CHAMELEON - SINGLE HARDWARE PRODUCT LINE

The CHAMELEON product line covers almost every need for Cable-TV and SMATV distribution with only one hardware.

The different inputs, processing and outputs are defined by software options, and all software options can be updated at any time.

The CHAMELEON includes a dual DVB-S/S2/T/T2/C receiver, furthermore it includes decoding of MPEG-2 and MPEG-4 video formats as well as it supports MPEG, AAC HE and Dolby audio decoding. The Dolby audio decoding requires the latest HW version.

The SW options define the different “product realisations” you can implement with the unique HW. For your specific application, you simply buy the SW options you need. When you need further functionality, just purchase additional SW options, and update the installed HW.

CHAMELEON products range from receiver, to edge, to streamer and to scrambler.

Some examples:
- Receiver DVB-S/S2/T(T2)/C
- Transmodulators
- DVB-C, DVB-T modulators
- DTMB modulator
- Analog VSB RF-modulators
- FM modulator
- Edge QAM/COFDM
- Dual MPEG2/4 SD decoder
- Single MPEG2/4 HD decoder
- CI multi-decryptions
- Remultiplexer multiple TS
- DVB_CSA Scrambler
- IP streamer
- ASI streamer
- SDI generator
Service and support

Support
For support information and help, please contact our support organisations. The support organisation is manned by support staff from both Sweden and Germany.

E-mail: support@chameleonconnect.tv
Telephone:
+46 141 22 91 15
+49 7233 66 621

E-mails sent to the above e-mail address will be available to all support staff. The general (Swedish) support telephone number +46 141 22 91 15 will have staff answering both from Sweden and from Germany.

Chameleon installation guide
This installation guide is also available at the chameleonconnect.tv portal, under Documents/Chameleon/Installation guides.

Support information available at the chameleonconnect.tv portal
At the chameleonconnect.tv portal, there is further information and support tools. Here you will find a Forum, a FAQ section and documentation such as Release Notes and Known Issues.
Content

Service and support  page 2
1. Getting started  page 4
2. General information and SW options  page 5
3. The chameleonconnect.tv portal  page 5
4. Registering the Chameleon & downloading SW options  page 6
5. Upgrading the Chameleon FW & SW options  page 7
6. Connecting to the Chameleon web UI  page 8
7. Select Operation mode  page 9
8. Add and configure inputs  page 10
8.1 Add ASI and IP inputs  page 11
8.2 Add tuner inputs  page 12
9. Add and configure outputs  page 13
9.1 Add and configure analogue PAL/SECAM outputs  page 14
9.2 Add and configure ASI, SDI and FM outputs  page 17
9.3 Add and configure DVB-T, DVB-C and DTMB outputs  page 18
9.4 Add and configure IP (SPTS/MPTS) outputs  page 21
10. SERVICE MANAGEMENT, service & PID management  page 22
10.1 Navigating the In/Outputs view in SERVICE MANAGEMENT  page 23
10.2 Navigating in the Services view in SERVICE MANAGEMENT  page 26
10.3 Managing services and PIDs in the Inputs part of SERVICE MANAGEMENT  page 28
10.4 Settings and management of Outputs in SERVICE MANAGEMENT  page 30
10.4.1 Character encoding, service names and provider names  page 33
10.5 Descrambling and Common Interface  page 34
10.5.1 Common Interface and CAM/smart card  page 34
10.5.2 Descrambling – Service level & PID level  page 35
10.6 Remultiplexing and PSI/SI  page 36
10.7 PIDs and PID listings  page 37
10.8 Outputs TS DVB Network settings  page 38
10.9 Outputs services settings  page 39
10.10 HE system management and DVB Network PSI/SI  page 40
10.11 Transmodulation and transparent outputs  page 41
11. Encryption – DVB-CSA scrambling and SimulCrypt  page 42
11.1 Encryption - scrambling overview  page 44
11.2 Add EMM Generator connections  page 45
11.3 Add EMM connection to the output(s)  page 47
11.4 Add ECM Generator connections  page 48
11.5 Add ECM streams to the ECM Generator(s)  page 49
11.6 Scrambling Control Groups & connect to ECM Streams  page 50
11.7 Connect the service to be scrambled to an SCG  page 51
12. Settings: Managing the Chameleon module  page 52
12.1 Add and configure Network interfaces  page 53
12.2 Date and time (NTP server access and Time sources)  page 54
12.3 Scheduler – commands scripting  page 55
12.4 SNMP  page 56
12.5 User management – password protection  page 58
12.6 Software and SW options (entitlement) upgrade  page 59
12.7 Module maintenance  page 60
12.8 Factory reset & Backup / Restore  page 61
13. Status information  page 62
14. SW options  page 63
1. Getting started

1. Register your Chameleon at chameleonconnect.tv
After registration and uploading the entitlement file to the Chameleon, your purchased SW options are loaded, and a 30 days trial period for all SW options is initiated.

2. Assemble in base unit
Mount your Chameleon in the base unit, and connect the power supply.

3. Connect: 192.168.0.20
Use an IP cable, start your web browser, and connect by entering 192.168.0.20 in the address field of the browser. Make sure your computer or network adaptor has an IP address in the same IP range.

4. Change the IP address (optionally)
When using a system of Chameleons, it is recommended to change the default management address 192.168.0.20 to a system unique IP address.

5. Configure your Chameleon
Connect and configure inputs and outputs. Select services from your inputs to your outputs.
2. General information and SW options

**Delivery without SW options – please register at the portal**
The Chameleons are delivered without any SW options loaded. You can connect to the Chameleon directly using a web browser and the default management IP address 192.168.0.20. In a non-registered Chameleon, you have access to the web UI, but no configuration or settings can be done. To enable the normal functionality, the Chameleon has to be registered at the chameleonconnect.tv portal, see §3.

**SW options and 30 days installation period with all SW options**
After registering your Chameleon, and uploading the entitlement file to the Chameleon, you have access to the functionalities you have purchased. A 30 days (uptime) trial period for all currently available SW options is initiated. Note that the trial period is terminated automatically if SW options are added after the initial purchase.

3. The chameleonconnect.tv portal

**Portal URL: http://chameleonconnect.tv**
Connect to the Chameleon portal using the URL: http://chameleonconnect.tv

**Login to the chameleonconnect.tv**
Enter your e-mail address and password, and click Login. If you have forgotten your password, click the Reset password link, and an e-mail will be sent to the entered e-mail address. The e-mail contains a hyper-link that you should follow to confirm the request for a new password.

**Requesting access to the chameleonconnect.tv portal**
If you do not have a password for access to the portal, please click the Request access to Chameleon portal link.
4. Registering the Chameleon & downloading SW options

Registering Chameleons at the chameleonconnect.tv portal
After login, and clicking the Register Chameleon tab, enter the serial number of your Chameleon. Optionally, also enter Module name, Vendor, and Description (these fields are intended for your own use, to be able to track and maintain your installed base). Information about SLA End date and SW options are entered automatically from the information stored in the Unit Data Base. Click the Register button to register the Chameleon.

Downloading SW options (entitlement file) to your computer
Go to the tab My Chameleons, and click the serial number for the module to download SW options (entitlement file) for. In the Edit Chameleon view, click Download file. Save the file to your computer.

Uploading SW options (entitlement file) to your Chameleon
Via the Chameleon web UI
Under SETTINGS / SOFTWARE AND ENTITLEMENT UPGRADE, browse for the entitlement file you previously downloaded to your computer. Click Upload, and reboot the module when the upload is ready.

