes (continued)***crocusHDSL/modem/nEBECountAlarm**

An alarm can be generated when the near end block error (NEBE) rate on a line pair exceeds a predefined value. The NEBE is expressed as block errors per second and is calculated by counting cyclic redundancy check (CRC) errors on the framed data on the line. The CRC is calculated every 6 msec, which results in a range of 0 ... 166 CRC errors per second.

The nEBECountAlarm configuration attributes are:

Attribute	Description	Range	Default
averagingPeriod (seconds)	Period, in seconds, over which the average NEBE value is calculated.	1 ... 255	3
onThreshold	If within the averagingPeriod the average NEBE value equals or exceeds the value entered in the onThreshold attribute, the modem will generate a NEBE alarm.	1 ... 166	3
offThreshold	If a NEBE alarm is active, and within the averagingPeriod the average NEBE value equals or drops below the value entered in the offThreshold attribute, the modem will clear the NEBE alarm.	0 ... 166	0

**crocusHDSL/modem/fEBECountAlarm**

The NEBE measured on the remote side of the line is called the far end block error rate (FEBE). This count is communicated to the local side. An alarm can be generated when the FEBE on a line pair exceeds a predefined value. This alarm is especially useful for generating a local alarm when a remote performance problem is detected.

The fEBECountAlarm configuration attributes are:

Attribute	Description	Range	Default
averagingPeriod (seconds)	Period, in seconds, over which the average FEBE value is calculated.	1 ... 255	3
onThreshold	If within the averagingPeriod the average FEBE value equals or exceeds the value entered in the onThreshold attribute, the modem will generate a FEBE alarm.	1 ... 166	3
offThreshold	If a FEBE alarm is active, and within the averagingPeriod the average FEBE value equals or drops below the value entered in the offThreshold attribute, the modem will clear the FEBE alarm.	0 ... 166	0

*Continued on next page*

*Modem configuration attributes (continued)***crocusHDSL/modem/chanunitMode***default: serial*

You can use a Crocus HDSL Repeater to increase the maximum distance between two Crocus HDSL modems. The initial firmware of the Crocus HDSL Repeater, did not allow management of the repeater. However, with new releases of the Crocus HDSL Repeater firmware, management is introduced.

Therefore, the `chanunitMode` attribute is introduced on the Crocus HDSL modem. This attribute has the following values:

Value	Description
serial	Select this for <i>normal operation</i> mode.
serial swap	Select this for <i>manageable Crocus HDSL Repeater</i> mode.



Both central and remote modem have to be set to the same mode.

**crocusHDSL/modem/channel***default: remote for TT / central for CV*

The `channel` attribute defines which modem is the central and which the remote modem. I.e. it determines which modem acts as master and which as slave during the synchronization procedure of the modem.

For more information, refer to *Section 4.2.2 - Channel*.

## 5.4 Line configuration attributes



### `crocusHDSL/modem/line[ ]/alarmMask`

The `alarmMask` attribute enables or disables for each alarm of the corresponding object, whether it is communicated to the central management system (e.g. HP OpenView®) or not.



### `crocusHDSL/modem/line[ ]/alarmLevel`

With this attribute, a priority level can be assigned to each alarm of the corresponding object. The alarm level range goes from 0 to 254, where 0 is the lowest and 254 is the highest priority level.



### `crocusHDSL/modem/line[ ]/alarmContactHighMask`

The `alarmContactHighMask` attribute enables or disables for each alarm of the corresponding object, whether:

- a visual indication is generated (blinking error LED)
- an alarm signal is generated on pin 1 of the auxiliary connector (TT only)
- the alarm contacts on the CN4 card nest are driven (CV only).



### `crocusHDSL/modem/line[ ]/alarmContactLowMask`

The `alarmContactLowMask` attribute enables or disables for each alarm of the corresponding object, whether:

- a visual indication is generated (blinking error LED)
- an alarm signal is generated on pin 9 of the auxiliary connector (TT only)
- the alarm contacts on the CN4 card nest are driven (CV only).

For more information on alarms in general, refer to *Chapter 8 - Alarm attributes*.

For more information on the alarms of the line object, refer to *Section 8.5 - Line alarms*.

## 5.5 NMS configuration attributes



For a Crocus HDSL TT, this object is called nMS. For a Crocus HDSL CV, this object is called nMSTwin.



crocusHDSL/nMS(Twin)/cms2Address

default: 0

If you want to connect with TMA to a modem, you have to specify the address of the modem in the *Select device* window. Refer to *Section 3.2.2 - Connecting to a Crocus HDSL with TMA*.

There are two different types of addresses:

Address type	Description
relative	<p>This type of addressing is meant for a network topology where the modems are connected <i>in-line</i> on management level. I.e. with extended management links between two modems. An extended management link is realized with a cross connect cable between the auxiliary connectors of two modems. Refer to <i>Figure 5.4: Relative addressing</i>.</p> <p>To enable relative addressing, no address has to be specified in the modem.</p>
absolute	<p>This type of addressing is meant for a network topology where the modems are not connected <i>in-line</i> on management level. I.e. when there is a digital multipoint device present. Refer to <i>Figure 5.5: Absolute addressing</i>.</p> <p>To enable absolute addressing, an address has to be specified in the modem. This is done with the attribute cms2Address. The absolute addressing range goes from 0 up to 65535.</p>

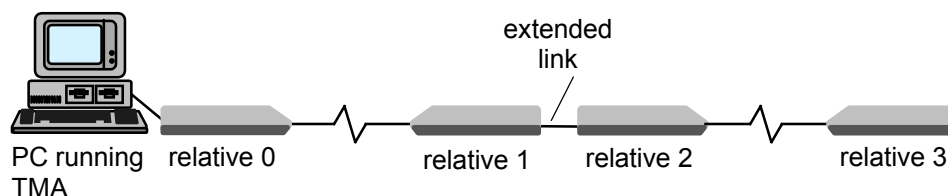


Figure 5.4: Relative addressing

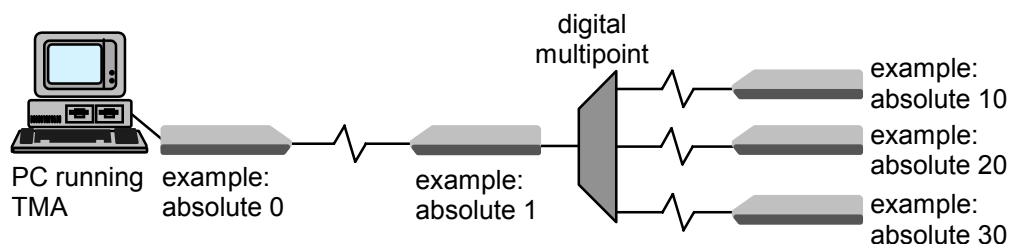


Figure 5.5: Absolute addressing

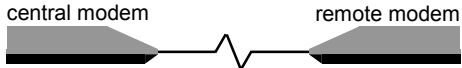
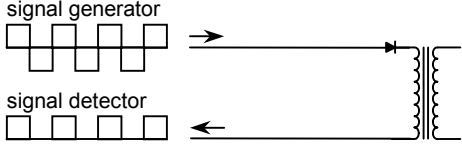
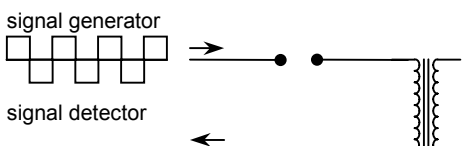
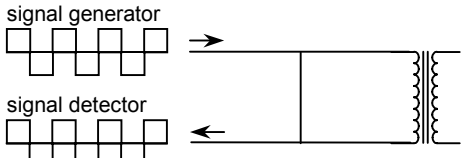
## 5.6 Power-off detection configuration attributes



The power-off detection mechanism is only available on non-remote powering modems.

When the remote modem generates a SyncLoss alarm, the power-off detection mechanism gathers information which enables you to determine the possible cause of the synchronization loss.

The mechanism works as follows:

Situation	Description
normal operation	<p>The following figure shows a local – remote configuration:</p>  <p>On detection of a SyncLoss alarm, the central modem generates an alternating DC current on the first wire of the line pair and detects the signal on the second wire of the line pair, as shown below.</p>
remote power fail	<p>When the remote modem is not powered, a diode is introduced in the line circuitry. Consequently, the alternating DC current is rectified which is detected by the central modem. It generates a remote power fail alarm.</p> 
open line	<p>When the line is interrupted, no signal returns. This is detected by the central modem and generates an open line alarm.</p> 
shorted line	<p>When the line is short circuited, the signal returns unmodified. This is detected by the central modem and generates a short circuit alarm.</p> 

Due to the nature of the short circuit detection mechanism, it is possible that a cause other than a short circuited line triggers this alarm.

E.g. some error which makes normal data transfer impossible, which causes the SyncLoss alarm. But as long as the remote modem is powered, the line transformer is not replaced by the diode. Consequently, the signal which is put on the line returns unmodified. This may be interpreted as a short circuit situation.



When a CV is powered down, no diode is introduced in the line circuitry. Therefore, the power-off detection does not work when a CV is the remote modem.



`crocusHDSL/powerOffDetection/mode`

*default: disabled*

Use this attribute to disable or enable the power-off detection mechanism.

*Continued on next page*

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*Power-off detection configuration attributes (continued)*

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**crocusHDSL/powerOffDetection/alarmMask**

The alarmMask attribute enables or disables for each alarm of the corresponding object, whether it is communicated to the central management system (e.g. HP OpenView®) or not.

**crocusHDSL/powerOffDetection/alarmLevel**

With this attribute, a priority level can be assigned to each alarm of the corresponding object. The alarm level range goes from 0 to 254, where 0 is the lowest and 254 is the highest priority level.

**crocusHDSL/powerOffDetection/alarmContactHighMask**

The alarmContactHighMask attribute enables or disables for each alarm of the corresponding object, whether:

- a visual indication is generated (blinking error LED)
- an alarm signal is generated on pin 1 of the auxiliary connector (TT only)
- the alarm contacts on the CN4 card nest are driven (CV only).

**crocusHDSL/powerOffDetection/alarmContactLowMask**

The alarmContactLowMask attribute enables or disables for each alarm of the corresponding object, whether:

- a visual indication is generated (blinking error LED)
- an alarm signal is generated on pin 9 of the auxiliary connector (TT only)
- the alarm contacts on the CN4 card nest are driven (CV only).

For more information on alarms in general, refer to *Chapter 8 - Alarm attributes*.

For more information on the alarms of the powerOffDetection object, refer to *Section 8.6 - Power-off detection alarms*.

## 5.7 Interface configuration attributes

This section discusses the configuration attributes of the different DTE interfaces. The following table gives an overview of this section.

Section	Title	Page
5.7.1	General interface configuration attributes	89
5.7.2	RS530, V35 and V36 interface configuration attributes	90
5.7.3	X21 interface configuration attributes	91
5.7.4	G703 interface configuration attributes	92
5.7.5	Bridge interface configuration attributes	93
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5.7.7	Onboard G703 interface configuration attributes	95

The following interface configuration attribute overview can be split in several sections:

- One section discussing the general interface configuration attributes. These are applicable on all interfaces.
- Six sections discussing the specific interface configuration attributes.

### 5.7.1 General interface configuration attributes



#### `crocusHDSL/<interface>/alarmMask`

The `alarmMask` attribute enables or disables for each alarm of the corresponding object, whether it is communicated to the central management system (e.g. HP OpenView<sup>®</sup>) or not.



#### `crocusHDSL/<interface>/alarmLevel`

With this attribute, a priority level can be assigned to each alarm of the corresponding object. The alarm level range goes from 0 to 254, where 0 is the lowest and 254 is the highest priority level.



#### `crocusHDSL/<interface>/alarmContactHighMask`

The `alarmContactHighMask` attribute enables or disables for each alarm of the corresponding object, whether:

- a visual indication is generated (blinking error LED)
- an alarm signal is generated on pin 1 of the auxiliary connector (TT only)
- the alarm contacts on the CN4 card nest are driven (CV only).



#### `crocusHDSL/<interface>/alarmContactLowMask`

The `alarmContactLowMask` attribute enables or disables for each alarm of the corresponding object, whether:

- a visual indication is generated (blinking error LED)
- an alarm signal is generated on pin 9 of the auxiliary connector (TT only)
- the alarm contacts on the CN4 card nest are driven (CV only).

For more information on alarms in general, refer to *Chapter 8 - Alarm attributes*.

For more information on the alarms of the `<interface>` object, refer to *Section 8.7 - Interface alarms*.



Note that the underlying alarms may differ for each interface.

## 5.7.2 RS530, V35 and V36 interface configuration attributes

 **crocusHDSL/<interface>/rTSCControl** *default: external*

Use the rTSCControl attribute to define which device will activate the RTS signal.

For more information, refer to *Section 4.2.3 - RTS control*.


 **crocusHDSL/<interface>/cTSDelay** *default: 0 ms*

Use the cTSDelay attribute to define the delay between the active edge of the incoming RTS signal and the active edge of the outgoing CTS signal.

Following delays can be selected:

- 0 ms
- 4 ms
- 16 ms
- 64 ms

If RTS control is set to ...	then ...
external	a delay is provided between: <ul style="list-style-type: none"> <li>• the moment the active edge of the RTS signal comes in</li> <li>• the moment the active edge of the outgoing CTS signal is generated.</li> </ul>
internal	no delay is provided. The CTS signal is always on.

 Between the moment the RTS signal drops and the moment the CTS signal drops, no delay is provided.

 **crocusHDSL/<interface>/tests** *default: disabled*


Use the tests attribute to disable or enable the interface tests.

As the keyboard tests, the interface tests of the Crocus HDSL are useful to trace possible problems. These interface tests are initiated by the application via the interface. If these tests are not supported by the application, it is possible that an undesired test is activated resulting in a disturbance of the data transfer. Therefore, they are disabled by default.

The available interface tests are:

Test	Description
interfaceAL	Analogue Loop which can be initiated by the application via the interface.
interfaceRDL	Remote Digital Loop which can be initiated by the application via the interface.

For more information on these tests, refer to *Chapter 11 - Diagnostic tests*.

 **crocusHDSL/<interface>/clocking** *default: Internal Preferred*

Use the clocking attribute to select a clocking mode.

For more information, refer to *Section 4.2.4 - Clocking*.

### 5.7.3 X21 interface configuration attributes



`crocusHDSL/x21/clocking`

*default:* Internal Alternative

Use the clocking attribute to select a clocking mode.

For more information, refer to *Section 4.2.4 - Clocking*.

### 5.7.4 G703 interface configuration attributes



#### crocusHDSL/g703/g703Coding

default: HDB3

Use the g703Coding attribute to set the G703 interface encoding mode.

Two encoding modes are available:

Value	Description
AMI	Alternate Mark Inversion is a bipolar code with no zero substitution.
HDB3	High Density Bipolar 3 is a modified bipolar code.  With HDB3 encoding, more than three consecutive zeroes occurring in the data are replaced by a substitution word. This to ensure a high pulse density. Therefore, data links using the HDB3 code can carry data patterns with a low 1 density. Most of the G703 applications use HDB3 encoding.



#### crocusHDSL/g703/framing

default: unframed

Use the framing attribute to set the G703 interface to unframed or framed mode.

For more information, refer to *Section 4.2.5 - G703 interface – framing*.



#### crocusHDSL/g703/tests

default: disabled

Use the tests attribute to disable or enable the interface tests.

As the keyboard tests, the interface tests of the Crocus HDSL are useful to trace possible problems. These interface tests are initiated by the application via the interface. If these tests are not supported by the application, it is possible that an undesired test is activated resulting in a disturbance of the data transfer. Therefore, they are disabled by default.

The available interface tests are:

Test	Description
interfaceAL	Analogue Loop which can be initiated by the application via the interface.
interfaceRDL	Remote Digital Loop which can be initiated by the application via the interface.

For more information on these tests, refer to *Chapter 11 - Diagnostic tests*.



#### crocusHDSL/g703/cRC4Insertion

default: disabled

Use the cRC4Insertion attribute to disable or enable the cyclic redundancy check (CRC):

Value	Description
enabled	A CRC is inserted in time slot 0 of the G.704 framed data stream. This CRC is used to check the data integrity on the G.703 connection.  When FAS-CRC or MFAS-CRC synchronization is used in the G.704 framing, the cRC4Insertion attribute has to be set to enabled.
disbaled	The CRC-4 bits in the data stream are set to 1.

### 5.7.5 Bridge interface configuration attributes



`crocusHDSL/bridge/IANFilter`

*default:* disabled

Use the IANFilter attribute to disable or enable the bridge (filter) functionality:

Value	Description
enabled	The Bridge acts as a filter. Refer to <i>Figure 5.6: Bridge functionality</i> .  Data coming from network 1, will only be let through by the Bridge if this data has a destination address on network 2. This means the Bridge filters the data and by doing this relieves both networks.
disabled	The Bridge acts as a repeater. Refer to <i>Figure 5.6: Bridge functionality</i> .  All the data which originates from network 1 will be let through to network 2. Even if the data is not destined for that network.

The following figure depicts a Bridge setup:

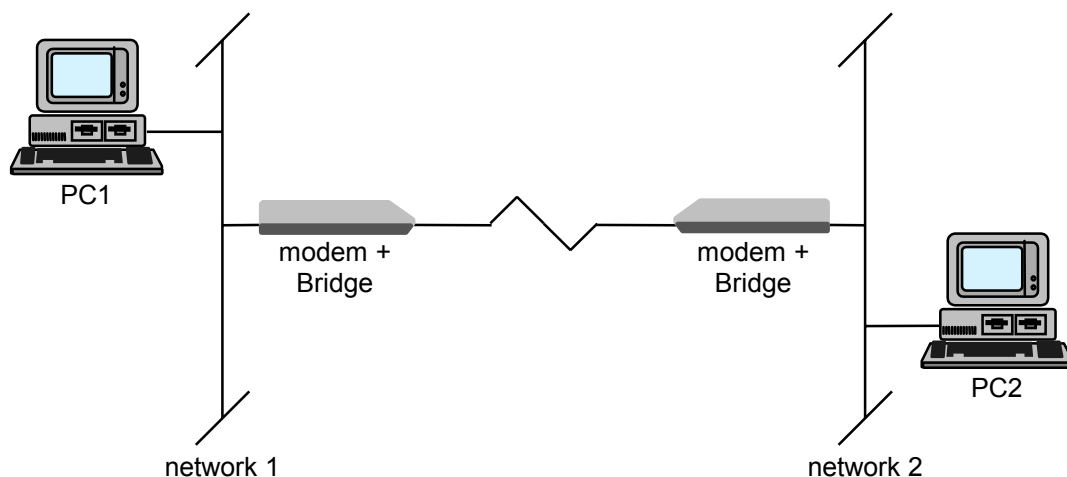


Figure 5.6: Bridge functionality



`crocusHDSL/bridge/clocking`

*default:* Internal Alternative

Use the clocking attribute to select a clocking mode.