Using the IP Supporter
With the Chameleon connected to your computer, and your computer connected to Internet, you can upload the entitlement file directly. Select you Chameleon, and check the box for “Entitlement from A2B server”, and click Upload.
5. Upgrading the Chameleon FW & SW options

Both FW and SW options (entitlements) are uploaded via the **SOFTWARE AND ENTITLEMENT UPGRADE** in the **SETTINGS** tab.

### Uploading firmware

1. Click on the UPLOAD button to browse for the firmware file to be uploaded from your computer
2. Locate the firmware file (.bin file) on your computer, and select it
3. Click Open in the browsing window
4. Click the Upload button in the Chameleon web UI
5. Wait for the feedback that the upload is OK
6. Reboot the module

### Uploading SW options (.ent file)

1. Click on the UPLOAD button to browse for the entitlement file to be uploaded from your computer
2. Locate the software file (<serial number>.ent) on your computer, and select it
3. Click Open in the browsing window
4. Click the UPLOAD button in the Chameleon web GUI
5. Wait for the feedback that the upload is OK
6. Reboot the module
6. Connecting to the Chameleon user interface

Default IP address: 192.168.0.20
The default IP address for a Chameleon module is 192.168.0.20. Change the IP address to a unique IP address in your network, in the web UI under SETTINGS / NETWORKING, or by using the “IP-Supporter”.

Connecting with web browser
Use a standard web browser on your computer to connect by typing the IP address of the Chameleon in the address field.

Supported web browsers
The Chameleon web interface is verified for Firefox version 14 and Internet Explorer 9. Other browsers might work, but the functionality cannot be guaranteed.

General information about the web interface structure
The web UI is designed to get a logical structure for the user/installer, and an overview of the module via the top tabs.
Operation mode must be selected before starting to use the Chameleon. The selected Operation mode will have implications on the general functionality of the module, e.g. the possible output standard and the IP streaming capability.
The main interface while managing services is the SERVICE MANAGEMENT. Here, you will have an overview of the configured inputs and outputs, and you will also manage the service selection, remultiplexing and decryption.
Before you start managing the services, you should add and configure the inputs and the outputs in their respective tabs.
The SETTINGS tab contains module settings such as Networking, Headend System Management, Operation Mode, Common Interface, SW and Entitlement Upgrade, Maintenance, and Log. The CAM menu, if available, is also displayed in the Common Interface menu under the SETTINGS tab.
Select Operation mode

Click **OPERATION MODE** under the **SETTINGS** tab. Select the generic operation mode by clicking Edit, and selecting operation mode with the radio buttons. Click Save.

**Operation modes:**
- Analogue mode
- DVB-T mode
- DVB-C mode
- Streaming mode
- FM mode
- DTMB mode

**Mode selection implications**

The selected operation mode will have an impact on the possible selection of output.

**Analog mode**: for 1 or 2 analog RF and/or SDI output.

**DVB-T mode**: for 1 or 2 digital terrestrial modulation (COFDM).

**DVB-C mode**: for digital cable TV modulation (QAM), 1 to 4 DVB-C multiplexes.

**Streaming mode**: for IP-TV output (TS over IP). Up to 20 IPTS out.

**FM mode**: for up to 8 analog FM outputs.

**DTMB mode**: for 1 DTMB out

For all the different operation modes, your Chameleon module must also be equipped with the appropriate SW options, see more details in §14.

**ASI and IP for all operation modes**

In all operation modes, input and output via ASI is available simultaneously. The ASI in/out can be used simultaneously with the modulated and IPTS outputs. The different operation modes also have capability for simultaneous IPTS (SPTS and/or MPTS) inputs and outputs. The number of IPTS in different operation modes are given to the right.

<table>
<thead>
<tr>
<th>Operation Mode</th>
<th>Number of IPTS in</th>
<th>Number of IPTS out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>FM</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>DVB-T</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>DVB-C</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>Streaming</td>
<td>4</td>
<td>20</td>
</tr>
</tbody>
</table>

*IPTS = SPTS and/or MPTS
8. Add and configure inputs

Go to INPUTS
Click on the **INPUTS** tab
Depending on the SW options in your Chameleon, you can configure inputs from:
- Tuner (up to 2 tuner inputs, note that available inputs depends on HW version)
- ASI (up to 2 ASI inputs)
- IP (up to 20 IPTS inputs, depending on Operation Mode)

Add an input
- Click on “Add new input” or the +
- Select input type in the **Choose input type** drop-down list (ASI, DVB-C, DVB-S, DVB-S2, DVB-T, DVB-T2, IPTV. Selectable tuner inputs will depend on the tuner installed).

Configure the input
For each type of input, you will get configuration settings in the expanded view.
- Type a name for the input. This name will be shown in the overview of the inputs.
- Fill out the required information/parameters and click **SAVE**.

Input status
If your settings were OK, the status will show you services found and additional input type related data.
8.1 Add ASI and IP inputs

Adding ASI inputs
Go to INPUTS, and click on “Add new input” or the +.
Select ASI in the drop down list for Choose input type.
Type a name for your ASI input.
Select the Physical port from the drop down list. Port 1 is the top BNC 1 connector, port 2 is the lower BNC 2 connector.
Click SAVE.
Note: ASI inputs automatically detects the incoming bit rate.

Add IP inputs
Go to INPUTS, click “Add new input” or the +.
Select IPTV in the Choose input type list.
Type a name for your new IPTV input.
Select Bitrate mode
• CBR Automatic (auto-detects the incoming bit rate)
• CBR Manual (manual setting of bit rate in)
• VBR (only available in Analogue Operation mode)
Select Network interface. If no network interface is available, you can use the link Manage interfaces.
Select Routing scheme, Multicast or Unicast.
• For Multicast; enter the Multicast address and Port.
• For Unicast: enter the Port (address will be the same as the IP address of the streaming interface).
Click SAVE.

Input status
If your settings were OK, the status will show you services found and additional input type related data.
8.2 Add tuner inputs

Adding tuner inputs
Go to **INPUTS**, and click on “Add new input” or the
Select the tuner type in the **Choose input type** list
Note: *The available tuner input types will depend on the SW
options, and on your HW.*
Type a name for your input
Select the Physical port from the drop down list. Port 1 is the
top F-connector (RF in 1), port 2 is the lower F-connector (RF
in 2), see picture in §8.1.
Fill out the required settings and click **SAVE**.
Note: *Each input type has its own set of input settings. Below
some examples.*

**Satellite input settings:**

- **Choose input type**: DVB-S
- **Name**: Type input name
- **Physical port**: Two
- **LNB type**: Universal
- **Polarisation**: Vertical
- **Voltage**: Auto
- **22 kHz tone**: Auto
- **FEC**: Auto
- **Symbol rate (kbaud)**: 27500
- **Transponder frequency (MHz)**: 12558
- **DiSEqC type**: None

**Terrestrial input settings:**

- **Choose input type**: DVB-T
- **Name**: Terrestrial input name
- **Physical port**: Two
- **Bandwidth**: 8 MHz
- **Frequency (MHz)**: E36

**Cable TV input settings:**

- **Choose input type**: DVB-C
- **Name**: QAM input name
- **Physical port**: Two
- **Symbol rate (kbaud/s)**: 6875
- **Frequency (MHz)**: 722
- **Constellation**: Auto

**Input status**
If your settings were OK, the status will show you services found and additional
input type related data.
9. Add and configure outputs

**Go to OUTPUTS**
Depending on SW options, and Operation mode, you can configure up to:
- 2 Analogue RF out (PAL, SECAM)
- 8 analogue FM radio
- 2 SDI out
- 2 ASI out
*Note: ASI in/out and SDI shares the 2 BNC ports. These ports are controlled by SW.*
- 2 DVB-T out
- 4 DVB-C out
- 1 DTMB out
- 20 IPTV out

**Add and configure an output**
In the **OUTPUTS** tab, click **Add new output**.
- Select output type (**ASI, SDI, IPTV, DVB-C, DVB-T, ANALOG, FM, DTMB**) from the drop-down list.
For each type, you will get different configuration settings in the expanded view.
- Fill out the required information/parameters
- Click **SAVE**.

**Output status**
After saving, the status of the configured outputs is shown. If e.g. too many outputs are configured, or an output that is not supported in the current Operation mode, there will be an error message displayed.
9.1 Add and configure analogue (PAL, SECAM) outputs

**Adding analogue output and Decoder settings**

0. Select Analog mode as Operation Mode, see also §7.
1. In the **OUTPUT**, select **ANALOG** in the **Choose output type** list.
2. Type a name for the output.
3. Select decoder instance.
4. Select the service in the **Services** drop down list. Note: if the incoming service is encrypted, you have to select the input to the CAM in SETTINGS/COMMON INTERFACE, and select to descramble the service in the Service Management. In the **Services** drop down list, make sure to select the decrypted service.
5. Select **PAL** or **SECAM** video standard in the **Video standard** drop down list.
6. Optional: select video conversion in the drop down list **Video Conversion**.
## Decoder settings for analogue output (cont.)

7. Optional: Select audio language

8. If subtitling is used, select subtitling “ON”, and set the subtitling parameters:
   - Subtitling language
   - Subtitling priority (DVB or Teletext)
   - Subtitle type (Normal or Hearing impaired)
   - Teletext codepage
   - Subtitle conversion (None, Auto, 14:9, 16:9)
   - WSS subtitle configuration (Auto, In picture, Out of picture)

9. Set the WSS parameters (Auto, Off, Forced 4:3 / 14:9 / 16:9)

10. Optional: for VPS signalling, select the VPS signalling source (*From Teletext* or *From EIT*), and enter the CNI code.

## Language selection for audio language and subtitling

For audio language, you can use default language, select the language from the drop down list, or manually enter the 3 letter language code according to ISO 639-2. When you use the manual settings, you can find the PID number in the Service Management, on the input side, when expanding to service level.

For subtitle language, you can select language from the drop down list, or enter the ISO 639-2 code.

---

*Note: The Dolby audio decoding capability in FW1.8 requires the latest HW version, and the GNDOL SW option.*
Modulator settings for analogue output
11. Select the TV standard (B/G, B/H, D/K, I, L, M/N)
12. Select the Video bandwidth (4.2, 5.0, 6.0)
13. Set the Picture carrier modulation depth (from 80% to 90%)
14. Set the Video group delay pre-correction (None, BG general, D/K GOST 20532-75, M FCC)
15. Choose to enable or disable test lines (Test lines ON or OFF)
16. Select audio system (NICAM, A2, A2*, Mono)
17. Use the sliding button for setting of Dual mono ON/OFF
18. Set the Audio deviation (-6dB to 6dB in 1 dB steps)
19. Set the Mono subcarrier level (Auto, Off, -10dBc to -30dBc in 1 dB steps)
20. Set the Stereo subcarrier level (Auto, Off, -10dBc to -30dBc in 1 dB steps)
21. Select frequency table (CCIR, OIRT)
22. Enter the output frequency, as a channel frequency name, or manually in MHz
23. Set output carrier level
24. Click SAVE

Note: many of the settings can be left with the default settings for most applications.

Important information about HD to SD downscaling
The MPEG decoder can downscale one service from MPEG2/4 HD to SD. When using the MPEG decoder for downscaling, you are limited to 1 analogue output.

Dual mono output
It is possible to set up one analogue output with dual mono sound (different languages in left/right audio channel).
- Create 2 analogue outputs
- Set up both decoders with the same service but different audio languages
- Select Stereo mode: Dual mono (Decoder settings)
- Deactivate the second analogue output (Output enabled = OFF)
- In the Modulator settings, select Audio system A2 Dual mono or NICAM Dual mono
- Select Dual mono source: Both decoders
9.2 Add and configure ASI, SDI, and FM outputs

Add ASI outputs
1. In the OUTPUT, select ASI in the drop down list for Choose output type
2. Enter name, physical port and bitrate
3. Click SAVE

Add and configure SDI outputs
0. Select Analog Operation Mode
1. In the OUTPUT, select SDI in the Choose output type list
2. Select the service in the Services drop down list
3. Set the audio language and subtitle settings
4. Set the WSS configurations
5. Click SAVE
See also §9.1 for more information about these settings.

Add FM radio outputs
Select FM mode as Operation Mode
1. In the OUTPUT, select FM in the drop down list for Choose output type
2. Select the service in the Services drop down list
3. Enter output frequency and output level
4. Optional: for RDS signalling, select the PI, PS and PTY sources, and enter the values if using manual settings.
9.3 Add and configure DVB-T, DVB-C and DTMB outputs

Add DVB-T outputs
Select Operation mode DVB-T under SETTINGS
1. In the OUTPUT, select DVB-T in the drop down list for Choose output type
2. Enter a name for the output
3. Select Frequency table (CCIR or OIRT)
4. Select the output channel, or set the output frequency in MHz
5. Select output bandwidth (5, 6, 7 or 8 MHz)
6. Set the output carrier level
7. Select the Forward error correction (FEC), the Guard interval (GI), the Carrier mode and the Constellation from the drop-down lists
8. Click SAVE

The Output enabled ON/OFF gives you the possibility to configure an output without adding it to your network. With Output enabled set to OFF, no signals will be transmitted.

Add additional DVB-T outputs
Repeat the steps above.
Note: Channel bonding. All output muxes within 40 MHz band (5 channels @ 8 MHz)
Add DVB-C outputs
Select Operation mode DVB-C under SETTINGS
1. In the OUTPUT, select DVB-C in the drop down list for Choose output type
2. Enter a name for the output
3. Select Frequency table (CCIR or OIRT)
4. Select the output channel, or set the output frequency in MHz
5. Select Constellation in the drop-down list
6. Select QAM spectrum (Normal or Inverted)
7. Set the symbol rate
8. Set the output carrier level
9. Click SAVE

The Output enabled ON/OFF gives you the possibility to configure an output without adding it to your network. With Output enabled set to OFF, no signals will be transmitted.

Add additional DVB-C outputs
Repeat the steps above.
Note: Channel bonding. All output muxes within 40 MHz band (5 channels @ 8 MHz)
Add DTMB output
Select Operation mode DTMB under SETTINGS
1. In the OUTPUT, select DTMB in the drop down list for **Choose output type**
2. Enter a name for the output
3. Select Frequency table (CCIR or OIRT)
4. Select the output channel, or set the output frequency in MHz
5. Set the output carrier level
6. Select the Header length in the drop down list
7. Select the Interleaving length in the drop down list
8. Select the Constellation in the drop down list
9. Click SAVE

The Output enabled ON/OFF gives you the possibility to configure an output without adding it to your network. With Output enabled set to OFF, no signals will be transmitted.
9.4 Add and configure IP (SPTS/MPTS) outputs

Configure a network interface for streaming (see also §12.1)
1. Go to NETWORKING in the SETTINGS tab, and click Add new interface
   For GN01 or GN40 mounting, add a new network interface for the streaming port.
   For GN50 mounting, add a new network interface to the backplane port.
2. Enter name for the interface, and IP parameters
3. Select Streaming ON, and click SAVE

Add IPTV outputs
1. In the OUTPUT, select IPTV in the drop down list for Choose output type
2. Select protocol, UDP or RTP
3. Select the bit rate mode, CBR or VBR
4. Set the output bit rate
5. Set the TTL (Time to live). The default TTL=255 => no limit for the lifespan of data.
6. Select Network interface
7. Set the destination (streaming) address and port.
4. Click SAVE.