For more information, refer to *Section 4.2.4 - Clocking*.

## 5.7.6 Router interface configuration attributes



crocusHDSL/router/clocking

*default:* Internal Alternative

Use the clocking attribute to select a clocking mode.

For more information, refer to *Section 4.2.4 - Clocking*.

### 5.7.7 Onboard G703 interface configuration attributes



The onboard G703 configuration applies on Crocus HDSL Dual Port modems only.



**crocusHDSL/g703OnBoard/interface**

*default: enabled*

Use this attribute to disable or enable the onboard G703 interface. When enabled, you have the possibility to use the onboard G703 interface together with any Nx64k modular interface.

For more information, refer to *Section 4.2.8 - Onboard G703 interface*.

The location of the onboard G703 interface framing attribute in the Crocus HDSL containment tree is:



**crocusHDSL/g703OnBoard/framing**

*default: framed*

If the onboard G703 interface is enabled and no modular Nx64k interface is present in the modem its interface slot, then the onboard G703 interface can operate both in unframed or framed mode.

However, if a modular Nx64k interface is present in the modem its interface slot, then the onboard G703 interface automatically works in framed mode. This implies that in such a situation the g703OnBoard/framing attribute is ignored.

For more information, refer to *Section 4.2.9 - Onboard G703 interface – framing*.

## 5.8 Nx64k configuration attributes



**crocusHDSL/nx64/timeslots**

*default:* 00000000000000000000000000000001

Use the `timeslots` attribute to configure the Nx64k interface speed to any multiple of 64 kbps up to 2048 kbps by means of G.704 framing.

For more information, refer to *Section 4.2.6 - Nx64k interface – time slots*.



**crocusHDSL/nx64/autospeed**

*default:* enabled

Use the `autospeed` attribute to disable or enable the auto speed feature on a Nx64k interface. When enabled, the modem itself determines the Nx64k interface speed.

For more information, refer to *Section 4.2.7 - Nx64k interface – auto speed*.

## 5.9 Remote power configuration attributes

This section discusses the configuration attributes concerned with remote powering. The following table gives an overview of this section.

Section	Title	Page
5.9.1	Remote Power Source configuration attributes	98
5.9.2	Remote Power Sink configuration attributes	99
5.9.3	Wetting Current configuration attributes	100
5.9.4	Dual Power configuration attributes	101

## 5.9.1 Remote Power Source configuration attributes



### The remPowerSource[ ] object

The remPowerSource[ ] object is only available on a Remote Power Source TT modem.

### The remPowerSourceCV[ ] object

The remPowerSourceCV[ ] object is only available on a Remote Power Source CV modem. This is a CV of which:

- the remote power DIP switches are set to enable remote powering
- the CN4 card nest in which the CV resides is connected to the CN4 RP add-on chassis.



### crocusHDSL/remPowerSource(CV)[ ]/mode

*default: enabled*

Use this attribute to disable or enable remote power operation.

For more information on remote powering – source on ...

- a TT, refer to the Crocus HDSL Remote Power manual.
- a CV, refer to *Section 4.3 - Remote powering for the Card Version* and the CN4 RP add-on chassis manual.



### crocusHDSL/remPowerSource(CV)[ ]/alarmMask

The alarmMask attribute enables or disables for each alarm of the corresponding object, whether it is communicated to the central management system (e.g. HP OpenView®) or not.



### crocusHDSL/remPowerSource(CV)[ ]/alarmLevel

With this attribute, a priority level can be assigned to each alarm of the corresponding object. The alarm level range goes from 0 to 254, where 0 is the lowest and 254 is the highest priority level.



### crocusHDSL/remPowerSource(CV)[ ]/alarmContactHighMask

The alarmContactHighMask attribute enables or disables for each alarm of the corresponding object, whether:

- a visual indication is generated (blinking error LED)
- an alarm signal is generated on pin 1 of the auxiliary connector (TT only)
- the alarm contacts on the CN4 card nest are driven (CV only).



### crocusHDSL/remPowerSource(CV)[ ]/alarmContactLowMask

The alarmContactLowMask attribute enables or disables for each alarm of the corresponding object, whether:

- a visual indication is generated (blinking error LED)
- an alarm signal is generated on pin 9 of the auxiliary connector (TT only)
- the alarm contacts on the CN4 card nest are driven (CV only).

For more information on alarms in general, refer to *Chapter 8 - Alarm attributes*.

For more information on the alarms of the remPowerSource(CV)[ ] object, refer to *Section 8.8 - Remote power alarms*.

## 5.9.2 Remote Power Sink configuration attributes



The remPowerSink object is only available on a Remote Power Sink TT modem.



**crocusHDSL/remPowerSink/ledPowerSavingMode**

*default: enabled*

Use this attribute to disable or enable a number of front panel LEDs. Only the power (PWR) LED and the signal quality (SQ) LEDs remain active. This to reduce the amount of power consumed by the Remote Power Sink modem. As a result, less power has to be introduced on the line. I.e. the Remote Power Source modem has to deliver less power.

For more information on remote powering – sink, refer to the Crocus HDSL Remote Power manual.

### 5.9.3 Wetting Current configuration attributes



#### The remPowerWetting[ ] object

The remPowerWetting[ ] object is only available on a Remote Power Source TT modem for which:

- the appropriate DIP switch on the Remote Power Source modem motherboard is set to enable wetting current
- the straps of the Remote Power Source modules are set to enable wetting current

#### The remPowerWettingCV[ ] object

The remPowerWettingCV[ ] object is only available on a Remote Power Source CV modem. This is a CV of which:

- the remote power DIP switches are set to enable remote powering
- the CN4 card nest in which the CV resides is connected to the CN4 RP add-on chassis
- the straps of the Remote Power Source module in the CN4 RP add-on chassis are set to enable wetting current.



crocusHDSL/remPowerWetting(CV)[ ]/mode

*default: enabled*

Use this attribute to disable or enable wetting current operation.

For more information on remote powering – wetting current on ...

- a TT, refer to the Crocus HDSL Remote Power manual.
- a CV, refer to *Section 4.3 - Remote powering for the Card Version* and the CN4 RP add-on chassis manual.

## 5.9.4 Dual Power configuration attributes



The dualPowered object is only available on a Dual Power TT modem.



**crocusHDSL/dualPowered/ledPowerSavingMode**

*default: enabled*

Use this attribute to disable or enable a number of front panel LEDs. Only the power (PWR) LED and the signal quality (SQ) LEDs remain active. This to reduce the amount of power consumed by the Remote Power Sink modem. As a result, less power has to be introduced on the line. I.e. the Remote Power Source modem has to deliver less power.

For more information on remote powering – dual power, refer to the Crocus HDSL Remote Power manual.



**crocusHDSL/dualPowered/alarmMask**

The alarmMask attribute enables or disables for each alarm of the corresponding object, whether it is communicated to the central management system (e.g. HP OpenView®) or not.



**crocusHDSL/dualPowered/alarmLevel**

With this attribute, a priority level can be assigned to each alarm of the corresponding object. The alarm level range goes from 0 to 254, where 0 is the lowest and 254 is the highest priority level.



**crocusHDSL/dualPowered/alarmContactHighMask**

The alarmContactHighMask attribute enables or disables for each alarm of the corresponding object, whether:

- a visual indication is generated (blinking error LED)
- an alarm signal is generated on pin 1 of the auxiliary connector (TT only)
- the alarm contacts on the CN4 card nest are driven (CV only).



**crocusHDSL/dualPowered/alarmContactLowMask**

The alarmContactLowMask attribute enables or disables for each alarm of the corresponding object, whether:

- a visual indication is generated (blinking error LED)
- an alarm signal is generated on pin 9 of the auxiliary connector (TT only)
- the alarm contacts on the CN4 card nest are driven (CV only).

For more information on alarms in general, refer to *Chapter 8 - Alarm attributes*.

For more information on the alarms of the dualPowered object, refer to *Section 8.8 - Remote power alarms*.

## 6. Status attributes

This chapter discusses the status attributes of the Crocus HDSL. The following table gives an overview of this chapter.

Section	Title	Page
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6.2	Crocus HDSL status attributes	105
6.3	Modem status attributes	107
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6.5	NMS status attributes	111
6.6	Power-off detection status attributes	112
6.7	Interface status attributes	113
6.8	Remote power status attributes	119

## 6.1 Status attribute overview

### > crocusHDSL

sysDesc  
sysObjectID  
systemUpTime  
sysServices  
flash1Version  
flash2Version  
activeFlash  
bootVersion  
deviceID  
**Action:** Cold Boot

### >> modem

testType  
testOriginator  
testStatus  
errorCount  
ifDescr  
ifType  
ifSpeed  
ifOperStatus

### >>> line[ ]

timeSinceLastRetrain  
lineState  
connectionToCentral  
lineAttenuation(dB)  
noiseMargin(dB)  
ifSpeed  
ifOperStatus

### >> nMS(Twin)

cardSlotNumber <sup>(1)</sup>  
cardNestNumber <sup>(1)</sup>  
modemPosition <sup>(1)</sup>  
ifSpeed

<sup>(1)</sup> CV only

### >> powerOffDetection <sup>(2)</sup>

state

<sup>(2)</sup> non-Remote Power modem only

*Continued in next column*

*(continued)*

### >> rs530, v35, v36 <sup>(3)</sup>

tXDCCT103  
rXDCCT104  
rTSCCT105  
cTSCCT106  
dSRCCT107  
dCDCCT109  
rDLCCT140  
aLCCT141  
tICCT142  
ifDescr  
ifType  
ifSpeed  
ifOperStatus

### >> x21 <sup>(3)</sup>

tXDCCT103  
rXDCCT104  
indicator  
ifDescr  
ifType  
ifSpeed  
ifOperStatus

### >> g703 <sup>(3)</sup>

tXDCCT103  
rXDCCT104  
tXDAIS  
tXDLFA  
tXDLOS  
ifDescr  
ifType  
ifSpeed  
ifOperStatus

*Continued on next page*

*Status attribute overview (continued)*

---

**>> bridge <sup>(3)</sup>**

wANTXD  
 wANRXD  
 ifDescr  
 ifType  
 ifSpeed  
 ifOperStatus

---

**>> router <sup>(3)</sup>**

ifDescr  
 ifType  
 ifSpeed  
 ifOperStatus

<sup>(3)</sup> only present when the corresponding interface is used

---

**>> g703OnBoard <sup>(4)</sup>**

tXDCCT103  
 rXDCCT104  
 tXDAIS  
 tXDLFA  
 tXDLOS  
 ifDescr  
 ifType  
 ifSpeed  
 ifOperStatus

<sup>(4)</sup> Dual Port modem only

---

**>> remPowerSource(CV)[ ] <sup>(5)</sup>**

state

<sup>(5)</sup> Remote Power Source modem only

---

**>> remPowerWetting(CV)[ ] <sup>(6)</sup>**

state

<sup>(6)</sup> Remote Power Source modem configured for wetting current only

---

**>> dualPowered <sup>(7)</sup>**

state

<sup>(7)</sup> Dual Power modem only

## 6.2 Crocus HDSL status attributes



### crocusHDSL/sysDesc

This is a description of the device. It is a SNMP MIB2 parameter.

Example: Crocus HDSL TT xP V35 Nx64 Txxxx/xxxxx. In this example the following parameters are visible:

- Crocus HDSL is the modem type
- TT is the modem version
- 2P is the amount of pairs this modem uses
- V35 Nx64 is the interface type
- Txxxx/xxxxx is the firmware code and version.



On an X21 interface a strap is present which allows you to select between external clocking (X) and byte timing (B). However, byte timing is only supported on the Crocus HS, not on other Crocus baseband modems. This means that when an X21 interface strapped for byte timing is inserted in a Crocus HDSL the sysDesc string will display the following: Crocus HDSL TT X21 Wrong HW Strap Txxxx/xxxxx. The Wrong HW Strap messages disappears when you set the X21 interface strap to external clocking.

This is only supported from X21 interface PCB revision 0.2 and onwards.



### crocusHDSL/sysObjectID

This is the SNMP identification string. It is a SNMP MIB2 parameter.

Example: 1.3.6.1.4.1.776.22.



### crocusHDSL/systemUpTime

This is the time since last power-on or cold boot of the Crocus HDSL.

Example: 00005d 02h 42m 15s, which means 5 days, 2 hours, 42 minutes and 15 seconds.



### crocusHDSL/sysServices

This is the SNMP service identification. It is a SNMP MIB2 parameter.

Example: 1, which indicates that the Crocus HDSL is a modem.



### crocusHDSL/flash1Version



### crocusHDSL/flash2Version

This displays the code and version of the firmware currently stored in flash bank 1 and 2, respectively. If a flash bank does not contain firmware then the value is left empty.

Example: Txxxx/xxxxx. In this example the following parameters are visible:

- Txxxx is the firmware code for this device
- xxxxx is the firmware version.



### crocusHDSL/activeFlash

This displays which flash bank is currently active.

Example: Flash2, which means the firmware stored in flash bank 2 currently controls the device.

*Continued on next page*

---

*Crocus HDSL status attributes (continued)*

---

**crocusHDSL/bootVersion**

This displays the code and version of the boot software currently used in the Crocus HDSL.

Example: Txxxx/xxxxx. In this example the following parameters are visible:

- Txxxx is the boot software code for this device
- xxxxx is the boot software version.

**crocusHDSL/deviceID**

This displays a unique code. This code is programmed into the Crocus HDSL before it leaves the factory. You can use this code for inventory purposes.

**crocusHDSL/Cold Boot**

This action will reboot the Crocus HDSL while the power stays up (the Crocus HDSL also reboots if it is powered down and up again).

For more information, refer to *Section 5.2 - Crocus HDSL configuration attributes*.

## 6.3 Modem status attributes



### crocusHDSL/modem/testType

This attribute displays the type of the test which is running. The possible indications are:

Value	Description
NO test	No test is active.
AL test	An analogue loop test is active.
DL test	A digital loop test is active.
RL test	A remote digital loop is active.
ET test	The error test pattern generator / detector is active.
ALET test	An analogue loop in combination with an error test is active.
RLET test	A remote digital loop in combination with an error test is active.



### crocusHDSL/modem/testOriginator

This attribute displays the origin of the test which is running. The possible indications are:

Value	Description
nmstst	The test is initiated by the Telindus Maintenance Application or the central management system (e.g. HP OpenView®).
keyboardst	The test is initiated by means of the buttons on the front panel of the modem.
interfacetst	The test is initiated by the application via the interface.
remotetst	The test is initiated by the remote modem.
unknown	There are two possibilities: <ul style="list-style-type: none"> <li>No test is running.</li> <li>For some reason it is not possible to define the origin of the test.</li> </ul>



### crocusHDSL/modem/testStatus

This attribute displays the status of the test which is running. The possible indications are:

Value	Description
progressing	The test is starting.
running	The test is running.
ending	The test is ending.
unknown	There are two possibilities: <ul style="list-style-type: none"> <li>No test is running.</li> <li>For some reason it is not possible to retrieve the status of the test.</li> </ul>

*Continued on next page*

*Modem status attributes (continued)***crocusHDSL/modem/errorCount**

This attribute displays the amount of detected errors since the start of an ET, ALET or RLET test. Every time a new ET, ALET or RLET is started, the errorCount attribute is reset to 0.



If you start an ET, ALET or RLET test when ...

- the central and remote modem are not synchronized
- not all the lines are connected to the modem
- no lines are connected to the modem

then no error pattern can be sent, hence the error counter can not be read. To indicate this erroneous situation, the errorCount attribute value is set to its maximum value: 65535.

**crocusHDSL/modem/ifDescr**

This attribute displays the interface description. It is a SNMP MIB2 parameter.

The ifDescr value for the modem object is Modem.

**crocusHDSL/modem/ifType**

This attribute displays the interface type. It is a SNMP MIB2 parameter.

The ifType value for the modem object is 1.

**crocusHDSL/modem/ifSpeed**

This attribute displays the current modem speed in bits per second (bps), e.g. 2048000. The modem speed is equal to the sum of the line speeds of all operational line pairs.

**crocusHDSL/modem/ifOperStatus**

This attribute displays the current operation status of the modem.

If fall-back is ...

- disabled, then the ifOperStatus of the modem is up when all the lines are up. As soon as one line goes down, then the ifOperStatus of the modem also goes down.
- enabled, then the ifOperStatus of the modem is up as long as at least one line is up. Only if all the lines are down, then the ifOperStatus of the modem also goes down.

Possible operation status values are:

Value	Description
up	The modem is up, data transfer is possible.
down	The modem is down, data transfer is not possible.
testing	A test is active. For more information on type, originator and status of the test refer to the modem status attributes testType, testOriginator and testStatus.

## 6.4 Line status attributes



`crocusHDSL/modem/line[ ]/timeSinceLastRetrain`

This attribute displays the time the line is in data state since the last retrain cycle.



`crocusHDSL/modem/line[ ]/lineState`

This attribute displays the status of the line. The possible indications are:

Value	Description
idle	No data link is present. No data is being transferred.
training	A training cycle is in progress.
data state	A data link is present. This does not necessarily mean data is being transferred. Refer to the <code>ifOperStatus</code> attribute.



`crocusHDSL/modem/line[ ]/connectionToCentral`

This attribute displays which line connector position of the remote modem is connected to which line connector position of the central modem.

This allows you to detect whether you crossed your line pairs. It is just an indication, because crossing line pairs is allowed. For more information refer to the line connection rules in *Section 2.5.5 - Connecting the lines to the Table Top*.



The `connectionToCentral` attribute is only meaningful for the remote modem.



`crocusHDSL/modem/line[ ]/lineAttenuation(dB)`

This attribute displays the current line attenuation in dB, e.g. 11.0.



`crocusHDSL/modem/line[ ]/noiseMargin(dB)`

This attribute displays the current noise margin of the line in dB, e.g. 2.5.



The status attributes `lineAttenuation(dB)` and `noiseMargin(dB)` do not display meaningful information when the line is not trained or in analogue loop (AL). These attributes are only relevant for a trained line.