Multicast vs. Unicast
Multicast or Unicast transmission is selected automatically by the address range used. In IPv4, addresses 224.0.0.0 through 239.255.255.255 are designated as multicast addresses.
10. SERVICE MANAGEMENT, service & PID management

Service management functionality and pre-requisites
The SERVICE MANAGEMENT tab is the main view for handling remultiplexing, service selection, decryption, encryption and PID management. Before using the Service management for management of services and PIDs, the inputs and outputs of the Chameleon module must be configured, see §8 and §9.

Service Management - left part for Inputs, right part for Outputs
The Service management menu has 2 main parts. In the left part, information about inputs (Inputs, Services) are shown. The right part contains information about the outputs (Outputs, Services). You can select to show information about Inputs/Outputs or Services by clicking the tabs at the top of the 2 main views.

- In the Inputs view, the listing is based on the configured inputs in the Chameleon, see §10.1
- In the Outputs view, the listing is based on the configured outputs in the Chameleon, see §10.1
- The Services views list all incoming/outgoing services, see §10.2

Information about inputs/outputs, services and PIDs can be accessed in any view, and the view you select to work with will depend on what you want to check or configure.

Service Management navigation
To navigate (expand/collapse) menu entries, the arrows in front of a menu is used:
- Click the icon ▲ to expand a menu and show the sub-menus
- Click the icon ▼ to collapse a menu and hide the sub-menus

Menu list sorting
All listings can be sorted according to any column name. Click a column name to sort the list entries by this column ▼. Click again to sort in reversed order ▲.
10.1 Navigating the In/Outputs view in SERVICE MANAGEMENT

In the Inputs and Outputs views in Service Management, all inputs and outputs for the Chameleon are listed. The top entries in the navigation trees are the physical inputs and outputs configured. To navigate in the menus, use the ▲ and ▼ arrows to expand/collapse. The complete navigation graphs for these views are given in the next 2 pages.

Note that each entry in the lists have additional information via “mouse over” or hover that is displayed when you place the mouse pointer over an entry. The hover pop-up gives you information about the input or output name, and which module that the input or output is configured in.

To add a service to an output, navigate to the SERVICE level, click the ▼ and select the output to add the service to. More information about the managing services and PIDs in the System Management is given in §10.4 and §10.5
Navigation graph for the Inputs view for Inputs in Service Management

**Hover info**

- **Input name** – From module: Module name or module serial

**INPUT**

- **TYPE**

**PSI/SI**

- PSI/SI PID
  - **TYPE**
  - **BITRATE**

**EMM**

- CA ID
  - **EMM PID**
    - **BITRATE**

**Other pids**

- **OTHER PID**
  - **TYPE**
  - **BITRATE**

**Services**

- **SERVICE SID**
  - **PMT**: xxx, PCR: yyy

**Pids**

- **PID TYPE BITRATE LANG**

**ECM**

- **CA ID**

**ECM PID**

- **BITRATE**

**indicating service with scrambled PIDs**

**scrambled PIDs**
Navigation graph for the Outputs view for Outputs in Service Management

OUTPUT  TSID ONID NID LCN

...... ...... ...... ...... ......

Utilized bitrate: xxx (limit yyy)

Settings

SETTING   VALUE
TSID .......
ONID .......
Network ID ......
Network name ......
LCN ......

Services

SERVICE PROVIDER SID LCN

Scrambling Control Group (SCG): ....

Settings

SETTING   VALUE
Name .......
Provider .......
SID ......
LCN ......

Pids

IN  OUT  TYPE  STATE
...... ...... ...... ......
10.2 Navigating in the Services view in SERVICE MANAGEMENT

In the Services views in Service Management, all services in and out for the Chameleon are listed. The top entries in the navigation trees are the services from the configured inputs and outputs. To navigate in the menus, use the ▲ and ▼ arrows to expand/collapse. The complete navigation graphs for these views are given in the next page.

Each entry in the lists of services have additional hover information when you place the mouse pointer over an entry. The hover pop-up states which module the service is coming from, the name of the input/output and (for output) the name of the input.

Inputs hover:  
From module: Romeo, input: Hotbird 12597 V

Outputs hover:  
From module: Romeo, output: Romeo T1 E34, input: Hotbird 12597 V.

To add a service to an output, click the 💐 tailing a service on the input side, and select the output to add the service to. More information about the managing services and PIDs in the System Management is given in §10.4 and §10.5.
Navigation graph for the Services view for Inputs in Service Management

Hover info
From module: Module name, input: Input name
indicating service with scrambled PIDs

<table>
<thead>
<tr>
<th>SERVICE</th>
<th>SID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service 1</td>
<td>SID 1</td>
</tr>
<tr>
<td>Service 2</td>
<td>SID 2</td>
</tr>
</tbody>
</table>

Hover info
From module: Module name, input: Input name

PMT: xxx, PCR: yyy

From module:
Module name,
input:
Hover info

<table>
<thead>
<tr>
<th>SERVICE</th>
<th>PROVIDER</th>
<th>SID</th>
<th>LCN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service 1</td>
<td>Name 1</td>
<td>SID 1</td>
<td>LCN 1</td>
</tr>
<tr>
<td>Service 2</td>
<td>Name 2</td>
<td>SID 2</td>
<td>LCN 2</td>
</tr>
</tbody>
</table>

Hover info
From module: Module name, output: output name, input: input name

PMT: xxx, PCR: yyy

From module:
Module name,
input:
Hover info

Scrambling Control Group (SCG): ....

Settings

<table>
<thead>
<tr>
<th>SETTING</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>....</td>
</tr>
<tr>
<td>Provider</td>
<td>....</td>
</tr>
<tr>
<td>SID</td>
<td>....</td>
</tr>
<tr>
<td>LCN</td>
<td>....</td>
</tr>
</tbody>
</table>

Hover info

<table>
<thead>
<tr>
<th>IN</th>
<th>OUT</th>
<th>TYPE</th>
<th>STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
</tr>
</tbody>
</table>
10.3 Managing services and PIDs in the Inputs part of SERVICE MANAGEMENT

Management of services, PIDs etc. in the Service Management is handled via pop-up menus. The presence of a pop-up menu is indicated by a grey arrow, , at the end of an entry line. For the input services, the menus are used to select services to the outputs. For inputs from CI, descrambling of services or PIDs are also managed, see §10.6.

Entry line pop-up menus for Inputs in Service management
The picture below shows the pop-up menus for the Inputs side of Service Management. Note that many of the entries contain important read-only information. Detailed information about the different actions you can do in the pop-up menus are given in the following pages.
Managing services, PIDs and descrambling in Inputs in Service Management

Selection of services from inputs to outputs and descrambling of services or PIDs is managed via the pop-up menus indicated by a grey menu arrow, , tailing the different menu line entries. If no menu arrow is present, the information is read-only.

INPUT level pop-up menu

The pop-up menu at INPUT level allows you to add all services of an Input to an output, or to connect an input transparently to an output. The Character encoding menu allows you select the encoding standard for the service names and for the provider names, see §10.4.1.

Add all services
Click on Add all services to, and select the output to add the services to. This will result in the same as adding all services one by one on the SERVICE level, and the automatic remultiplexing including creating correct PSI/SI will be done.

Connect transparently to
When you select Connect transparently to, all services of an Input will be added to the selected output, and no change is done in the PSI/SI information.

SERVICE level pop-up menu

The pop-up menu at SERVICE level allows you to add services one by one to an output by clicking Add and selecting the output in the new pop-up menu. The Descramble command sets all PIDs to be descrambled. This command is only available for CI inputs. For more information about descrambling, see §10.6.

PID level pop-up menu

The pop-up menu at PID level allows you to descramble individual PIDs of a service. This menu is only available for CI inputs. The Descramble command on PID level is activated only if the service is descrambled on SERVICE level.

Note: when selecting to descramble a PID, all other PIDs will become not selected for descrambling. Hence, if you need to descramble on PID level, make sure that you select descramble for all PIDS that you want to descramble.
10.4 Settings and management of Outputs in SERVICE MANAGEMENT

For the Outputs part of Service Management there are pop-up menus, and context menus where you type parameters. **Edit** in pop-up menus can open a context menu.

For the transport streams (TS) in the outgoing multiplexes, there are DVB Network related settings (TSID, ONID, Network ID, Network name, LCN type). There is also bitrate information for each output (utilized bitrate and configured (limit) bitrate).

For the services in the outputs, there are settings for service name, service provider name, SID (Service ID) and LCN number.

**Entry line pop-up menus ➤ for Outputs in Service management**

The picture below shows the pop-up menus for the Outputs side of Service Management. Note that many of the entries contain important read-only information. Detailed information about the different settings is given in the following pages.

[Diagram showing pop-up menus for Outputs in Service Management]
Managing output settings, service settings and PIDs
Removing services, edit output TS settings (TSID, ONID, Network ID, Network name, LCN type), edit service settings (service name, service provider name, SID, LCN number), and edit PID settings (IN pid number and OUT pid number, block/unblock) is managed via the menus in the Output side of Service Management. Connecting outputs to EMMg and services to SCG is also managed in the Outputs of Service Management. The scrambling related settings will be covered in §11.

OUTPUT level pop-up menu (remuxed)
The pop-up menu at OUTPUT level allows you to edit the main TS DVB Network settings (not the Network name), remove all services from an output, add an EMM connection (see §11), and set the Character encoding (see §10.4.1).

OUTPUT level pop-up menu (transparently connected)
The pop-up menu at OUTPUT level of an output that is transparently connected from an input allows you to disconnect the transparent connection or edit the Network ID (NID). Not that editing the NID is possible only if you have selected Share NIT to ON under SETTING.

Note: there are 2 different ways to edit the DVB Network settings for an output:
• Select Edit in the OUTPUT level pop-up menu
• Navigate to the SETTINGS under an output, and select Edit for this menu, see the following page

These 2 menus have different layout, but contain the same information, except that the Network name entry is not available from the OUTPUT level pop-up Edit.
OUTPUT / SETTING level pop-up menu
The Edit in the pop-up at OUTPUT / SETTING enters the menu for the DVB Network settings for TSID (Transport Stream ID), ONID (Original Network ID), Network ID, Network name and LCN type. See more information about the DVB Network settings in §10.9.

Output Service level pop-up menu
The pop-up at Service level allows you to edit the service settings (service name, service provider name, SID, LCN number). The Revert changes will reset all service settings to the original values. Remove will remove this service from the output. Connect to / Disconnect from SCG (for scrambling) is described in §11. The Character encoding menu allows you select the encoding standard for the service names and for the provider names, see §10.4.1.

Output Service Settings level pop-up menu
The Edit in the pop-up at Settings under Service will open the edit boxes for the service settings (service name, service provider name, SID, LCN number).
Enter the LCN number, and optimally change the Service Name, the Service Provider Name and the Service ID (SID). Click the green checkmark to save.

PID level pop-up menu
The Edit in the pop-up at PID level gives you access to editing the outgoing pid number. In the PID level pop-up menu, you can also block a PID from being output, or unblock a blocked PID. A blocked PID is marked with a red circle in the STATE column for the PIDs.

There are 2 different ways to edit the service settings; Select Edit for the service or edit directly in the Settings menu.
10.4.1 Character encoding, service names and provider names

DVB specifies a number of standard encodings of text strings, e.g. Service Names and Service Provider Names. These include ISO 8859-1 ISO 8859-15, GB-2312, BIG5, and UTF8. To indicate the encoding used, there is a flag in the SDT. If there is no flag, the name decoding should use ISO 6937.

Some transmissions omit the flag, but choose not to encode in ISO 6937. You may also want to use an encoding that is not defined by DVB.

**Character encoding settings for inputs**

On the input side of Service management, there are settings for text encoding for the Service Name and the Service Provider Name. These settings can be used if there is no encoding flag in the incoming SDT.

Note that this setting only has effect if the input service does NOT have a flag for character encoding.

**Character encoding settings for outputs**

At the output side of Service Management, there are encoding settings at output level as well as at service level. A service will inherit the encoding of the output unless you have set a specific encoding setting for the service.

For input services:
- Selecting a character encoding only has effect if the incoming SDT is without character encoding flag

For output services:
- For a not changed service name, and the output encoding set to Automatic (default), the service name is copied directly from the inputs
- For a not changed service, and the output encoding set to anything other than Automatic, the service name is decoded (according to the setting/flag for inputs), and encoded with the selected output encoding
- For a changed service/service provider name, and the output encoding set to Automatic, the Chameleon tries to encode the configured service name in an encoding that fits the text, e.g. "abcd" is encoded with ISO 6937 while "åäö" encoded with ISO 8859-9
- If the service/service provider name is changed and the output encoding is set to anything other than Automatic, the name will be encoded with the set encoding.

In all cases except the first, for "No DVB signalling" the encoding used is removed.
10.5 Descrambling and Common Interface

10.5.1 Common Interface and CAM/smart card
Descrambling requires a CAM to be inserted in one of the CI slots, and a smart card with the rights for descrambling the services. Note that multi-descrambling using professional CAMs is supported. CI settings are managed in the COMMON INTERFACE menu under SETTINGS.

Insert the CAM and smart card in the CI slot
Insert the CAM and smart card into the correct CI slot. From a rear view, CI slot 1 is to the left, CI slot 2 to the right.
*NOTE! Make sure that CAM is inserted with text side to the right*

Select CI source – set which input to be connected to the CI slot
In the COMMON INTERFACE menu, Click Edit.
Type a name for the CI. This name will appear in the Service Management as a input with type CI.

In the drop-down list of Select CI source, select the input to be connected to this common interface slot.

The Bitrate selection in the drop-down list (72 Mbps, 62 Mbps, 55 Mbps) can normally be left at the default value 72 Mbps for all modern CAMs.
10.5.2 Descrambling – Service level & PID level

After selecting CI source in the COMMON INTERFACE menu, a new “input” of type CI will be displayed in the Inputs part of Service Management.

Select the services to be descrambled
Click the edit arrow of the service you want to descramble, and select Descramble in the pop-up menu. To output a descrambled service, add the service from CI input to an output (see §10.4).

Descrambling status indication icons
- **Scrambled** (service or PID)
- **Descrambled** (complete service or individual PID)
- **Partly descrambled service** (some of the services PIDs are descrambled)
- **Unsuccessful descrambling** (complete service or individual PID)
- **Unsuccessful partly descrambled service**

**PID level descrambling**
At the PID level in the Inputs of Service Management, click the edit arrow of the PID you want to descramble, and select Descramble in the pop-up menu.

Note: when selecting to descramble a PID, all other PIDs will by default be selected not to be descrambled. Hence, if you descramble on PID level, make sure that you select to descramble all PIDS that you want to descramble.

**Descrambling for analogue output**
In Operation mode Analog you have to use the SERVICE MANAGEMENT for handling the decryption. The analogue output service selection is made in the output menu, and when a CI source has been set, the list of available services for analogue output will include the services routed via the CAM.
10.6 Remultiplexing and PSI/SI

Remultiplexing
In a Chameleon, remultiplexing is automatically done as services are selected from the inputs to the outputs. As such, all remultiplexing is managed in **SERVICE MANAGEMENT**.