*Continued on next page*

*Line status attributes (continued)***crocusHDSL/modem/line[ ]/ifSpeed**

This attribute displays the current line speed in bits per second (bps), e.g. 1024000.

**crocusHDSL/modem/line[ ]/ifOperStatus**

This attribute displays the current operation status of the line. It does not just indicate which line is in data state, but which line is actually used for data transmission.

The possible indications are:

Value	Description
up	The line is up, data transfer is possible.
down	The line is down, data transfer is not possible.
testing	A test is active. For more information on type, originator and status of the test refer to the modem status attributes testType, testOriginator and testStatus.

## 6.5 NMS status attributes

The first three NMS status attributes are specifically for the CV, and are not applicable on the TT.



---

### **crocusHDSL/nMSTwin/cardSlotNumber**

This attribute displays in which slot of the CN4 card nest the CV is positioned.

It is possible to make a management connection to a CV with, for instance, HP OpenView® via the Orchid 1003 LAN management concentrator. In that case, the CV its position in the CN4 card nest has to be known, to enable the Orchid to address the CV.



---

### **crocusHDSL/nMSTwin/cardNestNumber**

This attribute displays the CN4 card nest address.

It is possible to make a management connection to a CV with, for instance, HP OpenView® via the Orchid 1003 LAN management concentrator. As the **cardSlotNumber** status attribute, the **cardNestNumber** status attribute has to be known for addressing purposes. The CN4 card nest address can be set with DIP switches at the back of the card nest. For more information, refer to the CN4 manual.



---

### **crocusHDSL/nMSTwin/modemPosition**

This attribute displays the position of the modem (A or B) on a CV.

It is possible to make a management connection to a CV with, for instance, HP OpenView® via the Orchid 1003 LAN management concentrator. As the **cardSlotNumber** and **cardNestNumber** status attribute, the **modemPosition** status attribute has to be known for addressing purposes.

The following NMS status attribute applies on both the TT and CV.



---

### **crocusHDSL/nMS(Twin)/ifSpeed**

This attribute displays the current management interface speed in bits per second (bps), e.g. 9600.

## 6.6 Power-off detection status attributes



crocusHDSL/powerOffDetection/state

This attribute displays the power-off detection status. The possible indications are:

Value	Description
disabled	The power-off detection mechanism is disabled.
normal	The condition of the line is normal.
remote power fail	A power fail of the remote modem is detected.
open line	An interruption of the line is detected.
short circuit	A short circuit of the line is detected.

## 6.7 Interface status attributes

This section discusses the status attributes of the different DTE interfaces. The following table gives an overview of this section.

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6.7.1	General interface status attributes	114
6.7.2	RS530, V35 and V36 interface status attributes	115
6.7.3	X21 interface status attributes	116
6.7.4	G703 and G703 onboard interface status attributes	117
6.7.5	Bridge interface status attributes	118

The following interface status attribute overview can be split in several sections:

- One section discussing the general interface status attributes. These are applicable on all interfaces.
- Four sections discussing the specific interface status attributes.

### 6.7.1 General interface status attributes



**crocusHDSL/<interface>/ifDescr**

This attribute displays the DTE interface description. It is a SNMP MIB2 parameter.



**crocusHDSL/<interface>/ifType**

This attribute displays the DTE interface type. It is a SNMP MIB2 parameter.

The following table shows the ifDescr and ifType attribute for each DTE interface.

ifDescr value	ifType value
RS530	1
V35	1
V36	1
X21	1
G703	<ul style="list-style-type: none"> <li>1 when the G703 interface is used in unframed mode</li> <li>19 when the G703 interface is used in framed mode</li> </ul>
Bridge	6
Router	1
G703OnBoard	<ul style="list-style-type: none"> <li>1 when the G703 onboard interface is used in unframed mode</li> <li>19 when the G703 onboard interface is used in framed mode</li> </ul>



**crocusHDSL/<interface>/ifSpeed**

This attribute displays the current DTE interface speed in bits per second (bps), e.g. 2048000.



#### Remarks

1. In case of a Bridge interface, the ifSpeed attribute displays the speed on the LAN interface. This is always 10000000 bps.
2. In case of a Router interface, the ifSpeed attribute displays the speed between the Router interface and the Crocus HDSL. This is either the line speed or a speed Nx64k lower than the line speed in case of a Nx64k Router interface.



**crocusHDSL/<interface>/ifOperStatus**

This attribute displays the current operation status of the DTE interface. The possible indications are:

Value	Description
up	The DTE interface is up, data transfer is possible.
down	The DTE interface is down, data transfer is not possible.

## 6.7.2 RS530, V35 and V36 interface status attributes



**crocusHDSL/<interface>tXDCCT103**

This attribute displays the status (on / off) of the transmit data signal (circuit 103). The tXDCCT103 attribute only indicates the presence of the TxD signal, it does not monitor the real data signal.



**crocusHDSL/<interface>rXDCCT104**

This attribute displays the status (on / off) of the receive data signal (circuit 104). The rXDCCT104 attribute only indicates the presence of the RxD signal, it does not monitor the real data signal.



**crocusHDSL/<interface>rTSCCT105**

This attribute displays the status (on / off) of the request to send signal (circuit 105).



**crocusHDSL/<interface>cTSCCT106**

This attribute displays the status (on / off) of the clear to send signal (circuit 106).



**crocusHDSL/<interface>dSRCCT107**

This attribute displays the status (on / off) of the data set ready signal (circuit 107).



**crocusHDSL/<interface>dCDCCT109**

This attribute displays the status (on / off) of the data carrier detect signal (circuit 109).



**crocusHDSL/<interface>rDLCCT140**

This attribute displays the status (on / off) of the remote digital loop signal (circuit 140).



**crocusHDSL/<interface>aLCCT141**

This attribute displays the status (on / off) of the analogue loop signal (circuit 141).



**crocusHDSL/<interface>tICCT142**

This attribute displays the status (on / off) of the test indication signal (circuit 142).

### 6.7.3 X21 interface status attributes

---



#### **crocusHDSL/x21/tXDCCT103**

This attribute displays the status (on / off) of the transmit data signal (circuit 103). The tXDCCT103 attribute only indicates the presence of the TxD signal, it does not monitor the real data signal.

---



#### **crocusHDSL/x21/rXDCCT104**

This attribute displays the status (on / off) of the receive data signal (circuit 104). The rXDCCT104 attribute only indicates the presence of the RxD signal, it does not monitor the real data signal.

---



#### **crocusHDSL/x21/indicator**

This attribute displays the status (on / off) of the indicator signal.

### 6.7.4 G703 and G703 onboard interface status attributes



**crocusHDSL/g703(OnBoard)/tXDCCT103**

This attribute displays the status (on / off) of the transmit data signal (circuit 103). The tXDCCT103 attribute only indicates the presence of the TxD signal, it does not monitor the real data signal.



**crocusHDSL/g703(OnBoard)/rXDCCT104**

This attribute displays the status (on / off) of the receive data signal (circuit 104). The rXDCCT104 attribute only indicates the presence of the RxD signal, it does not monitor the real data signal.



**crocusHDSL/g703(OnBoard)/tXDAIS**

This attribute indicates (on / off) whether an alarm indication signal has been sent.



**crocusHDSL/g703(OnBoard)/tXDLFA**

This attribute indicates (on / off) whether a loss of frame alignment has occurred.



**crocusHDSL/g703(OnBoard)/tXDL0S**

This attribute indicates (on / off) whether a loss of signal has occurred.

### 6.7.5 Bridge interface status attributes

---



#### `crocusHDSL/bridge/wANTXD`

This attribute displays the status (on / off) of the WANTXD (wide area network transmit data) signal, after encapsulation of the user data on the Bridge interface.



#### `crocusHDSL/bridge/wANRXD`

This attribute displays the status (on / off) of the WANRXD (wide area network receive data) signal, before extraction of the user data on the Bridge interface.

## 6.8 Remote power status attributes

This section discusses the status attributes concerned with remote powering. The following table gives an overview of this section.

Section	Title	Page
6.8.1	Remote Power Source status attributes	120
6.8.2	Wetting Current status attributes	121
6.8.3	Dual Power status attributes	122

### 6.8.1 Remote Power Source status attributes



#### The remPowerSource[ ] object

The remPowerSource[ ] object is only available on a Remote Power Source TT modem.

#### The remPowerSourceCV[ ] object

The remPowerSourceCV[ ] object is only available on a Remote Power Source CV modem. This is a CV of which:

- the remote power DIP switches are set to enable remote powering
- the CN4 card nest in which the CV resides is connected to the CN4 RP add-on chassis.



crocusHDSL/remPowerSource(CV)[ ]/state

This attribute displays the status of the Remote Power Source module. The possible indications are:

Value	The Remote Power Source module ...
disabled	is disabled.
active	is active and operates normal.
no current	only has to deliver a current smaller than 15 mA. This might indicate that: <ul style="list-style-type: none"> <li>• the line is interrupted</li> <li>• the Remote Power Source module is defective</li> <li>• the remote modem is defective (e.g. the Remote Power Sink module is out of order) and therefore does not longer require supply current.</li> </ul>
overcurrent	has to deliver a current higher than 60 mA. This might indicate that: <ul style="list-style-type: none"> <li>• the line is short circuited</li> <li>• the Remote Power Source module is defective</li> <li>• the remote modem is defective (e.g. the Remote Power Sink module is out of order) and a short circuit has occurred.</li> </ul>

In case of a Remote Power Source CV modem, two more indications are possible. These extra remPowerSourceCV[ ]/state values are:

Value	The Remote Power Source module for the CV, located in the CN4 RP add-on chassis ...
disabled HW	has been disabled by the dedicated hardware strap. In this case it is not possible to enable remote powering via TMA.
disabled SW	has been disabled by the dedicated software strap. In this case it is possible to enable remote powering again via TMA.

For more information on remote powering – source on ...

- a TT, refer to the Crocus HDSL Remote Power manual.
- a CV, refer to *Section 4.3 - Remote powering for the Card Version* and the CN4 RP add-on chassis manual.

## 6.8.2 Wetting Current status attributes



### The remPowerWetting[ ] object

The remPowerWetting[ ] object is only available on a Remote Power Source TT modem for which:

- the appropriate DIP switch on the Remote Power Source modem motherboard is set to enable wetting current
- the straps of the Remote Power Source modules are set to enable wetting current

### The remPowerWettingCV[ ] object

The remPowerWettingCV[ ] object is only available on a Remote Power Source CV modem. This is a CV of which:

- the remote power DIP switches are set to enable remote powering
- the CN4 card nest in which the CV resides is connected to the CN4 RP add-on chassis
- the straps of the Remote Power Source module in the CN4 RP add-on chassis are set to enable wetting current.



### crocusHDSL/remPowerWetting(CV)[ ]/state

This attribute displays the status of the Remote Power Source module strapped for wetting current operation. The possible indications are:

Value	The Remote Power Source module ...
disabled	is disabled.
active	is active and operates normal.
no current	delivers no current. This might indicate that: <ul style="list-style-type: none"> <li>• the line is interrupted</li> <li>• the Remote Power Source module is defective.</li> </ul>

In case of a Remote Power Source CV modem configured for wetting current operation, two more indications are possible. These extra remPowerWettingCV[ ]/state values are:

Value	The Remote Power Source module for the CV, located in the CN4 RP add-on chassis ...
disabled HW	has been disabled by the dedicated hardware strap. In this case it is not possible to enable wetting current via TMA.
disabled SW	has been disabled by the dedicated software strap. In this case it is possible to enable wetting current again via TMA.

For more information on remote powering – wetting current on ...

- a TT, refer to the Crocus HDSL Remote Power manual.
- a CV, refer to *Section 4.3 - Remote powering for the Card Version* and the CN4 RP add-on chassis manual.

### 6.8.3 Dual Power status attributes



The dualPowered object is only available on a Dual Power TT modem.



crocusHDSL/dualPowered/state

This attribute displays the status of the Dual Power modem. The possible indications are:

Value	The modem is currently powered by ...
primary powered	the power supply at the local side.
remote powered	the remote modem.

For more information on remote powering – dual power, refer to the Crocus HDSL Remote Power manual.

## 7. Performance attributes

This chapter discusses the performance attributes of the Crocus HDSL. The following table gives an overview of this chapter.

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7.2	Introduction to the performance attributes	126
7.3	Crocus HDSL performance attributes	128
7.4	Modem performance attributes	128
7.5	Line performance attributes	130
7.6	G703 and G703 onboard interface performance attributes	135
7.7	Remote power performance attributes	137

## 7.1 Performance attribute overview

---

> crocusHDSL

Action: Cold Boot

---

>> modem

errorCount

h2TimeSinceLastUpdate

h2Modem

h24TimeSinceLastUpdate

h24Modem

relmodem

Action: Test Activation

Action: Force Full Retrain

---

>>> line[ ]

h2TimeSinceLastUpdate

h2LineParameters

h2NEBECOUNT

h2FEBECOUNT

h2BitError

h2Performance

h24TimeSinceLastUpdate

h24LineParameters

h24NEBECOUNT

h24FEBECOUNT

h24BitError

h24Performance

lineParameters

nEBECOUNT

fEBECOUNT

bitError

performance

*Continued in next column*

(continued)

---

>> g703 <sup>(1)</sup>

h2TimeSinceLastUpdate

h2TXDAIS

h2TXDLFA

h2TXDLOS

h24TimeSinceLastUpdate

h24TXDAIS

h24TXDLFA

h24TXDLOS

relTXDAIS

relTXDLFA

relTXDLOS

<sup>(1)</sup> only present when the corresponding interface is used

---

>> g703OnBoard <sup>(2)</sup>

h2TimeSinceLastUpdate

h2TXDAIS

h2TXDLFA

h2TXDLOS

h24TimeSinceLastUpdate

h24TXDAIS

h24TXDLFA

h24TXDLOS

relTXDAIS

relTXDLFA

relTXDLOS

<sup>(2)</sup> Dual Port modem only

*Continued on next page*

*Performance attribute overview (continued)*

---

**>> remPowerSource(CV)[ ]** <sup>(3)</sup>

h2TimeSinceLastUpdate  
h2RemPower  
h24TimeSinceLastUpdate  
h24RemPower  
remPower

<sup>(3)</sup> Remote Power Source modem only

---

**>> remPowerWetting(CV)[ ]** <sup>(4)</sup>

h2TimeSinceLastUpdate  
h2RemPower  
h24TimeSinceLastUpdate  
h24RemPower  
remPower

<sup>(4)</sup> Remote Power Source modem configured for wetting current only

---

**>> dualPowered** <sup>(5)</sup>

h2TimeSinceLastUpdate  
h2RemPower  
h24TimeSinceLastUpdate  
h24RemPower  
remPower

<sup>(5)</sup> Dual Power modem only

## 7.2 Introduction to the performance attributes

Performance information can be used for the following:

- If network problems arise, information about the history of the communication link can be reviewed and analyzed. These statistics can be useful to locate and solve the problem.
- By collecting performance information, an operator can keep track of the global performance of the network, e.g. network bottlenecks can be traced, etc.

Before discussing the performance attributes of the Crocus HDSL in detail, some general information on the performance attributes of the Crocus HDSL is given.

This section can be broken up into two parts:

- First, the timing of the performance information is explained.
- Secondly, frequently used terms such as *validity*, *period*, *min – max – average*, *count* and *time* are explained.

### Performance information timing

The following table explains the performance information timing.

Interval	Description
2 hours	<p>The performance information is accumulated during a 15 minutes time span, called a period. After a period, the accumulated performance information is written into a buffer. Then a new period starts. To cover a 2 hours interval, 8 periods are kept.</p> <p>The buffer in which the information is stored, is a circular buffer. I.e. every 15 minutes the most recent measured and calculated values are added, and the oldest values are lost.</p>
24 hours	<p>The performance information is accumulated during a 2 hours time span, called a period. After a period, the accumulated performance information is written into a buffer. Then a new period starts. To cover a 24 hours interval, 12 periods are kept.</p> <p>The buffer in which the information is stored, is a circular buffer. I.e. every 2 hours the most recent measured and calculated values are added, and the oldest values are lost.</p>
since boot	In this case, the performance information is kept since the latest cold boot of the modem. This can be considered as a performance information <i>summary</i> .

Table 7.1: Performance information timing

The modem does not contain a real-time clock, therefore time information is related to its internal clock. To allow you to situate the time intervals in the real time, the `TimeSinceLastUpdate` performance attribute is returned together with the performance information. Another time indication is the `SystemUpTime` status attribute, which reflects the time since the latest cold boot of the modem.



Only the available performance information is displayed. If the interrogation happens shortly after boot, no values are displayed. For example for the 2 hours and 24 hours intervals, the new performance information is available only when a complete time span (15 minutes, 2 hours) has elapsed.

*Continued on next page*

*Introduction to the performance attributes (continued)***Performance information terms**

The following table explains the performance information terms.

Term	Description
validity	Indicates, for the corresponding period, whether the performance information is valid or invalid.  When the modem has just booted, all periods are labeled as invalid. This because no performance information could be gathered yet.
period	Gives a time indication for the corresponding period. <ul style="list-style-type: none"> <li>The oldest period, labeled 1, has time indication -120min → -105min or -24h → -22h. This period is listed at the top of the performance table.</li> <li>The most recent period, labeled 8 or 12, has time indication -15min → 0min or -2h → 0h. This period is listed at the bottom of the performance table.</li> </ul>
min, max, avrg	Display the minimum, maximum and average values calculated for the corresponding period.  E.g. min-max-avrg value of the noise margin.
count	Counts the number of times an event occurred during the corresponding period.  E.g. the number of retrains.
time	Indicates the time duration of an event during the corresponding period.  E.g. the time during which the synchronization is lost.

Table 7.2: Performance information terms

## 7.3 Crocus HDSL performance attributes



### crocusHDSL/Cold Boot

This action will reboot the Crocus HDSL while the power stays up (the Crocus HDSL also reboots if it is powered down and up again).

For more information, refer to *Section 5.2 - Crocus HDSL configuration attributes*.

## 7.4 Modem performance attributes



### crocusHDSL/modem/errorCount

This attribute displays the amount of detected errors since the start of an ET, ALET or RLET test. Every time a new ET, ALET or RLET is started, the errorCount attribute is reset to 0.



If you start an ET, ALET or RLET test when ...

- the central and remote modem are not synchronized
- not all the lines are connected to the modem
- no lines are connected to the modem

then no error pattern can be sent, hence the error counter can not be read. To indicate this erroneous situation, the errorCount attribute value is set to its maximum value: 65535.