PSI/SI management
The PSI/SI of the outputs are automatically generated as services are assigned to the outputs. Selecting services from a single input, or selecting services from several inputs both result in the updating of the PSI/SI tables of the outputs.

DVB-Network PSI/SI management
To create a DVB-network-wide correct PSI/SI structure, all Chameleons in the same DVB network must be able to share PSI/SI information. The interconnection between the Chameleons is enabled by the HEADEND SYSTEM MANAGEMENT functionality, see §10.10. Further, the GNSYMUX SW option must be active to allow the interchange.
10.7 PIDs and PID listings

**PIDs and PID listings and PID types**

The PIDs of an input transport stream (TS) or an output TS can be listed by navigating to the PID level, see §10.1. In the Inputs view of Service Management, all PIDs including PSI/SI PIDs, EMM PIDs and unreferenced PIDs are listed. The Outputs view lists the audio PIDs, video PIDs, teletext PIDs and data PIDs related to the services. In the Services views of the Service Management, the service PIDs (audio PIDs, video PIDs, teletext PIDs and data/unknown PIDs) are listed.

**PID types and PID information**

All PID listings have (at least) 3 columns:
- PID number
- PID type
- Bitrate

PSI/SI PID types are given as table acronyms such as PAT, CAT NIT. Service PID types are indicated with icons:

- Audio PIDs
- Video PIDs
- Teletext PIDs
- Data PIDs

For outputs, the incoming as well as the outgoing PID number is listed in the columns IN and OUT. Often the outgoing PID number is the same as the incoming PID number, but if the PID number already exist in the system, there is an automatic PID remapping to avoid PID clashes. Just as for the PIDs of the input services, the stream (PID) types are indicated with icons.
10.8 Outputs TS DVB Network settings

**TSID, ONID, NID, LCN type and Network Name**

Each outgoing TS has a set of identifiers: TSID (transport stream ID), ONID (original network ID), NID (network ID), LCN (logical channel numbering type) and Network Name. All identifiers can be edited by clicking the edit arrow.

**TSID**
The transport_stream_id (TSID) is a 16-bit field which serves as a label for identification of this TS from any other multiplex within the delivery system. Hence, the TSID has to be unique within a DVB Network.

**ONID and NID**
The SI uses two labels related to the concept of a delivery system, namely the network_id (NID) and the original_network_id (ONID). The latter is intended to support the unique identification of a service, contained in a TS, even if that TS has been transferred to another delivery system than the delivery system where it originated. **Note:** If no network_id (NID) is set, the outputs will not contain any NIT.

**Network Name**
A string of characters that specify the name of the delivery system about which the NIT informs. A change of the Network Name is propagated to all TS with the same NID.

**LCN (LCN type)**
The LCN type specifies which LCN implementation to use. For a DVB-Network, the LCN type should be the same for all outgoing muxes. Available LCN types are Nordig, EACEM and ITC (Independent Television).

**Note:** The LCN number is edited in the settings for each service.
10.9 Outputs services settings

**Service name, service provider name, service ID and LCN number**
Each service in an outgoing TS has a set of identifiers: Service name, service provider name, service ID (SID) and LCN number. These identifiers are listed for all output services. All identifiers can be edited by clicking the edit arrow.

![Identifiers table](image)

**SID**
The service ID is a 16-bit field which serves as a label to identify this service from any other service within a transport stream (TS). Hence, the service ID is a unique identifier of a service within a TS.

**Service name and service provider name**
The service name and the service provider name is textual information used by the receivers to display information about the services.

**LCN (LCN number)**
The LCN number, which will be used by a receiver to make a channel list, is edited for each service in each outgoing mux. For correct functionality, the LCN number must be unique for each service within a DVB network.
10.10 HE system management and DVB Network PSI/SI

For creation of a network-wide correct PSI/SI structure in a DVB Network, information about PSI/SI has to be shared between the Chameleon modules in the same network. The basis for such a sharing is that the Chameleons are connected via a switch, and that a communication is set up between the Chameleons. Additionally, all Chameleons that are to share PSI/SI information must have the SW option GNSYMUX.

**Headend system management**

Under SETTINGS, in the HEADEND SYSTEM MANAGEMENT menu, you can select Chameleons in the same local (layer 2) network to be members in the same group, a HE Group.

When clicking EDIT, all Chameleon in the local IP network will be listed by their serial number. To add a Chameleon to a HE Group, click the green + in the list of Selectable units. Please note that the settings done in one Chameleon will automatically update the headend system management settings also for all Chameleons in the same group.

**DVB network and PSI/SI sharing – network settings**

When setting up a system where PSI/SI information is shared, you must also select network settings for all outgoing transport streams. The network_id (NID) must be identical for all outgoing transport streams, and all the transport streams must have different Transport Stream ID (TSID), see also §10.9.
10.11 Transmodulation and transparent outputs

Connect input to output transparently
An input can be sent transparently to an output by selecting “Connect transparently to”. When an input is “connected” to an output, as default there is no change of the content of the transport stream from input to output:
- All services, with all PIDs are sent from the input to the output
- The PSI/SI tables are sent from input to output without any change or modification

Settings for transparent outputs
As an alternative to the default setting (no change of content or signalling) there are settings available for sharing NIT, Network ID (NID), Network name and Delivery system descriptor. You can also select to remove null packets from the output. To edit these settings, click the ▶ for Settings, and then click the tailing ▶ and select Edit.
11. Encryption – DVB-CSA scrambling and SimulCrypt

**Conditional Access System (CAS) general information**

A conditional access system generally consists of two main subsystems:
- A scrambling subsystem that a) scrambles the signal to prevent non-subscribers from receiving it and b) descrambles the signal at the subscribers' receivers.
- An access control subsystem that processes access control messages to determine whether descrambling is to be performed.

A Chameleon used in this context contains a Control Word Generator (CWG) generating Control Words (CW) for the scrambling (DVB-CSA). To enable de-scrambling at the receiver side, the CW is transmitted in encrypted format as ECMs. The ECMs are created by the CAS, based on the CW, and an Access Criteria (AC) supplied by the CAS. The access control system is handled by EMMs. EMMs are received from the CAS, and included in the outgoing transport streams.
CAS vs. Chameleon interface structure

When setting up a Chameleon for scrambling, there are 2 main interconnections between the Chameleon and the CAS to be established:
• The connection for receiving EMMs from the CAS
• The connection for transmitting CW/AC to the CAS, and receiving the ECMs

Apart from this, there are some parameters/identifiers that has to be set internally in the Chameleon.

EMM communication req's
• Chameleon IP address for the IP interface used for Simulcrypt, and port for receiving the EMMs (EMM port) has to be given to the CAS.
• The Client ID has to be provided by the CAS, and entered in the Chameleon UI when setting up the connection.

The internal identifiers that has to be set in the Chameleon UI is the EMMg name and the EMM PID.

ECM communication req's
• The CAS IP address to be entered in the Chameleon UI.
• The SuperCAS ID, specified by the CAS, has to be entered in the Chameleon UI.
• The ECM port, the port at which the Chameleon should listen to for the ECMs, must be supplied.
• The Access Criteria has to be given by the CAS.

The internal identifiers that has to be set in the Chameleon UI is the ECMg name and the Channel ID.
11.1 Encryption - scrambling overview

Encryption overview
Scrambling of services, or PIDs in services, requires a connection to a CA Server (CAS). Chameleon can connect to the CAS via the management IP interface or via the streaming interface. For Chameleons installed in the GN50 base unit, use the Management port of the GN50 for CAS connection.