### crocusHDSL/modem/h2TimeSinceLastUpdate

This attribute displays the elapsed time since the last update of the 2 hours performance attributes of the modem object.



### crocusHDSL/modem/h2Modem

This structured value displays the 2 hours performance summary related to the modem object. The h2Modem attribute values are the following:

Value	For the corresponding period, this value displays ...
validity	whether the performance information is valid or invalid.
period	a time indication. The oldest period is listed at the top of the table, the most recent at the bottom.
noSyncTime	the time during which synchronization was lost.  Note that the synchronization loss time only starts running after expiration of time-out period set by the syncLossAlarmTimeout attribute. Refer to <i>Section 5.3 - Modem configuration attributes</i> .
fallbackAlarmCount	the number of fall-back alarms which was counted.
fallbackAlarmTime	the time during which a fall-back alarm was active.

*Continued on next page*

*Modem performance attributes (continued)***crocusHDSL/modem/h24TimeSinceLastUpdate**

This attribute displays the elapsed time since the last update of the 24 hours performance attributes of the modem object.

**crocusHDSL/modem/h24Modem**

This structured value displays the 24 hours performance summary related to the modem object. The h24Modem attribute values are the same as the h2Modem attribute values.

**crocusHDSL/modem/reImodem**

This structured value displays the performance summary related to the modem object since the last cold boot. Except for validity and period which are not present, the modem attribute values are the same as the h2Modem attribute values.

**crocusHDSL/Test Activation**

Use this action to perform a test on the Crocus HDSL. These tests are useful to trace possible problems.

To execute a test, proceed as follows:

Step	Action
1	In the TMA window, select the object modem and the group Performance.
2	In the action window of TMA, click the left mouse button on the field under the heading Argument Value. ⇒ A drop down box appears.
3	In the drop down box, select the action you want to execute.
4	Press the right mouse button and select <u>E</u> xecute.

Table 7.3: Executing a test

For more information on these tests, refer to *Chapter 11 - Diagnostic tests*.

**crocusHDSL/Force Full Retrain**

Use this action to initiate a retrain cycle.

To initiate a retrain cycle, proceed as follows:

Step	Action
1	In the TMA window, select the object modem and the group Performance.
2	In the action window of TMA, click the left mouse button on Force Full Retrain so that this action is selected.
3	Press the right mouse button and select <u>E</u> xecute.

Table 7.4: Initiating a retrain cycle

## 7.5 Line performance attributes



### crocusHDSL/modem/line[ ]/h2TimeSinceLastUpdate

This attribute displays the elapsed time since the last update of the 2 hours performance attributes of the line[ ] object.



### crocusHDSL/modem/line[ ]/h2LineParameters

This structured value displays the 2 hours performance summary related to the line parameters. The h2LineParameters attribute values are the following:

Value	For the corresponding period, this value displays ...
validity	whether the performance information is valid or invalid.
period	a time indication. The oldest period is listed at the top of the table, the most recent at the bottom.
lineAttenuationMin(dB)	the minimum line attenuation which was measured.
lineAttenuationMax(dB)	the maximum line attenuation which was measured.
lineAttenuationAvrg(dB)	the average line attenuation which was calculated.
noiseMarginMin(dB)	the minimum noise margin which was measured.
noiseMarginMax(dB)	the maximum noise margin which was measured.
noiseMarginAvrg(dB)	the average noise margin which was calculated.



### crocusHDSL/modem/line[ ]/h2NEBECCount

This structured value displays the 2 hours performance summary related to the near end block errors. The h2NEBECCount attribute values are the following:

Value	For the corresponding period, this value displays ...
validity	whether the performance information is valid or invalid.
period	a time indication. The oldest period is listed at the top of the table, the most recent at the bottom.
min	the minimum number of near end block errors which was counted.
max	the maximum number of near end block errors which was counted.
avrg	the average number of near end block errors which was counted.
totalCount	the total number of near end block errors which was counted.
alarmCount	the number of near end block error alarms which was counted.
alarmTime	the time during which a near end block alarm was active.

*Continued on next page*

*Line performance attributes (continued)***crocusHDSL/modem/line[ ]/h2FEBECCount**

This structured value displays the 2 hours performance summary related to the far end block errors. The h2FEBECCount attribute values are the same as the h2NEBECCount attribute values.

**crocusHDSL/modem/line[ ]/h2BitError**

This structured value displays the 2 hours performance summary related to the bit error rate. The h2BitError attribute values are the following:

Value	For the corresponding period, this value displays ...
validity	whether the performance information is valid or invalid.
period	a time indication. The oldest period is listed at the top of the table, the most recent at the bottom.
bERMin	the minimum bit error rate which was measured.
bERMax	the maximum bit error rate which was measured.
bERAvg	the average bit error rate which was calculated.
highAlarmCount	the number of high bit error rate alarms which was counted.
highAlarmTime	the time during which a high bit error rate alarm was active.
lowAlarmCount	the number of low bit error rate alarms which was counted.
lowAlarmTime	the time during which a low bit error rate alarm was active.

**crocusHDSL/modem/line[ ]/h2Performance**

This structured value displays the 2 hours performance summary related to the performance. The h2Performance attribute values are the following:

Value	For the corresponding period, this value displays ...
validity	whether the performance information is valid or invalid.
period	a time indication. The oldest period is listed at the top of the table, the most recent at the bottom.
retrainAlarmCount	the number of retrain alarms which was counted.
retrainAlarmTime	the time during which a retrain alarm was active.
erroredSecCount	the number of erroneous seconds which was counted.
sevErrSecAlarmCount	the number of severely erroneous second alarms which was counted.
sevErrSecAlarmTime	the time during which a severely erroneous second alarm was active.
unavailAlarmCount	the number of unavailability alarms which was counted.
unavailAlarmTime	the time during which an unavailability alarm was active.

*Continued on next page*

*Line performance attributes (continued)***crocusHDSL/modem/line[ ]/h24TimeSinceLastUpdate**

This attribute displays the elapsed time since the last update of the 24 hours performance attributes of the line object.

**crocusHDSL/modem/line[ ]/h24LineParameters**

This structured value displays the 24 hours performance summary related to the line parameters. The h24LineParameters attribute values are the same as the h2LineParameters attribute values.

**crocusHDSL/modem/line[ ]/h2NEBECOUNT**

This structured value displays the 24 hours performance summary related to the near end block errors. The h24NEBECOUNT attribute values are the same as the h2NEBECOUNT attribute values.

**crocusHDSL/modem/line[ ]/h2FEBECOUNT**

This structured value displays the 24 hours performance summary related to the far end block errors. The h24FEBECOUNT attribute values are the same as the h2FEBECOUNT attribute values.

**crocusHDSL/modem/line[ ]/h24BitError**

This structured value displays the 24 hours performance summary related to the bit error rate. The h24BitError attribute values are the same as the h2BitError attribute values.

**crocusHDSL/modem/line[ ]/h24Performance**

This structured value displays the 24 hours performance summary related to the performance. The h24Performance attribute values are the same as the h2Performance attribute values.

*Continued on next page*

*Line performance attributes (continued)***crocusHDSL/modem/line[ ]/lineParameters**

This structured value displays the current line parameters.

Value	This value displays the current ...
lineAttenuation(dB)	line attenuation in dB.
noiseMargin(dB)	noise margin in dB.

**crocusHDSL/modem/line[ ]/nEBECount**

Value	For the time since the last cold boot, this value displays ...
totalCount	the total number of near end block errors which was counted.
alarmCount	the number of near end block error alarms which was counted.
alarmTime	the time during which a near end block alarm was active.

**crocusHDSL/modem/line[ ]/fEBECount**

Value	For the time since the last cold boot, this value displays ...
totalCount	the total number of far end block errors which was counted.
alarmCount	the number of far end block error alarms which was counted.
alarmTime	the time during which a far end block alarm was active.

**crocusHDSL/modem/line[ ]/bitError**

This structured value displays the performance summary related to the bit error rate since the last cold boot. The bitError attribute values are the following:

Value	For the time since the last cold boot, this value displays ...
bER	the bit error rate.
highAlarmCount	the number of high bit error rate alarms which was counted.
highAlarmTime	the time during which a high bit error rate alarm was active.
lowAlarmCount	the number of low bit error rate alarms which was counted.
lowAlarmTime	the time during which a low bit error rate alarm was active.

*Continued on next page*

*Line performance attributes (continued)*`crocusHDSL/modem/line[ ]/performance`

This structured value displays the performance summary related to the performance object since the last cold boot. The performance attribute values are the following:

Value	For the time since the last cold boot, this value displays ...
retrainAlarmCount	the number of retrain alarms which was counted.
retrainAlarmTime	the time during which a retrain alarm was active.
erroredSecCount	the number of erroneous seconds which was counted.
sevErrSecAlarmCount	the number of severely erroneous second alarms which was counted.
sevErrSecAlarmTime	the time during which a severely erroneous second alarm was active.
unavailAlarmCount	the number of unavailability alarms which was counted.
unavailAlarmTime	the time during which an unavailability alarm was active.

## 7.6 G703 and G703 onboard interface performance attributes



### `crocusHDSL/g703(OnBoard)/h2TimeSinceLastUpdate`

This attribute displays the elapsed time since the last update of the 2 hours performance attributes of the `g703(OnBoard)` object.



### `crocusHDSL/g703(OnBoard)/h2TXDAIS`

This structured value displays the 2 hours performance summary related to the alarm indication signal. The `h2TXDAIS` attribute values are the following:

Value	For the corresponding period, this value displays ...
validity	whether the performance information is valid or invalid.
period	a time indication. The oldest period is listed at the top of the table, the most recent at the bottom.
alarmCount	the number of alarm indication signal alarms which was counted.
alarmTime	the time during which an alarm indication signal alarm was active.



### `crocusHDSL/g703(OnBoard)/h2TXDLFA`

This structured value displays the 2 hours performance summary related to the loss of frame alignment. The `h2TXDLFA` attribute values are the following:

Value	For the corresponding period, this value displays ...
validity	whether the performance information is valid or invalid.
period	a time indication. The oldest period is listed at the top of the table, the most recent at the bottom.
alarmCount	the number of loss of frame alignment alarms which was counted.
alarmTime	the time during which a loss of frame alignment alarm was active.



### `crocusHDSL/g703(OnBoard)/h2TXDLOS`

This structured value displays the 2 hours performance summary related to the loss of signal. The `h2TXDLOS` attribute values are the following:

Value	For the corresponding period, this value displays ...
validity	whether the performance information is valid or invalid.
period	a time indication. The oldest period is listed at the top of the table, the most recent at the bottom.
alarmCount	the number of loss of signal alarms which was counted.
alarmTime	the time during which a loss of signal alarm was active.

*Continued on next page*

*G703 and G703 onboard interface performance attributes (continued)***crocusHDSL/g703(OnBoard)/h24TimeSinceLastUpdate**

This attribute displays the elapsed time since the last update of the 24 hours performance attributes of the g703(OnBoard) object.

**crocusHDSL/g703(OnBoard)/h24TXDAIS****crocusHDSL/g703(OnBoard)/h24TXDLFA****crocusHDSL/g703(OnBoard)/h24TXDLOS**

These structured values display the 24 hours performance summary related to AIS, LFA and LOS. The h24TXDAIS, h24TXDLFA and h24TXDLOS attribute values are the same as the h2TXDAIS, h2TXDLFA and h2TXDLOS attribute values.

**crocusHDSL/g703(OnBoard)/relTXDAIS**

This structured value displays the performance summary related to the alarm indication signal since the last cold boot. The relTXDAIS attribute values are the following:

Value	For the time since the last cold boot, this value displays ...
alarmCount	the number of alarm indication signal alarms which was counted.
alarmTime	the time during which an alarm indication signal alarm was active.

**crocusHDSL/g703(OnBoard)/relTXDLFA**

This structured value displays the performance summary related to the loss of frame alignment since the last cold boot. The relTXDLFA attribute values are the following:

Value	For the time since the last cold boot, this value displays ...
alarmCount	the number of loss of frame alignment alarms which was counted.
alarmTime	the time during which a loss of frame alignment alarm was active.

**crocusHDSL/g703(OnBoard)/relTXDLOS**

This structured value displays the performance summary related to the loss of signal since the last cold boot. The relTXDLOS attribute values are the following:

Value	For the time since the last cold boot, this value displays ...
alarmCount	the number of loss of signal alarms which was counted.
alarmTime	the time during which a loss of signal alarm was active.

## 7.7 Remote power performance attributes

This section discusses the performance attributes concerned with remote powering. The following table gives an overview of this section.

Section	Title	Page
7.7.1	Remote Power Source performance attributes	138
7.7.2	Wetting Current performance attributes	139
7.7.3	Dual Power performance attributes	140

### 7.7.1 Remote Power Source performance attributes



#### The remPowerSource[ ] object

The remPowerSource[ ] object is only available on a Remote Power Source TT modem.

#### The remPowerSourceCV[ ] object

The remPowerSourceCV[ ] object is only available on a Remote Power Source CV modem. This is a CV of which:

- the remote power DIP switches are set to enable remote powering
- the CN4 card nest in which the CV resides is connected to the CN4 RP add-on chassis.



#### crocusHDSL/remPowerSource(CV)[ ]/h2TimeSinceLastUpdate

This attribute displays the elapsed time since the last update of the 2 hours performance attributes of the remPowerSource(CV)[ ] object.



#### crocusHDSL/remPowerSource(CV)[ ]/h2RemPower

This structured value displays the 2 hours performance summary related to the remPowerSource(CV)[ ] object. The h2RemPower attribute values are the following:

Value	For the corresponding period, this value displays ...
validity	whether the performance information is valid or invalid.
period	a time indication. The oldest period is listed at the top of the table, the most recent at the bottom.
noRemPowerTime	the time during which no remote power was delivered by the Remote Power Source module.



#### crocusHDSL/remPowerSource(CV)[ ]/h24TimeSinceLastUpdate

This attribute displays the elapsed time since the last update of the 24 hours performance attributes of the remPowerSource(CV)[ ] object.



#### crocusHDSL/remPowerSource(CV)[ ]/h24RemPower

This structured value displays the 24 hours performance summary related to the remPowerSource(CV)[ ] object. The h24RemPower attribute values are the same as the h2RemPower attribute values.



#### crocusHDSL/remPowerSource(CV)[ ]/remPower

This structured value displays the performance summary related to the remPowerSource(CV)[ ] object since the last cold boot. Except for validity and period which are not present, the remPower attribute values are the same as the h2RemPower attribute values.

For more information on remote powering – source on ...

- a TT, refer to the Crocus HDSL Remote Power manual.
- a CV, refer to *Section 4.3 - Remote powering for the Card Version* and the CN4 RP add-on chassis manual.

## 7.7.2 Wetting Current performance attributes



### The remPowerWetting[ ] object

The remPowerWetting[ ] object is only available on a Remote Power Source TT modem for which:

- the appropriate DIP switch on the Remote Power Source modem motherboard is set to enable wetting current
- the straps of the Remote Power Source modules are set to enable wetting current

### The remPowerWettingCV[ ] object

The remPowerWettingCV[ ] object is only available on a Remote Power Source CV modem. This is a CV of which:

- the remote power DIP switches are set to enable remote powering
- the CN4 card nest in which the CV resides is connected to the CN4 RP add-on chassis
- the straps of the Remote Power Source module in the CN4 RP add-on chassis are set to enable wetting current.



### crocusHDSL/remPowerWetting(CV)[ ]/h2TimeSinceLastUpdate

This attribute displays the elapsed time since the last update of the 2 hours performance attributes of the remPowerWetting(CV)[ ] object.



### crocusHDSL/remPowerWetting(CV)[ ]/h2RemPower

This structured value displays the 2 hours performance summary related to the remPowerWetting(CV)[ ] object. The h2RemPower attribute values are the following:

Value	For the corresponding period, this value displays ...
validity	whether the performance information is valid or invalid.
period	a time indication. The oldest period is listed at the top of the table, the most recent at the bottom.
noRemPowerTime	the time during which no wetting current was delivered by the Remote Power Source module.



### crocusHDSL/remPowerWetting(CV)[ ]/h24TimeSinceLastUpdate

This attribute displays the elapsed time since the last update of the 24 hours performance attributes of the remPowerWetting(CV)[ ] object.



### crocusHDSL/remPowerWetting(CV)[ ]/h24RemPower

This structured value displays the 24 hours performance summary related to the remPowerWetting(CV)[ ] object. The h24RemPower attribute values are the same as the h2RemPower attribute values.



### crocusHDSL/remPowerWetting(CV)[ ]/remPower

This structured value displays the performance summary related to the remPowerWetting(CV)[ ] object since the last cold boot. Except for validity and period which are not present, the remPower attribute values are the same as the h2RemPower attribute values.

*Continued on next page*

*Wetting Current performance attributes (continued)*

For more information on remote powering – wetting current on ...

- a TT, refer to the Crocus HDSL Remote Power manual.
- a CV, refer to *Section 4.3 - Remote powering for the Card Version* and the CN4 RP add-on chassis manual.

**7.7.3 Dual Power performance attributes**

The dualPowered object is only available on a Dual Power TT modem.

**crocusHDSL/dualPowered/h2TimeSinceLastUpdate**

This attribute displays the elapsed time since the last update of the 2 hours performance attributes of the dualPowered object.

**crocusHDSL/dualPowered/h2RemPower**

This structured value displays the 2 hours performance summary related to the dualPowered object. The h2RemPower attribute values are the following:

Value	For the corresponding period, this value displays ...
validity	whether the performance information is valid or invalid.
period	a time indication. The oldest period is listed at the top of the table, the most recent at the bottom.
primaryPowerFailTime	the time during which no primary power (power at the local site) was present. During that time, the modem is supplied by the Remote Power Source modem located at the remote site.

**crocusHDSL/dualPowered/h24TimeSinceLastUpdate**

This attribute displays the elapsed time since the last update of the 24 hours performance attributes of the dualPowered object.

**crocusHDSL/dualPowered/h24RemPower**

This structured value displays the 24 hours performance summary related to the dualPowered object. The h24RemPower attribute values are the same as the h2RemPower attribute values.

**crocusHDSL/dualPowered/remPower**

This structured value displays the performance summary related to the dualPowered object since the last cold boot. Except for validity and period which are not present, the remPower attribute values are the same as the h2RemPower attribute values.

For more information on remote powering – dual power, refer to the Crocus HDSL Remote Power manual.

## 8. Alarm attributes

This chapter discusses the alarm attributes of the Crocus HDSL. The following table gives an overview of this chapter.

Section	Title	Page
8.1	Alarm attribute overview	142
8.2	Introduction to the alarm attributes	143
8.3	Crocus HDSL alarms	145
8.4	Modem alarms	146
8.5	Line alarms	147
8.6	Power-off detection alarms	149
8.7	Interface alarms	150
8.8	Remote power alarms	151

## 8.1 Alarm attribute overview

### > crocusHDSL

totalAlarmLevel  
alarmInfo  
    NotResponding  
    AlarmSyncLoss  
    StrapChanged  
    Access  
    RemoteAlarm  
    PowerSupply1CVFailure <sup>(1)</sup>  
    PowerSupply2CVFailure <sup>(1)</sup>  
    UnknownState  
    Boot  
    CodeConsistencyFail  
    ConfigConsistencyFail

Action: Cold Boot

<sup>(1)</sup> CV only

### >> modem

alarmInfo  
    LinkDown  
    TestActive  
    SyncLoss  
    Fallback

### >>> line[ ]

alarmInfo  
    LinkDown  
    Retrain  
    HighBitError  
    LowBitError  
    NEBError  
    FEBError  
    SeverelyErroredSecond  
    Unavailability

### >> powerOffDetection <sup>(2)</sup>

alarmInfo  
    Open line  
    Remote power fail  
    Short circuit

<sup>(2)</sup> non-Remote Power modem only

*Continued in next column*

*(continued)*

### >> rs530, v35, v36, bridge, router <sup>(3)</sup>

alarmInfo  
    LinkDown

### >> g703 <sup>(3)</sup>

alarmInfo  
    LinkDown  
    AIS  
    LFA

<sup>(3)</sup> only present when the corresponding interface is used

### >> g703OnBoard <sup>(4)</sup>

alarmInfo  
    LinkDown  
    AIS  
    LFA

<sup>(4)</sup> Dual Port modem only

### >> remPowerSource(CV)[ ] <sup>(5)</sup>

alarmInfo  
    RP overcurrent  
    RP no current  
    RP communication fail <sup>(6)</sup>  
    RP manually disabled <sup>(6)</sup>

<sup>(5)</sup> Remote Power Source modem only

<sup>(6)</sup> Remote Power Source CV modem only

### >> remPowerWetting(CV)[ ] <sup>(7)</sup>

alarmInfo  
    RP no current

<sup>(7)</sup> Remote Power Source modem configured for wetting current only

### >> dualPowered <sup>(8)</sup>

alarmInfo  
    primaryPowerFail

<sup>(8)</sup> Dual Power modem only

## 8.2 Introduction to the alarm attributes

Before discussing the alarm attributes of the Crocus HDSL in detail, some general information on the alarm attributes of the Crocus HDSL is given.

This section can be broken up into two parts:

- First, the configuration alarm attributes are explained.
- Secondly, the general alarm attributes such as `totalAlarmLevel` and `alarmInfo` are explained.

### Configuration alarm attributes

The following four configuration alarm attributes are already explained in *Chapter 5 - Configuration attributes*, but are explained more thoroughly below.



`crocusHDSL/.../alarmMask`



`crocusHDSL/.../alarmLevel`



`crocusHDSL/.../alarmContactHighMask`



`crocusHDSL/.../alarmContactLowMask`

The following table explains the configuration alarm attributes.

Attribute	Description
alarmMask	<p>The <code>alarmMask</code> attribute enables or disables for each alarm of the corresponding object, whether it is communicated to the central management system (e.g. HP OpenView®) or not.</p> <p>Alarms are always seen in the <code>alarmInfo</code> of an object, regardless of the masking of the alarm. I.e. even if an alarm is set to <i>disabled</i> in the <code>alarmMask</code> of an object, if the alarm condition is fulfilled then the alarm will be set to <i>on</i> in the <code>alarmInfo</code> of that object. However, because this alarm is disabled:</p> <ul style="list-style-type: none"> <li>• it will not be send to the central management system (e.g. HP OpenView®)</li> <li>• it will not be shifted towards the value <code>previousAlarms</code> of the <code>alarmInfo</code> attribute (refer to <i>Table 8.2: General alarm attributes – the alarmInfo attribute</i>).</li> </ul>
alarmLevel	<p>With this attribute, a priority level can be assigned to each alarm of the corresponding object. The alarm level range goes from 0 to 254, where 0 is the lowest and 254 is the highest priority level.</p> <p>The <code>alarmLevel</code> of an unmasked, active alarm is sent to the <code>totalAlarmLevel</code> of the top object <code>crocusHDSL</code>.</p>

*Continued on next page*

*Configuration alarm attributes (continued)*

Attribute	Description
alarmContactHighMask	<p>The alarmContactHighMask attribute enables or disables for each alarm of the corresponding object, whether:</p> <ul style="list-style-type: none"> <li>a visual indication is generated (blinking error LED)</li> <li>an alarm signal is generated on pin 1 of the auxiliary connector (TT only)</li> <li>the alarm contacts on the CN4 card nest are driven (CV only).</li> </ul> <p>For more information on alarm signaling, refer to <i>Section 5.2 - Crocus HDSL configuration attributes</i>.</p>
alarmContactLowMask	<p>The alarmContactLowMask attribute enables or disables for each alarm of the corresponding object, whether:</p> <ul style="list-style-type: none"> <li>a visual indication is generated (blinking error LED)</li> <li>an alarm signal is generated on pin 9 of the auxiliary connector (TT only)</li> <li>the alarm contacts on the CN4 card nest are driven (CV only).</li> </ul> <p>For more information on alarm signaling, refer to <i>Section 5.2 - Crocus HDSL configuration attributes</i>.</p>

Table 8.1: Configuration alarm attributes

**General alarm attributes**

The general alarm attributes totalAlarmLevel and alarmInfo are explained below.

**crocusHDSL/totalAlarmLevel**

This attribute is only present in the top object of the containment tree of the Crocus HDSL, crocusHDSL.

It displays the priority level of an unmasked, active alarm. When several alarms are generated at the same time, the highest priority level is shown. If the alarm levels are set in a structured manner, one look at the totalAlarmLevel attribute enables the operator to make a quick estimation of the problem.

The value of the totalAlarmLevel attribute is also communicated to the central management system (e.g. HP OpenView®) where it determines the colour of the icon. This colour is an indication of the severity of the alarm.

**crocusHDSL/.../alarmInfo**

The alarmInfo contains the actual alarm information of the corresponding object. The alarmInfo attributes are:

Attribute	Displays for the corresponding object ...
discriminator	the total alarm count since the last cold boot.
currentAlarms	the current alarms.
previousAlarms	the second most recent alarms.
alarmMask	the alarmMask as configured in the Configuration group. Refer to <i>Chapter 5 - Configuration attributes</i> .
alarmLevel	the alarmLevel as configured in the Configuration group. Refer to <i>Chapter 5 - Configuration attributes</i> .

Table 8.2: General alarm attributes – the alarmInfo attribute

## 8.3 Crocus HDSL alarms

See *Section 8.2 - Introduction to the alarm attributes* for the general alarm attributes.



### crocusHDSL/alarmInfo

The different alarms related to the object `crocusHDSL` together with their explanation and their default `alarmMask` and `alarmLevel` value are given in the following table:

The alarm ...	is generated ...	Default value	
		alarmMask	alarmLevel
NotResponding	by the Orchid 1003 LAN when the Crocus HDSL does not respond on its polling session.	enabled	4
AlarmSyncLoss	when the internal alarm buffer overflows.	enabled	4
StrapChanged	when the local configuration has been changed.	disabled	1
Access	when TMA is connected locally via the auxiliary connector to the Crocus HDSL.	disabled	1
RemoteAlarm	when the remote Crocus HDSL is in alarm condition.	disabled	0
PowerSupply1CV Failure	when the upper power supply in the CN4 card nest is not present or fails. This alarm exists on the CV only.	disabled	3
PowerSupply2CV Failure	when the lower power supply in the CN4 card nest is not present or fails. This alarm exists on the CV only.	disabled	3
UnknownState	each time a new Telindus device is added to the network, and before the Orchid 1003 LAN has completed a first successful polling session.	disabled	0
Boot	each time the Crocus HDSL reboots.	disabled	1
CodeConsistencyFail	when the version of the firmware stored in the Orchid 1003 LAN does not correspond with the version of the firmware stored in the Crocus HDSL.	disabled	1
ConfigConsistencyFail	when the Crocus HDSL configuration stored in the Orchid 1003 LAN does not correspond with the actual configuration of the Crocus HDSL.	disabled	1



### crocusHDSL/Cold Boot

This action will reboot the Crocus HDSL while the power stays up (the Crocus HDSL also reboots if it is powered down and up again).

For more information, refer to *Section 5.2 - Crocus HDSL configuration attributes*.

## 8.4 Modem alarms

See *Section 8.2 - Introduction to the alarm attributes* for the general alarm attributes.



### crocusHDSL/modem/alarmInfo

The different alarms related to the object modem together with their explanation and their default alarmMask and alarmLevel value are given in the following table:

The alarm ...	is generated ...	Default value	
		alarmMask	alarmLevel
LinkDown	when no data link towards the remote is present.  It does not necessarily mean that the line pairs are disconnected. If the line quality is so bad that data transfer is not possible, a LinkDown alarm is generated.	enabled	3
TestActive	when a test is running.	disabled	1
SyncLoss	when synchronization is lost.  Note that the SyncLoss alarm is generated after expiration of the time-out period set by the syncLossAlarmTimeout attribute. Refer to <i>Section 5.3 - Modem configuration attributes</i> .	disabled	3
Fallback	when the Crocus HDSL operates in fall-back.	disabled	2



The LinkDown and SyncLoss alarm basically have the same meaning: the data link towards the remote is interrupted. The difference is that a time-out period is linked to the SyncLoss alarm, and not to the LinkDown alarm.

## 8.5 Line alarms

See *Section 8.2 - Introduction to the alarm attributes* for the general alarm attributes.



`crocusHDSL/modem/line[ ]/alarmInfo`

The different alarms related to the object `line[ ]` together with their explanation and their default `alarmMask` and `alarmLevel` value are given in the following table:

The alarm ...	is generated ...	Default value	
		alarmMask	alarmLevel
LinkDown	when no data link towards the remote is present.  It does not necessarily mean that the line pair is disconnected. If the line quality is so bad that data transfer is not possible, a LinkDown alarm is generated.	disabled	3
Retrain	when the modem is retraining.	disabled	2
HighBitError	when the bit error rate equals or exceeds the predefined value entered in <code>onThreshold</code> of the <code>highBitErrorAlarm</code> attribute. Refer to <i>Section 5.3 - Modem configuration attributes</i> .	disabled	2
LowBitError	when the bit error rate equals or exceeds the predefined value entered in <code>onThreshold</code> of the <code>lowBitErrorAlarm</code> attribute. Refer to <i>Section 5.3 - Modem configuration attributes</i> .	disabled	1
NEBError	when the near end block error rate equals or exceeds the predefined value entered in <code>onThreshold</code> of the <code>nEBErrorAlarm</code> attribute. Refer to <i>Section 5.3 - Modem configuration attributes</i> .	disabled	1
FEBError	when the far end block error rate equals or exceeds the predefined value entered in <code>onThreshold</code> of the <code>fEBErrorAlarm</code> attribute. Refer to <i>Section 5.3 - Modem configuration attributes</i> .	disabled	0

*Continued on next page*

*Line alarms (continued)*

The alarm ...	is generated ...	Default value	
		alarmMask	alarmLevel
SeverelyErroredSecond	<p>when during a one second period the bit error rate equals or exceeds <math>10^{-3}</math>.</p> <p>For each second the alarm condition is true, the alarm is activated. If a non-severely erroneous second occurs, the alarm is cleared.</p> <p>The measurement is conform the G.821 recommendation.</p>	disabled	2
Unavailability	<p>when a period of unavailable time is detected.</p> <p>A period of unavailable time begins when the bit error rate in each second is worse than <math>10^{-3}</math> for a period of ten consecutive seconds. These ten seconds are considered to be unavailable time.</p> <p>A new period of available time begins with the first second of a period of ten consecutive seconds each of which has a bit error rate better than <math>10^{-3}</math>.</p> <p>The measurement is conform the G.821 recommendation.</p>	disabled	2

## 8.6 Power-off detection alarms

See *Section 8.2 - Introduction to the alarm attributes* for the general alarm attributes.



### `crocusHDSL/powerOffDetection/alarmInfo`

The different alarms related to the object `powerOffDetection` together with their explanation and their default `alarmMask` and `alarmLevel` value are given in the following table:

The alarm ...	is generated ...	Default value	
		alarmMask	alarmLevel
Open line	when the line is interrupted.	disabled	3
Remote power fail	when the remote Crocus HDSL has a power failure.	disabled	3
Short circuit	when the line is short circuited.	disabled	3

## 8.7 Interface alarms

See [Section 8.2 - Introduction to the alarm attributes](#) for the general alarm attributes.



### crocusHDSL/<interface>/alarmInfo

The different alarms related to the object <interface> together with their explanation and their default alarmMask and alarmLevel value are given in the following table:

The alarm ...	is generated ...	Default value	
		alarmMask	alarmLevel
LinkDown (for RS530, V35 and V36)	when no RTS signal is detected. I.e. the connection between the Crocus HDSL and the DTE is down.  The LinkDown alarm is only generated if the attribute rTSControl is set to external. If the attribute rTSControl is set to internal, the LinkDown alarm will never be generated.	enabled	3
LinkDown (for X21)	when no valid C signal is detected. I.e. the connection between the Crocus HDSL and the DTE is down.	enabled	3
LinkDown (for G703 and G703 onboard)	when there is a loss of signal. I.e. the incoming G703 transmit data (data coming from the application) is no longer present.	enabled	3
LinkDown (for Bridge)	when the LAN connector is not plugged in the interface.	enabled	3
LinkDown (for Router)	when there is no connection between the Router and the Crocus HDSL. Because this connection is made by the interface connector, it is highly unlikely that this alarm will be generated. However, when it does occur it might indicate that the Router interface is faulty.	enabled	3
AIS (G703 and G703 onboard only)	when an alarm indication signal has been detected on the incoming G703 transmit data. It means the application has detected an error.	disabled	2
LFA (G703 and G703 onboard only)	when the frame alignment signal (FAS), which is present in time slot 0 of the G.704 framed data, is not detected after a certain period.	disabled	2

## 8.8 Remote power alarms

See *Section 8.2 - Introduction to the alarm attributes* for the general alarm attributes.



`crocusHDSL/<remPowerObject>/alarmInfo`

The different alarms related to the *remote power* objects together with their explanation and their default alarmMask and alarmLevel value are given in the following table:

The alarm ...	is generated ...	Default value	
		alarmMask	alarmLevel
RP overcurrent (RP Source TT and CV modem only)	when the Remote Power Source modem has to deliver a current higher than 60 mA. This might indicate that: <ul style="list-style-type: none"> <li>the line is short circuited</li> <li>the remote modem is defective (e.g. the Remote Power Sink module is out of order) and a short circuit has occurred.</li> </ul>	disabled	3
RP no current (RP Source TT and CV modem only)	when the Remote Power Source modem only has to deliver a current smaller than 15 mA. This might indicate that: <ul style="list-style-type: none"> <li>the line is interrupted</li> <li>the remote modem is defective (e.g. the Remote Power Sink module is out of order) and therefore does not longer require supply current.</li> </ul>	disabled	3
RP no current (RP Source TT and CV modem configured for wetting current only)	when the Remote Power Source modem delivers no current. This might indicate that: <ul style="list-style-type: none"> <li>the line is interrupted</li> <li>the Remote Power Source module is defective.</li> </ul>	disabled	3
RP communication fail (RP Source CV modem only)	when the communication between the CV and its dedicated Remote Power Source module located in the CN4 RP add-on chassis fails.	disabled	3
RP manually disabled (RP Source CV modem only)	when the remote power or wetting current operation has been manually disabled, i.e. by the dedicated hardware strap on the Remote Power Source module located in the CN4 RP add-on chassis.	disabled	1
primaryPowerFail (Dual Power modem only)	when the primary power (power at the local site) fails and the modem is supplied by the Remote Power Source modem located at the remote site.	disabled	2

## 9. TMA subsystem picture of the Crocus HDSL

The subsystem picture is a TMA tool which visualizes the status information of the Crocus HDSL. This chapter explains how to display the subsystem picture, and how to interpret the visual indications.

The following table gives an overview of this chapter.

Section	Title	Page
9.1	Displaying the subsystem picture	152
9.2	Structure of the subsystem picture	153



Note that the figures in this chapter are those of a Crocus HDSL TT. Although the subsystem picture of the CV has a different layout, the interpretation of the visual indications is the same.

### 9.1 Displaying the subsystem picture

To display the subsystem picture of the Crocus HDSL, proceed as follows:


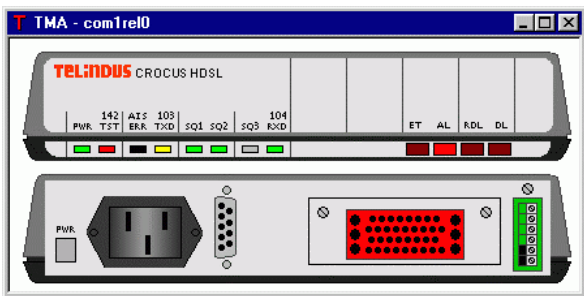

Step	Action
1	Establish a link between TMA and the Crocus HDSL through the auxiliary connector. Refer to <i>Section 3.2.2 - Connecting to a Crocus HDSL with TMA</i> .
2	<p>In the TMA window, press on the subsystem picture button: .</p> <p>The subsystem picture is displayed: .</p>
3	To close the subsystem picture, press  .

Table 9.1: Displaying the subsystem picture

## 9.2 Structure of the subsystem picture

This section displays and labels the different elements of the subsystem picture. It also explains how the visual indications should be interpreted. Below, the Crocus HDSL TT subsystem picture is displayed.