Setting up encryption in Chameleon includes the following steps:
- Create your outputs, and add the services you want to have in your outputs
- (Set up your CAS for EMM and ECM generation)
- Add EMM Generator connections to the Chameleon SimulCrypt interface
- Add EMM connection to the output(s)
- Add ECM Generator(s) to the Chameleon SimulCrypt interface
- Add “ECM streams” to the ECM Generator(s)
- Create Scrambling Control Groups (SCG) and connect SCG to ECM Streams
- Connect the service(s) to be scrambled to an Scrambling Control Group (SCG)

Notes
- In the FW version 1.6, you can encrypt DVB-C, DVB-T and ASI outputs.
- The maximum number of PIDs that can be encrypted is 64 PIDs per output
- The maximum number of encryption keys is 64.
- Each SCG can only be connected to one output. Create separate SCGs for each output.
11.2 Add EMM Generator connections

The CA Server set-up for EMM and ECM generation is not covered by this manual. Please contact your CAS supplier for information. The IP address to be entered in the CAS is the IP address of the Chameleon network interface used for SimulCrypt communication.

Adding an EMM Generator connection
In the SimulCrypt menu under SETTINGS, click ADD in the EMM Generators box.

1. Enter a name for the EMM generator connection (internal name/identifier)
2. Enter the Client ID (info from CAS supplier, often same as the superCAS). The Client ID should be entered as a hex number, but without the 0x prefix. As an example, if the Client ID is given as 0x320011ac, you should enter 320011ac in the UI. The Client ID should always be 8 hex digits.
3. Enter the EMM port (Supply information to the CAS supplier which ports you can listen to. Alternatively agree with CAS supplier a port that can be used)
4. Enter the EMM PID, the PID number for the EMMs in your output. Select the EMM PID so that it does not collide with any other PID in the system.
5. If required, enter Private Data in hex format (info from CAS supplier)
6. Enter the maximum EMM bandwidth (BW) (kbit/s)
7. Click the green confirmation symbol , or press enter

Adding another EMM Generator connection
Repeat the steps above.
EMM Generator connection status during initialisation
After configuring the EMMg, the Chameleon will start setting up the communication to the CA server. During the initialisation process:
- the EMMg STATUS will be marked as *Initializing*
- the Listen socket STATUS is *Open*
- the TCP/IP status is *Socket listen*

![Simulcrypt](image1)

EMM Generator connection status after connection established
When the communication between the Chameleon and the CAS is established:
- the EMMg STATUS will be marked as *Running*
- the Listen socket STATUS is *Closed*
- the TCP/IP status is *Connected*

![Simulcrypt](image2)
11.3 Add EMM connection to the output(s)

Connecting an EMM Generator to an output
In SERVICE MANAGEMENT, for an output, click the grey arrow to the right of an output.
In the pop-up menu, select “Add EMM connection”
Select the EMM generator you want to use for this output.

EMM information, and EMMg removal
An output connected to an EMMg will have an EMM entry under Settings.
To remove an EMMg, click the and select Remove.
11.4 Add ECM Generator connections

The CA Server set-up for EMM and ECM generation is not covered by this manual. Please contact your CAS supplier for information.

Adding an ECM Generator connection
In the SimulCrypt menu under SETTINGS, click ADD in the ECM Generators box.

1. Enter a name for the ECM generator connection (internal name/identifier)
2. Enter the Super CAS ID (info from CAS supplier). The Super CAS ID should be entered as a hex number, but without the 0x prefix. As an example, if the Super CAS ID is given as 0x320011ac, you should enter 320011ac in the UI.
3. Enter the IP address of the CA Server (info from CAS supplier)
4. Enter the ECM port (info from CAS supplier, alternatively decide after agreement with the CAS supplier which port the CAS can listen to)
5. Enter the Channel ID. The Channel ID is an internal identifier that should be unique for all ECMg.
6. Click the green confirmation symbol , or press enter

To add another ECMg, repeat the steps above.

When the communication between the Chameleon and the CAS is established:
- the Socket STATUS is Open
- the Channel state STATUS is OPENED
- the TCP/IP status is Connected
11.5 Add ECM streams to the ECM Generator(s)

The concept of “ECM streams” is used to enable connection of the ECM generators to the Scrambling Control Groups (SCG), and this is where you enter the access criteria giving smart cards rights to descramble services.

Adding an ECM stream to the ECM Generator
In the SimulCrypt menu under SETTINGS, click the grey arrow 🔄 to the right of an ECM generator. Select “Add stream”.

1. Enter a name for the ECM stream
2. Enter the STREAM ID and ECM ID (local identifiers)
3. Enter the access criteria (info from CAS supplier)
4. If required, enter Private Data in hex format (info from CAS supplier)
5. Click the green confirmation symbol ✅, or press enter

Adding another ECM stream to an ECM Generator
Repeat the steps above.

Access criteria format
There are different formats for the access criteria (AC):

- For 32 bit (8 hex digits) Hex numbers, use the format 0x... e.g. 0x00112233
- For non-32 bit Hex numbers, use the format #... e.g. #000900020001
- Otherwise, enter string value e.g. Access-string
11.6 Scrambling Control Groups & connect to ECM Streams

**Scrambling Control Group (SCG)** (*ETSI TS 103 197 V1.5.1*): data structure gathering together in one same logical set the list of A/V streams scrambled at the same time with the same control word and the list of ECMs that are going to be generated with the identifier of their CA system and with their respective Access Criteria

**Adding a Scrambling Control Group (SCG)**
In the SimulCrypt menu under SETTINGS, click ADD in the SimulCrypt Control Groups box.
1. Enter a group name
2. Click the green confirmation symbol ✅, or press enter

**Connecting ECM Streams to Scrambling Control Groups**
In the SimulCrypt menu under SETTINGS, click the grey arrow to the right of an ECM stream. In the pop-up menu, select “Connect to group”, and select the scrambling control group (SCG) to connect to.
11.7 Connect the service to be scrambled to an SCG

**Connecting a service to a Scrambling Control Group (SCG)**

In SERVICE MANAGEMENT under Outputs, click the grey arrow to the right of a service.

In the pop-up menu, select “Connect to SCG”, and select the Scrambling Control Group you want to connect to.

When an output service connected to a Scrambling Control Group is expanded (clicking the leading ▶), the SCG it is connected to is displayed below the service name.

Services that are scrambled are indicated with a padlock 

For the services connected to an SCG, all video and audio PIDs will be scrambled.
12. Settings: Managing the Chameleon module

Under **SETTINGS**, all module specific setting are managed.

NETWORKING: Networking settings for IP interfaces, see §12.1.

HEADEND SYSTEM MANAGEMENT: for Chameleon interconnection, see §10.11

OPERATION MODE: selection of output mode, see §7

COMMON INTERFACE: In the COMMON INTERFACE menu, you select the input source for the CI, and you have access to the menu from the inserted CAM or CAMs. See § 10.6.

SIMULCRYPT: for setting up EMM and ECM connections to a CA Server, and connecting ECM streams to Scrambling Control Groups, see §11 and sub-paragraphs.