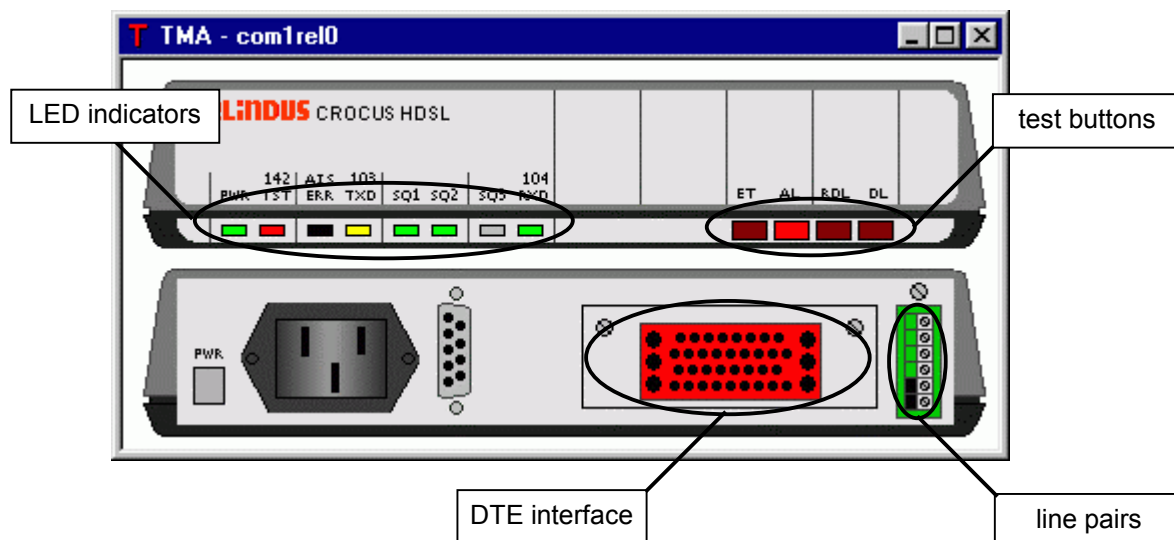


Figure 9.1: Structure of the subsystem picture

The table below gives an overview of the subsystem picture elements and what they indicate.

Element	Description								
LED indicators	They reflect the actual status of the modem. The LED indication on the subsystem picture always corresponds with the LED indication on the modem itself. For more information on the interpretation of the LEDs, refer to <i>Section 2.7 - Front panel LED indicators</i> .								
test buttons	They reflect which front panel test(s) is (are) currently active. The front panel buttons which are pushed in on the modem light up in the subsystem picture.								
line pair	This reflects the status of the line. The possible indications are: <table border="1"> <thead> <tr> <th>Colour</th><th>Explanation</th></tr> </thead> <tbody> <tr> <td>green</td><td>No alarm of the line[ ] object is active.</td></tr> <tr> <td>red</td><td>An alarm of the line[ ] object is active.</td></tr> </tbody> </table>	Colour	Explanation	green	No alarm of the line[ ] object is active.	red	An alarm of the line[ ] object is active.		
Colour	Explanation								
green	No alarm of the line[ ] object is active.								
red	An alarm of the line[ ] object is active.								
DTE interface	This reflects the status of the DTE interface. The possible indications are: <table border="1"> <thead> <tr> <th>Colour</th><th>Explanation</th></tr> </thead> <tbody> <tr> <td>none</td><td>If the DTE interface slot in the subsystem picture is blank, it means that no DTE interface module was present at power-up.</td></tr> <tr> <td>green</td><td>No alarm of the &lt;interface&gt; object is active.</td></tr> <tr> <td>red</td><td>An alarm of the &lt;interface&gt; object is active.</td></tr> </tbody> </table> <p>The layout of the connector also gives an indication of the type of DTE interface which is currently used in the Crocus HDSL.</p>	Colour	Explanation	none	If the DTE interface slot in the subsystem picture is blank, it means that no DTE interface module was present at power-up.	green	No alarm of the <interface> object is active.	red	An alarm of the <interface> object is active.
Colour	Explanation								
none	If the DTE interface slot in the subsystem picture is blank, it means that no DTE interface module was present at power-up.								
green	No alarm of the <interface> object is active.								
red	An alarm of the <interface> object is active.								

Table 9.2: Elements of the subsystem picture

## 10. Firmware download

This chapter explains how to download new firmware into the flash memory of the Crocus HDSL. The following table gives an overview of this chapter.

Section	Title	Page
10.1	Downloading with TMA	155
10.2	Downloading in boot mode	156
10.3	Downloading via the Orchid 1003 LAN	158

## 10.1 Downloading with TMA

To download firmware with TMA, proceed as follows:

Step	Action
1	Establish a link between TMA and the Crocus HDSL through the auxiliary connector. Refer to <i>Section 3.2.2 - Connecting to a Crocus HDSL with TMA</i> .
2	In the TMA window select <u>T</u> ools → <u>D</u> ownload...
3	<p>In the <i>TMA – Download</i> window, select the <i>Options</i> tab.</p> <p>Here it is a good practice to set the initial transfer speed to 9600 bps.</p> <p>If you set the maximum transfer speed to 115200 bps, the actual transfer speed will be negotiated between the computer and the modem and will be between 9600 bps and 115200 bps.</p>
4	In the <i>TMA – Download</i> window, select the <i>Configuration</i> tab, and press <i>Add...</i>
5	<p>In the <i>Remote filename</i> window:</p> <ol style="list-style-type: none"> <li>1. Select the filename you want to download (e.g. T2114001.00)</li> <li>2. Type CONTROL in the <i>Remote file</i> field.</li> <li>3. Press <i>O</i>pen.</li> </ol>
6	<p>When the <i>TMA – Download</i> window reappears, press <i>OK</i>.</p> <p>⇒ A DOS window opens and shows the download progress.</p>

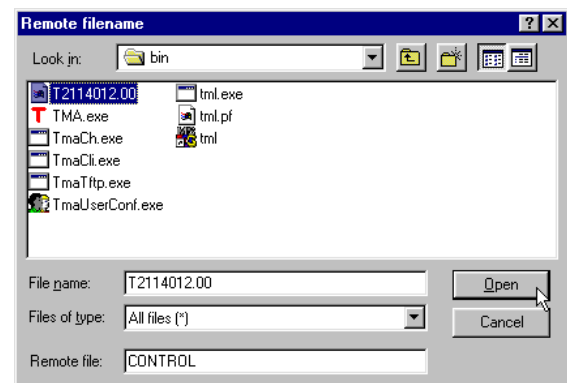
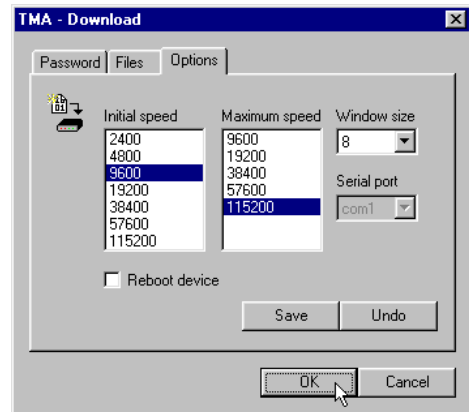


Table 10.1: Downloading firmware with TMA

## 10.2 Downloading in boot mode

When a flash memory software download has failed or when a flash memory error occurs, it may be possible that the modem becomes inaccessible to TMA. In that case, new software can still be downloaded by setting the modem in boot mode. This is done by means of the software mode DIP switch.

The location of the software mode DIP switch is:



DIP switch name	TT DS2 no. CV DS2 no.	Setting	Function
software mode	7	on	application mode
		off	boot mode

The modem can be forced in boot mode by setting DIP switch bank DS2 position 7 to *off*. If a new software download is successfully completed, the DIP switch must be reset to *on* in order to restart operation from flash memory.

Note that this DIP switch setting cannot be overruled by TMA.

To download firmware in boot mode on a TT, proceed as follows:



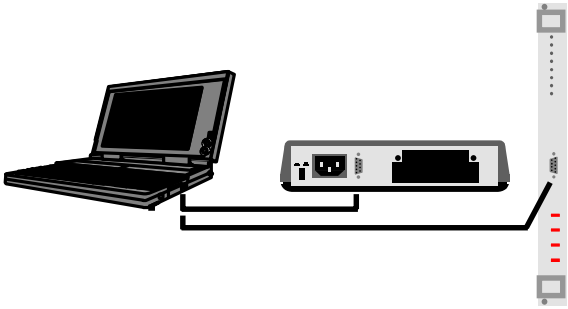
Step	Action
1	<b>Disconnect the modem from the mains.</b>
2	Open the housing.
3	Set DIP switch bank DS2 position 7 to <i>off</i> . To locate this DIP switch bank and for the DIP switch setting procedure, refer to <i>Section 3.1 - Configuration with the DIP switches</i> .
4	Close the housing and reconnect the modem to the mains. The modem is now in boot mode (the TST and ERR LEDs light up).
5	Connect the COM1 port of your PC through a straight DB9 male-female cable with the auxiliary connector of your Crocus HDSL as shown in the following figure: 
6	Open a DOS window on the PC.
7	Go to the directory <code>C:\program files\tma\bin</code> .
8	Place the file you want to download in this directory.
9	Enter the following command: <code>tml -v -c1 -f&lt;filename&gt;@CONTROL</code> where <filename> is the file you want to download, e.g. T2114001.00.
10	After the download, <b>disconnect the modem from the mains</b> , open the housing and reset DIP switch bank DS2 position 7 to <i>on</i> . Then close the housing again.



Table 10.2: Downloading firmware in boot mode on a TT

*Continued on next page*

*Downloading in boot mode (continued)*

To download firmware in boot mode on a CV, proceed as follows:

Step	Action
1	Remove the card from the CN4 card nest.
2	Set DIP switch bank DS2 position 7 to <i>off</i> .  To locate this DIP switch bank and for the DIP switch setting procedure, refer to <i>Section 3.1 - Configuration with the DIP switches</i> .
3	Place the card in the CN4 card nest. The modem is now in boot mode (the TST and ERR LEDs light up).
4	Connect the COM1 port of your PC through a straight DB9 male-female cable with the auxiliary connector of your Crocus HDSL as shown in the following figure: <div data-bbox="826 629 1401 931" data-label="Image"> </div>
5	Open a DOS window on the PC.
6	Go to the directory <code>C:\program files\tma\bin</code> .
7	Place the file you want to download in this directory.
8	Enter the following command: <code>tml -v -c1 -f&lt;filename&gt;@CONTROL</code> where <filename> is the file you want to download, e.g. T2114001.00.
9	After the download, remove the card from the CN4 card nest and reset DIP switch bank DS2 position 7 to <i>on</i> . Then place the card in the CN4 card nest again.

Table 10.3: Downloading firmware in boot mode on a CV

### **10.3 Downloading via the Orchid 1003 LAN**

If many Card Version modems need a software update, it is more efficient to use the software distribution feature of the Orchid 1003 LAN management concentrator. Also the remote Table Top modems which are connected to the Card Version modems can get new software via the Orchid.

For more information, refer to the Orchid 1003 LAN manual.

## 11. Diagnostic tests

Once installed and operational, the Crocus HDSL modems offer the network manager and/or the user the possibility to carry out diagnostic tests. They are a helpful tool to locate a problem, should one occur. This chapter describes the diagnostic tests of the Crocus HDSL.

The following table gives an overview of this chapter.

Section	Title	Page
11.1	Introduction to the diagnostic tests	160
11.2	Error test	162
11.3	Analogue loop	163
11.4	Remote digital loop	164
11.5	Digital loop	165
11.6	Interface tests	166

## 11.1 Introduction to the diagnostic tests

This section gives some introductory notes on the diagnostic tests.

### Test originators and corresponding priority levels

The following table shows the possible test originators and their priority level.

Diagnostic tests can be generated by ...	with the priority level ...
TMA	high.
the front panel buttons of the modem	medium.
the application via the interface (RS530, V35, V36 and G703 only)	low.
the remote modem (RDL only)	low.

Table 11.1: Diagnostic test originators

### Front panel button and interface test signal state and transitions

Observe the following example:

Phase	Action	Result
1	Start an interface test, for example AL.	The AL test is started.
2	Start a test in TMA, for example RDL.	The AL test stops, and the RDL test starts. This because the interface test has a lower priority than the TMA test.
3	Stop the TMA test.	<i>The interface test, in this case AL, is restarted.</i>

Table 11.2: Diagnostic tests – example 1

Now observe another example:

Phase	Action	Result
1	Start an front panel test, for example AL.	The AL test is started.
2	Start a test in TMA, for example RDL.	The AL test stops, and the RDL test starts. This because the front panel test has a lower priority than the TMA test.
3	Stop the TMA test.	<i>The front panel test, in this case AL, is not restarted.</i>

Table 11.3: Diagnostic tests – example 2

The explanation for the not restarting of the front panel test is that the front panel button *transitions* are monitored, not the *state* of those buttons. This as opposed to the interface test signals of which the *state* of the signal is monitored, not the *transitions* of those signals.

*Continued on next page*

*Introduction to the diagnostic tests (continued)***Front panel buttons on a Card Version**

The position of the upper button on the Crocus HDSL CV determines on which modem the front panel button tests are carried out. This implies that when performing keyboard tests on the Crocus HDSL CV, it is not possible to start a test on both modem A and modem B at the same time.

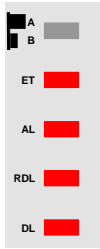
Button state	Description	Figure
released	If a front panel test button is pushed (e.g. AL) the test is started on modem A.	
pushed	If a front panel test button is pushed (e.g. AL) the test is started on modem B.	

Table 11.4: Starting a test on modem A or B of a CV

**Important remarks**

1. Within the same priority level the rule *first come, first served* applies.
2. Note that TMA can inhibit all tests, disregarding the originator.
3. As stated in the ETSI standard ETS 300 233, loop tests may only be generated on the side of the local exchange (i.e. the central modem or LTE). This is why, for instance, the use of Sa6bits for alarm conditions and loops is only supported on the modem that is configured as *central*.

## 11.2 Error test

Initiating the ET test activates the internal error test pattern generator and detector. Possible errors which are received by the detector are accumulated in an internal register. The amount of errors can be seen with TMA: the status attribute `errorCount` of the modem object. The error LED on the front panel will also light.

### How to use this test?

Example:

Phase	Description
1	Press the ET button on the local modem. ⇒ A test pattern is sent down the line.
2	Press the ET button on the remote modem. ⇒ The detector of the remote modem receives this test pattern, and looks for possible errors in the pattern. The quantity of errors could be an indication of the line quality.

Table 11.5: ET test – example

## 11.3 Analogue loop

Initiating the AL test establishes an analogue loop on the local modem. This loop is compliant to loop 3 as described in the ITU-T recommendation V.54.

The loop is situated immediately behind the analogue part of the local modem, schematically represented as follows:

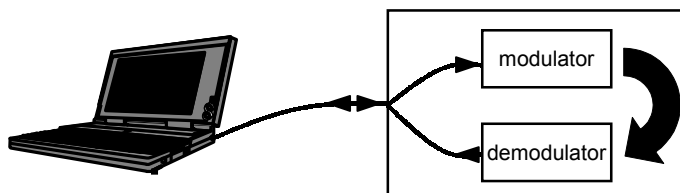


Figure 11.1: Analogue loop

### How to use this test?

Example:

Phase	Description
1	Press the AL button on the local modem. ⇒ An analogue loop is established on the local modem.
2	Send data with the application. ⇒ If this data is received again by the application, the connection between the DTE and the modem is OK. If not, it is possible that there is a bad connection between the DTE and the modem.

Table 11.6: AL test – example

In combination with the ET test, the AL test can also be used as a *self-test* of the modem.



During the execution of an AL test, no normal data communication is possible. In order to avoid that this test would stay active for an indefinite time, and thus blocking the normal data transfer, an `alDuration` attribute is linked with the test (refer to *Section 5.3 - Modem configuration attributes*). This attribute determines how long the test lasts.

## 11.4 Remote digital loop

Initiating the RDL test establishes a digital loop on the remote modem. This loop is compliant to loop 2 as described in the ITU-T recommendation V.54.

The loop is situated immediately behind the digital part of the remote modem, schematically represented as follows:

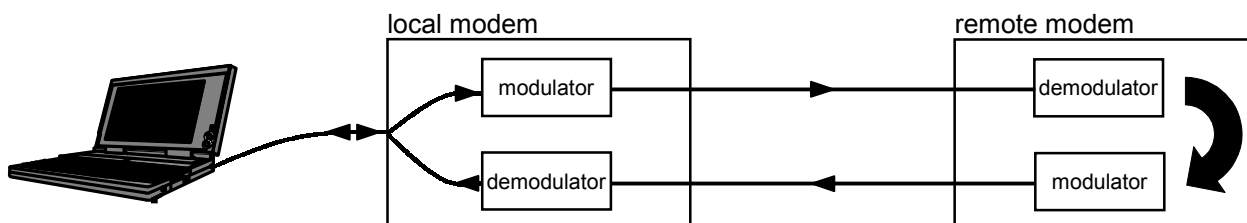


Figure 11.2: Remote digital loop

### How to use this test?

Example:

Phase	Description
1	Press the RDL button on the local modem or press the DL button on the remote modem. ⇒ A digital loop is established on the remote modem.
2	Press the ET button on the local modem. ⇒ A test pattern is sent down the line.
3	Because the remote side is in a digital loop, the test pattern returns to the local modem.
4	The detector receives this test pattern, and can compare it with the original transmitted pattern. ⇒ The quantity of inconsistencies that might exist between the original and the returned pattern could be an indication of the line quality.

Table 11.7: RDL test – example

## 11.5 Digital loop

Initiating the DL test also establishes a digital loop, but on the local modem itself. This loop is compliant to loop 2 as described in the ITU-T recommendation V.54.

The loop is situated immediately behind the digital part of the remote modem, schematically represented as follows:

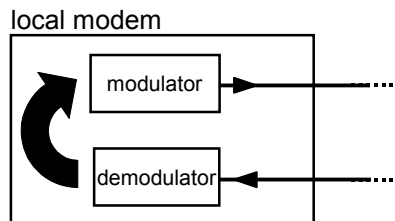


Figure 11.3: Digital loop

### How to use this test?

With this test, you can verify the same things as with the remote digital loop (refer to *Table 11.7: RDL test – example*). The only difference is that the loop is not made on the *remote* modem (as with RDL), but on the *local* modem. This can be necessary when, for example, the remote modem is unable to initiate a remote digital loop test.

### The digital loop and clocking

Initiating a DL test may cause problems for some setups. The following example clarifies this.

Example:

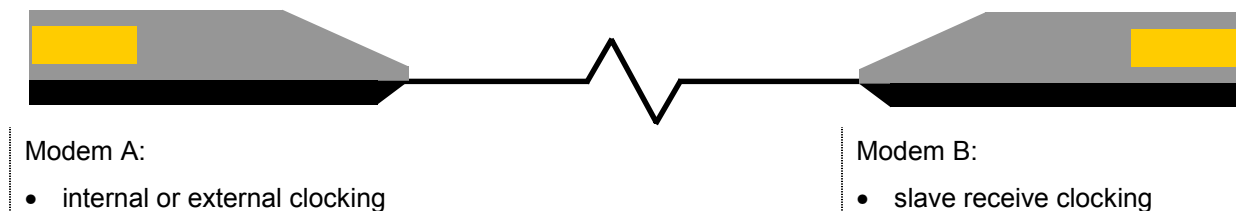


Figure 11.4: Digital loop and clocking – example

Initiate a DL test on modem A:

- ⇒ The clocking mode of modem A automatically goes to slave receive alternative.
- ⇒ Result: both modem A and B work in slave receive clocking.
- ⇒ The PLLs of the modems are floating and the clock frequency can go out of the specified range.

Therefore, you should take care on which modem you initiate a DL test.



The remote digital loop (RDL) does not have this problem. When initiating a RDL test on a modem, its clocking mode automatically goes to internal alternative.

## 11.6 Interface tests

For the RS530, V35, V36 and G703 DTE interfaces it is possible that the application initiates a test on the modem via the interface. This because circuit 140 (RDL) and 141 (AL) are present on these interfaces.

### Interface RDL

The activation of this signal will initiate a digital loop (loop 2) on the remote modem, in compliance with ITU-T recommendation V.54.

### Interface AL

The activation of this signal will initiate an analogue loop (loop 3) on the local modem, in compliance with ITU-T recommendation V.54.

## 12. Technical specifications

This chapter gives the technical specifications of the Crocus HDSL. The following table gives an overview of this chapter.

Section	Title	Page
12.1	Basic modem units	168
12.2	Line interface	168
12.4	Management interface	170
12.5	Auxiliary connector	171
12.6	Remote power specifications	173
12.7	Power requirements	173
12.8	Mechanical dimensions	174
12.9	Environmental requirements	174

## 12.1 Basic modem units

The basic modem types of the Crocus HDSL are:

- Crocus HDSL 2P F TT
- Crocus HDSL 2P F CV (Twin)
- Crocus HDSL 3P F TT
- Crocus HDSL 3P F CV (Single)
- Crocus HDSL 2P DP F TT
- Crocus HDSL 3P DP F TT

All types can be powered with either 230/115 Vac, 48 Vac or -48 Vdc. CV models are powered via the CN4 card nest.

All types are available in a Remote Power version. For CV models a CN4 RP add-on chassis is necessary.

## 12.2 Line interface

### Specifications

The line interface specifications are as follows:

Parameter	Description
connections	up to 3 line pairs + shield (screw connections)
impedance	135 $\Omega$
line speeds per pair	2E1: 1168 kbps 3E1: 784 kbps
throughput delay	300 $\mu$ sec compliant to ETSI DTR/tm-3036
transmit level	13.5 dBm compliant to ETSI DTR/tm-3036
coding	2B1Q conform ETSI ETR 152
supports	fractional E1
G.704 mode	G.704 time slot prioritization
performance (distance covered noise free)	conform to the following standard noise margin specifications: <ul style="list-style-type: none"> <li>• Bellcore TA-NWT-001210</li> <li>• ANSI T1E1.4/94-006</li> <li>• ETSI ETR 152</li> </ul>

Table 12.1: Line interface specifications

*Continued on next page*

*Line interface (continued)***Covered distance over a noise-free line**

The following table gives the maximum covered distance over a noise-free line.

Wire diameter (mm)	Maximum covered distance (km)	
	2 pair version	3 pair version
0.4	3.6	4.0
0.5	5.0	5.5
0.6	7.1	7.8
0.7	7.3	8.2
0.8	8.9	9.9
0.9	11.3	12.6
1.0	12.5	13.9
1.1	12.9	14.3
1.2	13.9	15.4

Table 12.2: Maximum covered distance over a noise-free line

## 12.3 Onboard G703 interface and connector

This applies on Dual Port modems only.

The onboard G703 interface specifications are as follows:

Interface	Conform ...	Speed	Connector	Other ...
G703	ITU-T G.703	2048 kbps	RJ45 (120 $\Omega$ )	<ul style="list-style-type: none"> <li>acceptable jitter compliant to G.823</li> <li>HDB3 or AMI coding</li> </ul>

Table 12.3: Onboard G703 interface specifications

The onboard G703 interface connector has the following pin layout:

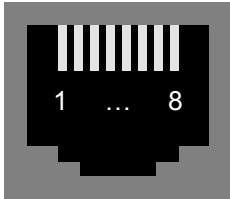
Pin	Signal	DCE	Figure
1	receive A	output	
2	receive B	output	
3	signal ground	-	
4	transmit A	input	
5	transmit B	input	
6	signal ground	-	
7	not connected	-	
8	not connected	-	

Table 12.4: Onboard G703 interface connector pin layout

## 12.4 Management interface

The possible management interfaces are:

Management interface	Connector	Speed
asynchronous through the auxiliary connector	9 pins subD (on the Crocus HDSL)	9600 bps, 8+N
synchronous through the Orchid 1003 LAN	RJ45 (on the CN4 card nest)	800 kbps

Table 12.5: Management interface specifications

## 12.5 Auxiliary connector

The auxiliary connector (sometimes also called control port) is a 9 pins subD connector that is labeled ...

- AUX on the Crocus HDSL Table Top
- CTRL on the Crocus HDSL Card Version.

The signals on these connector are V.24 / V.28 signals.

### The auxiliary connector on the Table Top

On the Crocus HDSL Table Top, the pin layout of the auxiliary connector is the following:

Pin	Signal	DCE	Figure
1	AUX RxD / high alarm signal <sup>(*)</sup>	output	
2	NMS RxD	output	
3	NMS TxD	input	
4	AUX TxD	input	
5	GND	-	
6	AUX RTS	input	
7	NMS RTS	input	
8	NMS CTS	output	
9	AUX CTS / low alarm signal <sup>(*)</sup>	output	

Table 12.6: Table Top auxiliary connector pin layout

<sup>(\*)</sup> Alarm signaling and the auxiliary channel cannot be used at the same time. However, using a special adapter cable, you can use the auxiliary channel together with the TMA management channel. For more information, refer to *Section 5.3 - Modem configuration attributes*, the `auxChannelMode` attribute.

### Remarks

- The connection with TMA can be made with a straight 9 pins subD (Male/Female) cable or a regular 25/9 pins subD adapter cable.
- The cable which is used to connect the TT with the Orchid 1003 LAN management concentrator can be ordered at the distributor (code 149.220).
- Even if no management system is used, it is still possible to configure different modem alarms to generate a local alarm. This is called alarm signaling. Refer to *Section 5.2 - Crocus HDSL configuration attributes*.

*Continued on next page*

*Auxiliary connector (continued)***The auxiliary connector on the Card Version**

On the Crocus HDSL Card Version, the pin layout of the auxiliary connector is the following:

Pin	Signal	DCE	Figure
1	AUX RxD A	output	
2	NMS RxD	output	
3	NMS TxD	input	
4	AUX TxD A	input	
5	GND	-	
6	AUX TxD B (*)	input	
7	NMS RTS	input	
8	NMS CTS	output	
9	AUX RxD B (*)	output	

Table 12.7: Card Version auxiliary connector pin layout

(\*) These signals are only present on a Crocus HDSL 2P CV Twin.

Using a special adapter cable, you can use the auxiliary channel together with the TMA management channel. For more information, refer to *Section 5.3 - Modem configuration attributes*, the `auxChannelMode` attribute.

**Remark**

- The connection with TMA can be made with a straight 9 pins subD (Male/Female) cable or a regular 25/9 pins subD adapter cable.
- The connection to the Orchid 1003 LAN management concentrator is made through the high speed bus of the CN4 card nest. Refer to the CN4 manual for more information.
- Alarm signaling with the auxiliary connector on the CV is not possible. This because pin 1 and 9 do not support the high and low alarm signals. However, it is possible to perform alarm signaling with the alarm contacts on the CN4 card nest. Refer to the CN4 manual for more information.

## 12.6 Remote power specifications

The remote power specifications are as follows:

Parameter	Description
operation mode	Selection between remote power or wetting current operation is strap selectable.
V out	120 V
max. RP current	60 mA
max. wetting current	10 mA
overcurrent protection	foldback at 60 mA
max. differential current	1 mA
typical efficiency	85%
PGND connection	Selection between floating or balanced PGND connection is strap selectable.

Table 12.8: Remote power specifications

## 12.7 Power requirements

The power requirements for the different Crocus HDSL types are as follows:

Type	Voltage	Frequency	Maximum current
2P Table Top	230 Vac +/- 10%	50 – 60 Hz	50 mA
	115 Vac +/- 10%	50 – 60 Hz	100 mA
	-48 Vdc (-25 Vdc → -80 Vdc)	-	110 mA
3P Table Top	230 Vac +/- 10%	50 – 60 Hz	56 mA
	115 Vac +/- 10%	50 – 60 Hz	112 mA
	-48 Vdc (-25 Vdc → -80 Vdc)	-	124 mA
2P Card Version (Twin)	-48 Vdc (-25 Vdc → -80 Vdc)	-	130 mA
3P Card Version (Single)	-48 Vdc (-25 Vdc → -80 Vdc)	-	124 mA
2P Table Top RP Source	-48 Vdc (-25 Vdc → -80 Vdc)	-	210 mA
3P Table Top RP Source	-48 Vdc (-25 Vdc → -80 Vdc)	-	220 mA

Table 12.9: Power requirements

These values were measured on a Crocus HDSL with a Crocus Router interface and a data link towards a remote Crocus HDSL.

## 12.8 Mechanical dimensions

The mechanical dimensions are as follows:

Dimensions	Table Top	Card Version	CN4 Card Nest	RP add-on chassis
height (mm)	50	20	270	135
width (mm)	200	235	445 without rackmounts	445 without rackmounts
depth (mm)	320 without interface 350 with interface	300	330 without interface 350 with interface	230
weight (kg)	2	1	6.1	2.8

Table 12.10: Mechanical dimensions

## 12.9 Environmental requirements

The environmental requirements are as follows:

Parameter	Description
ambient operational temperature	0°C to 50°C
storage temperature	-25°C to +70°C
maximum altitude	3000 m
relative humidity	0% to 95% non-condensing
statutory requirement	EN60950, class I equipment EN55022B, IEC 1000-4-2, IEC 1000-4-3, IEC1000-4-4
safety regulations	EN60950, EN41003

Table 12.11: Environmental requirements

## 13. Fuse replacement

This chapter gives a fuse replacement procedure for the TT and the CV. The following table gives an overview of this chapter.

Section	Title	Page
13.1	Fuse replacement on the Table Top	176
13.2	Fuse replacement on the Card Version	177



---

### **FUSE REPLACEMENT**

For continued protection against the possibility of fire, replace fuses only with the specified voltage, current and type ratings.

---

### 13.1 Fuse replacement on the Table Top

This section gives a fuse replacement procedure for the TT.

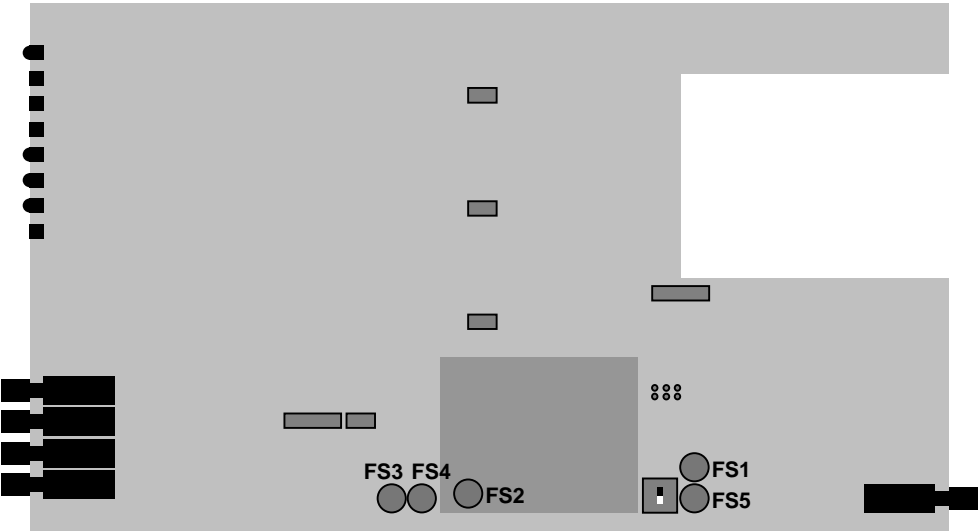


Figure 13.1: Fuse position on the TT motherboard

To replace a fuse on the TT, proceed as follows:



Step	Action																																				
1	<b>Make sure the modem is disconnected from the mains.</b>																																				
2	Unscrew the four screws located at the bottom of the modem.																																				
3	Lift the cover from the modem.																																				
4	Locate the blown fuse on the power module PCB and remove it.																																				
5	<b>Verify the specifications of the fuse about to be replaced.</b>  The fuse values of the TT are: <table><tr><th colspan="2">230/115 Vac powered</th><th colspan="2">48 V powered (non-RP)</th><th colspan="2">48 V powered (RP Source)</th></tr><tr><th>Ref.</th><th>Value</th><th>Ref.</th><th>Value</th><th>Ref.</th><th>Value</th></tr><tr><td>FS1</td><td>T160mAL/250V</td><td>FS2</td><td>T2AL/250V</td><td>FS2</td><td>T2AL/250V</td></tr><tr><td>FS3</td><td>T800mAL/250V</td><td>FS5</td><td>T500mAL/250V</td><td>FS5</td><td>T2AL/250V</td></tr><tr><td>FS4</td><td>T800mAL/250V</td><td></td><td></td><td></td><td></td></tr><tr><td>FS5</td><td>T160mAL/250V</td><td></td><td></td><td></td><td></td></tr></table>	230/115 Vac powered		48 V powered (non-RP)		48 V powered (RP Source)		Ref.	Value	Ref.	Value	Ref.	Value	FS1	T160mAL/250V	FS2	T2AL/250V	FS2	T2AL/250V	FS3	T800mAL/250V	FS5	T500mAL/250V	FS5	T2AL/250V	FS4	T800mAL/250V					FS5	T160mAL/250V				
230/115 Vac powered		48 V powered (non-RP)		48 V powered (RP Source)																																	
Ref.	Value	Ref.	Value	Ref.	Value																																
FS1	T160mAL/250V	FS2	T2AL/250V	FS2	T2AL/250V																																
FS3	T800mAL/250V	FS5	T500mAL/250V	FS5	T2AL/250V																																
FS4	T800mAL/250V																																				
FS5	T160mAL/250V																																				
6	Place the new fuse.																																				
7	Replace the cover and close tight.																																				
8	Fasten the four screws located at the bottom of the modem.																																				

Table 13.1: Replacing a fuse on the TT

## 13.2 Fuse replacement on the Card Version

This section gives a fuse replacement procedure for the TT.

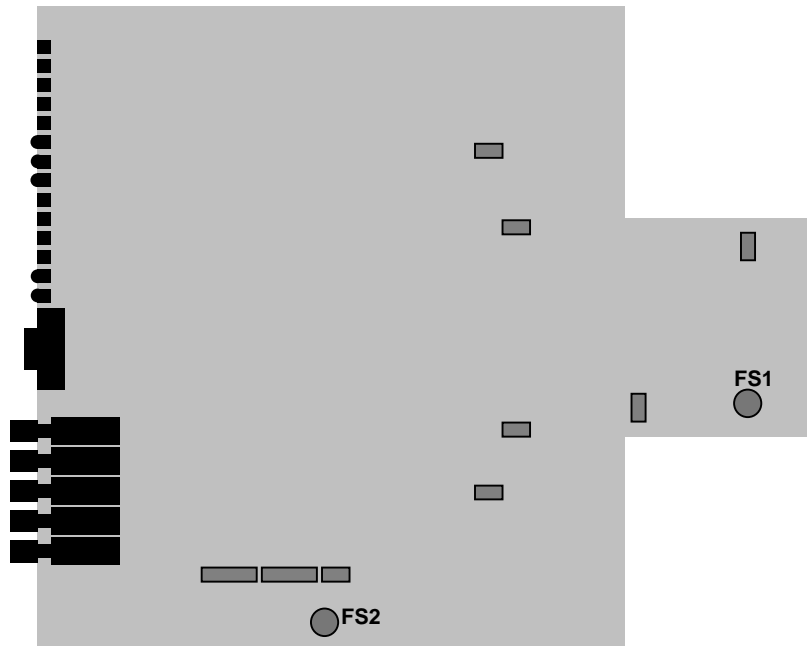


Figure 13.2: Fuse position on the CV motherboard

To replace a fuse on the CV, proceed as follows:

Step	Action								
1	Remove the card from the CN4 card nest.								
2	Locate the blown fuse on the power module PCB and remove it.								
3	<b>Verify the specifications of the fuse about to be replaced.</b> The fuse values of the CV are: <table border="1" data-bbox="395 1341 903 1570"> <thead> <tr> <th colspan="2">48 V powered</th></tr> <tr> <th>Reference</th><th>Value</th></tr> </thead> <tbody> <tr> <td>FS1</td><td>T800mAL/250V</td></tr> <tr> <td>FS2</td><td>T3.15AL/250V</td></tr> </tbody> </table>	48 V powered		Reference	Value	FS1	T800mAL/250V	FS2	T3.15AL/250V
48 V powered									
Reference	Value								
FS1	T800mAL/250V								
FS2	T3.15AL/250V								
4	Place the new fuse.								
5	Place the card in the CN4 card nest.								

Table 13.2: Replacing a fuse on the CV

# Annexes



## Annex A: DIP switch configuration tables

This annex gives an overview of all the DIP switches of the Crocus HDSL, their function and corresponding settings. The default DIP switch settings are printed in **bold**.

The following table displays the dual port configuration DIP switches.

DIP switch name	Dual Port TT DS1 no.								Function
	1	2	3	4	5	6	7	8	
onboard G703 interface	<b>on</b>	<b>on</b>	<b>off</b>	<b>off</b>	<b>off</b>	<b>off</b>	<b>off</b>	<b>off</b>	enabled
	off	off	on	on	on	on	on	on	disabled

The following table displays the basic configuration DIP switches of the Crocus HDSL.

DIP switch name	TT DS2 no. 2P CV-A/B DS2/1 no. 3P CV DS2 no.	Setting	Function
clocking	1 2 3	<b>off off off</b>	internal preferred
		on off off	internal alternative
		off on off	slave receive preferred
		on on off	slave receive alternative
		off off on	external
-	4 5 6	-	reserved
software mode (*)	7	<b>on</b>	application mode
		off	boot mode
initial settings	8	<b>on</b>	Load flash memory configuration.
		off	Use DIP switch configuration.