DATE AND TIME: Settings for TDT source, and connection to NTP server. See § 12.2

SCHEDULER: Task scheduling for scripts, see § 12.3

SNMP: settings for SNMP, traps etc., see § 12.4

USER MANAGEMENT: password protection for UI access, see § 12.5

SOFTWARE AND ENTITLEMENT UPGRADE: Software upgrade, used both for uploading new FW and for uploading SW options (entitlement files), see §12.6

MAINTENANCE: For software reboot, factory reset and configuration backup and restore, see § 12.7 and §12.8

LOG, for displaying logged data.
12.1 Add and configure Network interfaces

Adding network interface for streaming
1. Click on NETWORKING in the SETTINGS tab
2. Click Add new interface
3. Type a name for the interface
4. Enter the IPv4 address, the Netmask and the Gateway
5. Select IGMP version
6. Select the capabilities needed for the interface (e.g. Streaming)
7. Click SAVE

Note: Chameleon has 2 IP ports in the front, a 10/100 Ethernet management port, and a GigE port for streaming. As default, there are no IP interfaces defined for the streaming port. When connecting a PC to the streaming port, the Ethernet port of the PC must have GigE capability. Chameleons installed in a GN50 base unit use the backplane connector for both management and streaming interfaces.
12.2 Date and time (NTP server access and Time sources)

The DATE AND TIME menu allows you to connect the Chameleon to an NTP server for establishing a valid UTC time reference. The time reference can be used as a time source for the creation of the TDT table. The TDT and TOT is used to enable receivers to detect correct time, and is also the time basis for the EPG (EIT). The connection to an NTP server requires Internet connection to the Chameleon.

As an alternative, TDT information from incoming streams from the input sources can be used as a time source.

**NTP server connection for UTC time reference**

In the DATE AND TIME menu under SETTINGS, click Edit
- Select your Time zone in the drop down list
- Select daylight saving time ON/OFF
- Enter a valid URL to an NTP server (e.g. ntp.pool.org)
- Click save

The added NTP server will be shown under Time sources. The UTC time from the NTP server is displayed, and if there are other valid time sources, their times will also be displayed.

As default, the NTP time reference is used for the TDT.

**Selecting Time source for the TDT manually**

- Click the grey edit arrow to the right of the Time source that is indicated as YES under USED
- Select OFF in the drop-down list under ENABLADE
- Click the green confirmation symbol, or click enter

The Time reference will automatically switch to another Timer source.
12.3 Scheduler – commands scripting

The SCHEDULER is a task scheduler that can be used to run LUA commands from the UI of the Chameleon. The triggering of the tasks (set of commands) are based on local time (hour and minute), with the time source in DATE AND TIME as reference.

Adding a new task
- Click the green plus , or Add new task.
- Enter a name for the task
- Set the time the task should be run (hh:mm)
- Enter the LUA commands in the Lua script window
- Click SAVE

Running (testing) a task
You can test a task / the LUA commands manually by clicking EXECUTE SCRIPT

LUA commands for scripting
For information about available LUA commands, please contact Support.
12.4 SNMP

SNMP, Simple Network Management Protocol
SNMP can be used for alarms (traps/notifications) or to read (Get) or write (Set) information from/to a Chameleon.
To use SNMP, you need an NMS (Network Management System) that is connected to the Chameleon.

SNMP versions supported
In the current implementation, SNMP v1 and SNMP v2c is supported.

SNMP settings
- Enable agent: for turning the SNMP agent in Chameleon ON/OFF
- Agent port: UDP listen port (161 is the standard port used)
- Agent community read string: a “password” that has to be set in the NMS. The standard default string is “public”.
- Agent community write string: a “password” that has to be set in the NMS. The standard default string is “private”.
- Enable traps: for turning ON/OFF the alarm functionality
- Traps address: destination address of the NMS receiving the traps
- Destination port: destination port of the NMS receiving the traps
- Traps Community string: a “password”. Should be stated in the NMS. Default standard: “public”
Supported SNMP traps and SNMP read/write in FW1.8

SNMP traps
- Tuner locked status change
- Loss of IP input bit rate (IP input bit rate = 0)
- IP input changed alternative input (for input redundancy)
- Chameleon temperature exceeding 65 °C
- Decoder not running

SNMP read/write
- Tuner input status
- Tuner input configuration
- IP input status
- IP input configuration
- Chameleon module temperature (read only)
- Chameleon module name (read only)
- Chameleon module description (read only)
- GN50 slot number (read only)

MIB, MIB structure and NMS integration
Please contact Support for information about the MIB.
12.5 User management – password protection

The USER MANAGEMENT allows settings of password for the UI. You can add users, and create passwords for each user.

**Adding a user and password**
- Click Add new user, or the green plus 
- Enter a user name
- Enter a password
- Confirm the password by entering it again
- Click SAVE

**Enabling password control**
- Select User authentication ON
- Click SAVE
The web UI will respond with a “Authentication Required” where you should enter the user name and password.

**Note**: make sure to remember your user names and passwords!
12.6 Software and SW options (entitlement) upgrade

Both FW and SW options are uploaded via the SOFTWARE AND ENTITLEMENT UPGRADE in the SETTINGS tab. Additionally, there is status information about the running software version, and, if a new software is uploaded, also about the latest (not running) software version.

**Uploading Firmware**
1. Click UPLOAD. Click Browse… in the pop-up, and select the software file (*.bin file) to be uploaded from your computer
2. Click the Upload button
3. After upload complete message, reboot the module

**Uploading software options**
1. Click UPLOAD. Click Browse… in the pop-up to browse for the software options file (*.ent) for this specific Chameleon module

*Note:* The SW options file will have the format <serial number>.ent. If you need to, you can download the entitlement file from the chameleonconnect.tv portal, see §4.

2. Locate the software options file on your computer, and select it
3. Click the Upload button
4. Reboot the module
12.7 Module maintenance

Reboot
Some operations, such as upgrading the software, requires a reboot. Click the Reboot button to reboot the unit. During the rebooting process, Rebooting will be shown.

Reboot from Rescue mode
In very special circumstances the Chameleon can enter the Rescue mode. Click the Reboot button in the rescue mode to return to normal mode. Note: re-enter the IP address of your Chameleon in the address field of your browser to access the normal mode web GUI.

In the rescue mode, you can access basic functionality, and upload new software and software options.
12.8 Factory reset & Backup / Restore

Factory reset
The Chameleon module can be reset to the same status as when delivered from the factory, apart from the SW option that will remain as before factory reset, and the management IP address that will be kept. Go to the SETTINGS tab, and MAINTENANCE. Click on FACTORY RESET.

Backup and restore (saving configuration)
The backup and restore functionality gives you the possibility to save the complete configuration of a Chameleon to your computer. The stored file is in xml format. The backup file can be used for e.g. copying configurations between different installations, or keeping a possibility to upload the original configuration to a Chameleon if you have tested a different configuration.
Additionally, the backup file is useful for support purposes, since it gives the support team a possibility to set up an identical installation.
13. Status information

The **STATUS** tab gives a general overview over the Chameleon module. This page is also the starting page for the web UI.

**MODULE IDENTIFICATION**
Serial number and the HW version is shown. Further, there are 3 editable fields; Name, Location and Description. Clicking **EDIT** below the box enables you to save your own selected information about this Chameleon module.

**CONFIGURATION**
The configuration box shows you the Operation mode, the Software version, and the enabled SW options. A warning will be shown if no operation mode is selected.

**STATUS**
Uptime (from last reboot), and current module temperature.

**SERVICE LICENCE AGREEMENT**
Shows if the Chameleon is registered at the chameleonconnect.tv portal, and the expiry date of the service level agreement. If the demo/trial period is still on, the remaining demo uptime is displayed. If not, Demo Expired will be show.
14. SW options

Chameleon “products” range from receiver, to edge, to streamer and to scrambler. The different “products” realisations are controlled by the SW options enabled in any specific Chameleon module.

To get an overview of all different SW options currently available, please contact your sales representative or contact the Chameleon Support.

List of uploaded SW options
Under the Status tab, all enabled SW options are listed.
NOTE! During DEMO trial period all SW options are enabled. Don’t forget to order SW options needed for the actual installation.

How to get and upload additional SW options
Please contact your sales representative at A2B or Wisi to get information.