(\*) For a Crocus HDSL CV this function is only supported on DIP switch bank DS2.

*Continued on next page*

*Annex A: DIP switch configuration tables (continued)*

The following table displays the channel and wetting current DIP switch for a standard Crocus HDSL TT.

DIP switch name	Standard TT DS3 no.	Setting	Function
channel	1	<b>on</b>	remote
		<b>off</b>	central
wetting current	2	<b>on</b>	wetting current operation
		<b>off</b>	normal operation
-	3 4	-	reserved

The following table displays the channel and remote power DIP switch for a Remote Power Source Crocus HDSL TT.

DIP switch name	RP Source TT DS3 no.	Setting	Function
channel	1	<b>on</b>	remote
		<b>off</b>	central
remote powering	2	<b>on</b>	wetting current operation
		<b>off</b>	remote powering operation
-	3 4	-	reserved

The following table displays the channel DIP switch for a Crocus HDSL CV.

DIP switch name	CV DS3 no.	Setting	Function
channel	1 (for 2P CV-B, 3P CV)	<b>on</b>	remote
	3 (for 2P CV-A)	<b>off</b>	central
-	2	-	reserved
-	4	-	reserved

The following table shows which DIP switches of the Crocus HDSL CV should be set *off*, when the CN4 Remote Power add-on chassis is used to enable remote powering or wetting current operation.

Type	All positions of the following DIP switches should be set <i>off</i> for remote powering:
Crocus HDSL 2P CV (Twin version) modem A	DS8
Crocus HDSL 2P CV (Twin version) modem B	DS9
Crocus HDSL 3P CV (Single version)	DS8 & DS9

## Annex B: abbreviations

The following table gives a list of abbreviations and their description.

Abbreviation	Description
2P	2 pair
3P	3 pair
AIS	Alarm Indication Signal
AL	Analogue Loop
AMI	Alternate Mark Inversion
AUX	AUXiliary
BER	Bit Error Rate
bps	bits per second
CN4	Card Nest 4
CRC	Cyclic Redundancy Check
CTRL	ConTRoL
CTS	Clear To Send
CV	Card Version
CV-A	Card Version modem A
CV-B	Card Version modem B
DCE	Data Communications Equipment
DIP	Dual In line Pin
DL	Digital Loop
DP	Dual Port
DS	Dip Switch bank
DTE	Data Terminal Equipment
ERR	Error
ET	Error Test
ExtTxClk	External Transmit Clock
FAS	Frame Alignment Signal
FEBE	Far End Block Error
FS	Fuse
HDB3	High Density Bipolar 3
HDSL	High bit rate Digital Subscriber Line
HDSL F	HDSL Flash

*Continued on next page*

*Annex B: abbreviations (continued)*

if	interface
IP	Internet Protocol
LAN	Local Area Network
LED	Light Emitting Diode
LFA	Loss of Frame Alignment
LOS	Loss Of Signal
MIB	Management Information Base
NEBE	Near End Block Error
NMS	Network Management System
PWR	PoWeR
RDL	Remote Digital Loop
RP	Remote Power
RTS	Request To Send
Rx	Receive
RxClk	Receive Clock
RxD	Receive Data
SDSL	Symmetric Digital Subscriber Line
SDSL F	SDSL Flash
SELV	Safety Extra Low Voltage
SNMP	Simple Network Management Protocol
SQ	Signal Quality
SSR	Solid State Relay
TMA	Telindus Maintenance Application
TML	Telindus Memory Loader
TNV	Telecom Network Voltage
TST	TeST
TT	Table Top
Tx	Transmit
TxClk	Transmit Clock
TxD	Transmit Data
WAN	Wide Area Network

## Annex C: product information

The following table displays the product information of the Crocus HDSL basic units.

Sales code	Product name	Description
152483	CROCUS HDSL F 2P TT BU 230V	Table-top manageable (TMA user interface) 2Mbps baseband modem 2 pairs. Flash Memory and Router INTF support. Basic Unit, no interface provided. Interface module available as separate sales items. 230/115 Vac
152485	CROCUS HDSL F 2P TT BU 48V	Table-top manageable (TMA user interface) 2Mbps baseband modem 2 pairs. Flash Memory and Router INTF support. Basic Unit, no interface provided. Interface module available as separate sales items. 48 Vdc.
152484	CROCUS HDSL F 3P TT BU 230V	Table-top manageable (TMA user interface) 2Mbps baseband modem 3 pairs to cover longer distances without repeaters. Flash Memory and Router INTF support. Basic Unit, no interface provided. Interface module available as separate sales items. 230/115 Vac
152486	CROCUS HDSL F 3P TT BU 48V	Table-top manageable (TMA user interface) 2Mbps baseband modem 3 pairs to cover longer distances without repeaters. Flash Memory and Router INTF support. Basic Unit, no interface provided. Interface module available as separate sales items. 48 Vdc
152487	CROCUS HDSL F 2P TWIN-CV BU	Twin cardversion manageable (TMA user interface) dual 2Mbps baseband modem 2 pairs. Flash Mem. and Router INTF support. Basic Unit, no INTF provided. Interface modules (2 modules required) = separate sales items. (From PCB=1.1 RP ready)
152488	CROCUS HDSL F 3P CV BU	Cardversion manageable (TMA user interface) single 2Mbps baseband modem 3 pairs to cover longer distances without repeaters. Flash Mem. and Router INTF support. Basic Unit, no INTF provided. Interface module=separate sales items. (From PCB=1.1 RP ready)
156236	CROCUS HDSL F DP 2P TT BU 230V	Table-top manageable (TMA user interface) 2Mbps Dual Port baseband modem 2 pairs. Flash and Router support. Basic Unit with one onboard G.703/704 and one interfaceslot for a modular Nx64K interface module. (separate item). 230/115Vac.
156238	CROCUS HDSL F DP 2P TT BU 48V	Table-top manageable (TMA user interface) 2Mbps Dual Port baseband modem 2 pairs. Flash and Router support. Basic Unit with one onboard G.703/704 and one interfaceslot for a modular Nx64K interface module. (separate item). 48Vdc.
156237	CROCUS HDSL F DP 3P TT BU 230V	Table-top manageable (TMA user interface) 2Mbps Dual Port baseband modem 3 pairs. Flash and Router support. Basic Unit with one onboard G.703/704 and one interfaceslot for a modular Nx64K interface module. (separate item). 230/115Vac.
156239	CROCUS HDSL F DP 3P TT BU 48V	Table-top manageable (TMA user interface) 2Mbps Dual Port baseband modem 3 pairs. Flash and Router support. Basic Unit with one onboard G.703/704 and one interfaceslot for a modular Nx64K interface module. (separate item). 48Vdc.
169430	MANUAL CROCUS HDSL-F (E)	Manuals are delivered with the product in electronic format (CD-ROM) for environmental reasons. If however a hardcopy (print-out) of the manual is required, this sales item can be used. Between brackets an indication of the language.

The following table displays the product information of the Crocus HDSL remote power related units.

Sales code	Product name	Description
157037	CR HDSL F 2P TT BU SR 48V	TT manageable (TMA user interface) 2Mbps BB modem 2 pairs. Flash & Router INTF support. Basic Unit, no interface provided. Interface module available as separate sales items. Rem Power SOURCE version. 48Vdc.
157036	CR HDSL F 2P TT BU RP	TT manageable (TMA user interface) 2Mbps BB modem 2 pairs. Flash & Router INTF Support. Basic Unit, no interface provided. Interface module available as separate sales items. Remotely Powered.
157035	CR HDSL F 2P TT BU 48V/RP	TT manageable (TMA user interface) 2Mbps BB modem 2 pairs. Flash & Router INTF Support. Basic Unit, no interface provided. Interface module available as separate sales items. Dual powered: 48 Vdc, back-up Remotely Powered.
157034	CR HDSL F 2P TT BU 230V/RP	TT manageable (TMA user interface) 2Mbps BB modem 2 pairs. Flash & Router INTF Support. Basic Unit, no interface provided. Interface module available as separate sales items. Dual powered: 230/115 Vac, back-up Remotely Powered.
157041	CR HDSL F 3P TT BU SR 48V	TT manageable (TMA user interface) 2Mbps BB modem 3 pairs. Flash & Router INTF Support. Basic Unit, no interface provided. Interface module available as separate sales items. Rem Power SOURCE version. 48Vdc.
157040	CR HDSL F 3P TT BU RP	TT manageable (TMA user interface) 2Mbps BB modem 3 pairs. Flash & Router INTF Support. Basic Unit, no interface provided. Interface module available as separate sales items. Remotely Powered.
157039	CR HDSL F 3P TT BU 48V/RP	TT manageable (TMA user interface) 2Mbps BB modem 3 pairs. Flash & Router INTF Support. Basic Unit, no interface provided. Interface module available as separate sales items. Dual powered: 48 Vdc, back-up Remotely Powered.
157038	CR HDSL F 3P TT BU 230V/RP	TT manageable (TMA user interface) 2Mbps BB modem 3 pairs. Flash & Router INTF Support. Basic Unit, no interface provided. Interface module available as separate sales items. Dual powered: 230/115 Vac, back-up Remotely Powered.
157046	CR HDSL F DP 2P TT BU SR 48V	TT manageable (TMA user interface) 2Mbps Dual Port BB modem 2 pairs. Flash & Router INTF Support. Basic Unit, onboard G.703/704 and one interfaceslot for a modular Nx64K interface module, (separate sales item). Rem Power SOURCE version. 48Vdc.
157045	CR HDSL F DP 2P TT BU RP	TT manageable (TMA user interface) 2Mbps Dual Port BB modem 2 pairs. Flash & Router INTF Support. Basic Unit, onboard G.703/704 and one interfaceslot for a modular Nx64K interface module, (separate sales item). Remotely Powered.
157044	CR HDSL F DP 2P TT BU 48V/RP	TT manageable (TMA user interface) 2Mbps Dual Port BB modem 2 pairs. Flash & Router INTF Support. Basic Unit, onboard G.703/704 and one interfaceslot for a modular Nx64K interface module, (separate sales item). Dual Powered: 48V backup: Rem Powered.
157043	CR HDSL F DP 2P TT BU 230V/RP	TT manageable (TMA user interface) 2Mbps Dual Port BB modem 2 pairs. Flash & Router INTF Support. Basic Unit, onboard G.703/704 and one interfaceslot for a modular Nx64K interface module, (separate sales item). Dual Powered: 230/115V backup: Rem Powered.

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*Crocus HDSL remote power related units (continued)*

Sales code	Product name	Description
157050	CR HDSL F DP 3P TT BU SR 48V	TT manageable (TMA user interface) 2Mbps Dual Port BB modem 3 pairs. Flash & Router INTF Support. Basic Unit, onboard G.703/704 and one interfaceslot for a modular Nx64K interface module, (separate sales item). Rem Power SOURCE version. 48Vdc.
157049	CR HDSL F DP 3P TT BU RP	TT manageable (TMA user interface) 2Mbps Dual Port BB modem 3 pairs. Flash & Router INTF Support. Basic Unit, onboard G.703/704 and one interfaceslot for a modular Nx64K interface module, (separate sales item). Remotely Powered.
157048	CR HDSL F DP 3P TT BU 48V/RP	TT manageable (TMA user interface) 2Mbps Dual Port BB modem 3 pairs. Flash & Router INTF Support. Basic Unit, onboard G.703/704 and one interfaceslot for a modular Nx64K interface module, (separate sales item). Dual Powered: 48V backup: Rem Powered.
157047	CR HDSL F DP 3P TT BU 230V/RP	TT manageable (TMA user interface) 2Mbps Dual Port BB modem 3 pairs. Flash & Router INTF Support. Basic Unit, onboard G.703/704 and one interfaceslot for a modular Nx64K interface module, (separate sales item). Dual Powered: 230/115V backup: Rem Powered.
169431	MANUAL CROCUS HDSL-F RP (E)	Manuals are delivered with the product in electronic format (CD-ROM) for environmental reasons. If however a hardcopy (print-out) of the manual is required, this sales item can be used. Between brackets an indication of the language.

The following table displays the product information of the Crocus HDSL DTE interfaces.

Sales code	Product name	Description
143664	G703 INTF.CROCUS HDSL	Plug-in modular interface G.703 (2M) for Crocus HDSL. Connectors: BNC (75 Ohm) and RJ45 (120 Ohm). Remark: Pin layout RJ45 compliant with ISO 10173. Suitable for Crocus HDSL / HDSL-F
143666	V35 INTF. CROCUS	Plug-in modular interface V.35 transparant. Suitable for Crocus HS / SDSL-F/ HDSL / HDSL-F / FO10M / INV-MUX.
149378	V35 (NX64K) INTF.CROCUS	Plug-in modular interface V.35 (Nx64K). Suitable for Crocus SDSL-F / HDSL / HDSL-F / HDSL-F DP.
142199	V36 INTF.CROCUS	Plug-in modular interface V.36 transparant. Suitable for Crocus HS / SDSL-F/ HDSL / HDSL-F / FO10M / INV-MUX.
149377	V36 (NX64K) INTF.CROCUS	Plug-in modular interface V.36 (Nx64K). Suitable for Crocus SDSL-F / HDSL / HDSL-F / HDSL-F DP.
142200	X21 INTF.CROCUS	Plug-in modular interface X.21 transparant. Suitable for Crocus HS / SDSL-F/ HDSL / HDSL-F / FO10M / INV-MUX.
149379	X21 (NX64K) INTF.CROCUS	Plug-in modular interface X.21 (Nx64K). Suitable for Crocus SDSL-F / HDSL / HDSL-F / HDSL-F DP.
161611	RS-530 INTF.CROCUS	Plug-in modular interface RS-530 for Crocus HS / SDSL-F/ HDSL / HDSL-F / FO10M / INV-MUX.
161612	RS-530 (NX64K) INTF.CROCUS	Plug-in modular interface RS-530 (Nx64K). Suitable for Crocus SDSL-F / HDSL / HDSL-F / HDSL-F DP.
150466	BRIDGE INTF.CROCUS	Plug-in modular interface Ethernet Bridge for direct UTP LAN connection. IEEE 802.3 compliant. Suitable for Crocus HS / SDSL-F/ HDSL / HDSL-F / FO10M / INV-MUX.
162602	BRIDGE (NX64K) INTF.CROCUS	Plug-in modular interface Ethernet Bridge for direct UTP LAN connection. IEEE 802.3 compliant. Nx64K capability. Suitable for Crocus SDSL-F / HDSL / HDSL-F / HDSL-F DP.
161613	ROUTER INTF.CROCUS	Plug-in modular interface Ethernet Router for direct UTP LAN connection. IEEE 802.3 compliant. Suitable for Crocus SDSL-F / HDSL-F / FO10M (limited to 2M) / HS (Requires a BootP server for initial config)
161614	ROUTER (NX64K) INTF.CROCUS	Plug-in modular interface Ethernet Router for direct UTP LAN connection. IEEE 802.3 compliant. Nx64K capability. Suitable for Crocus SDSL-F / HDSL-F / HDSL-F DP.

The following table displays the product information of the CN4 card nest.

Sales code	Product name	Description
142.189	CARDNEST CN4	Cardnest for Crocus xDSL family, SDSL-QUAD, Aster 4 CV-CN4 and Crocus FO family. 19 inch, 6U high, 15 modemslots & 2 PWR module slots. Suitable for direct 48 Vdc powering (No power modules required) If Ac powering is required, see available PWR Modules.
163.459	DESKTOP CN4	Available soon. Desktop version of Cardnest CN4 for small concentration sites. 4 modemslots & 2 PWR module slots. Suitable for direct 48 Vdc powering (No power modules required) If Ac powering is required, see available PWR Modules. (80W version recommended)
142.190	PWR MOD 220/110V CN4 80W	Plug-in Power module 230/115 Vac 80 Watt for CN4. Two Power modules will provide full redundancy. Suitable for Cardnest CN4 with Crocus HS modem range only and for Desktop CN4 ( 4 slots, all type of card-modems)
143.678	PWR MOD 220/110V CN4 300W	Plug-in Power module 230/115 Vac 300 Watt for cardnest CN4. Two Power modules will provide full redundancy. Suitable for full Crocus xDSL modem family, Aster 4 CV-CN4 modems and Crocus FO family.
142.187	BLANKING MODEMSLOT CN4	Blanking modems slot cardnest CN4 to cover unused modem slots for EMC compatibility.
142.188	BLANKING PWR MOD CN4	Blanking power module slot cardnest CN4 to cover unused PWR slots for EMC compatibility.
142.449	BLANKING INTF.SLOT CN4	Blanking interface-slot cardnest CN4 to cover unused interface slots to comply with EMC regulations.(Each modems slot has two interface slots)

The following table displays the product information of the CN4 RP add-on rack.

Sales code	Product name	Description
157.056	RP ADD-ON CHASSIS CN4	Add-on chassis (3U H) to provided Remote Powering Source capabilities for xDSL-F CV modems housed in CN4 (PCB rev:0.3). This 48Vdc-only chassis is connected to the CN4 via high density cables (included) and accepts up to 15 RP Source modules.
157.057	RP SOURCE MODULE 2 LINES	Remote Power Source modules for 2 lines. Suitable for Crocus SDSL-F TWIN-CV. (PCB rev: 1.1)
157.058	RP SOURCE MODULE 4 LINES	Remote Power Source modules for 4 lines. Suitable for Crocus HDSL-F 2P TWIN-CV (PCB rev: 1.1) and Crocus HDSL-F 3P CV (PCB rev: 1.1).

The following table displays miscellaneous product information.

Sales code	Product name	Description
158.345	DESK-TOP PWR MOD 230VAC->48VDC 30W	Optional External Desk-top Power supply module (230/115Vac -> 48Vdc) for Crocus xDSL-F TT Remote Power SOURCE version. Suitable for CR HDSL-F ** TT BU SR 48V and CR SDSL-F TT BU SR 48V.
107.333	RMK 2X 1U-HOUSING (2U-HIGH)	Rackmount kit with ventilation, 2U high, supporting up to two modems. (See also code: 151.038 & 140.787)
151.038	BENCH WITH VENTILATION (DEPTH 470 MM)	General purpose mounting bench with ventilation. (depth 470mm)
140.787	BENCH WITH VENTILATION (DEPTH 597MM)	General purpose mounting bench with ventilation. (depth 597mm)