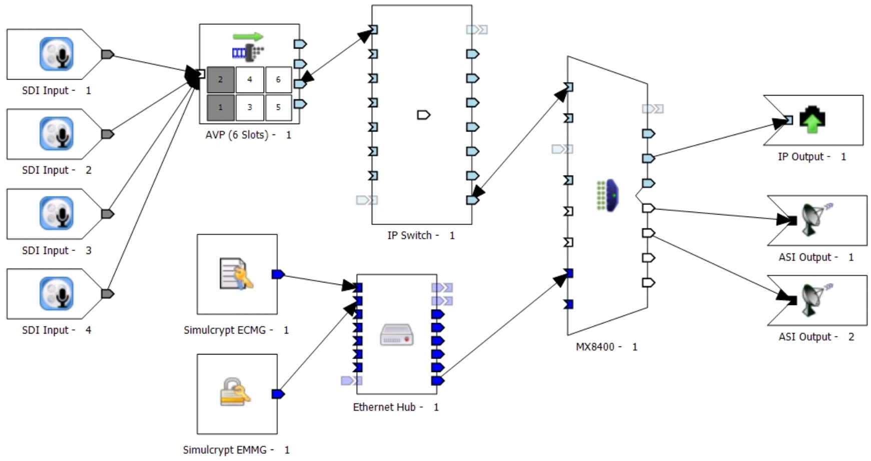
Simulcrypt CA Configuration

Jan 2017



Introduction

This page is for an MX8400 / AVP / nCC based system

These notes have been compiled using nCompass 9 from R3.12 SVT06 (nCC_9.01.25636.0) and will be valid for nCC versions from around v8.5. Unlike earlier version of nCompass, no XML files need to be edited (there is one if you are doing Director, not covered here) and no extra services need to be manually started.

The parameters used for the CA relate to equipment (ECMG, EMMG) that exists in SVT that is currently managed by Rob O'Neil. The concept is the same for configuration on customer sites, the only difference will be IP addresses / Ports and CA parameters, but the configuration remains the same.

This is not a comprehensive CA guide, it's a simple set of notes designed to assist in a Simulcrypt CA configuration for anyone who has dealt with CA before, but needs a reminder of the basic configuration steps. If you have never dealt with a CA configuration before, this may not be that helpful.

I suggest reading this document in its entirety before starting a configuration, as all the information within is required for a working system.

This guide assumes that you are a competent user of nCompass Control as it is assumed you will know how to perform tasks such as creating a map, profile, scheduling profiles etc.

Topics

The steps covered here are:

1. Basic Terminology
2. Quick Overview
3. Adding items to nCompass map
4. ECMG/EMMG map settings
5. Mux Static Parameters
6. Adding Components to Profiles
7. Profile Scrambling Settings
8. Telnet testing functions

Basic Terminology

ECMG is the ***Entitlement Control Message Generator***, this is an external server provided by the CA vendor that communicates with the

SCS and sends ECMs on request.

ECM is the ***Entitlement Control Message***, the ECM contains an encrypted version of the ***Control Word (CW)*** and ***Access Criteria (AC)***, and this provides the means for the receiver/STB to descramble the content.

The ***CWG*** is the ***Control Word Generator***, and this generates a random 8 byte Control Word. This is forwarded on request to the ***SimulCrypt Synchronizer (SCS)***.

Control Words (CW) are also knows as ***keys***.

Typically every 10 seconds, the CW will change. The time between new CWs is defined as the ***the Crypto Period (CP)***. CWs are defined as ODD or EVEN and alternate every CP to allow the STB to distinguish between CWs of adjacent CP, thus the CW is made available ahead of time.

EMMG is the ***Entitlement Management Message Generator***, this communicates with the Mux and sends EMMs.

EMM is the ***Entitlement Management Message***, and the EMM contains the authorization details for the smartcard/receiver to determine whether it is “allowed” to descramble the content.

Scrambler physically scrambles the required content using the ***CSA. (Common Scrambling Algorithm)***.

Remember, the ***ECMG*** is the key to descramble the content, but you can only descramble if the ***EMM*** entitles you (your smartcard) to do so.

CSA is the ***Common Scrambling Algorithm*** and this is the part of the Mux that scrambles the components.

Encryption – The ***ECMG Encrypts*** the Control Words sent by the CW Generator in the Mux.

SuperCAS ID is the ***CA System ID*** + ***CA Sub System ID***.

Quick Overview

It is worth remembering that Scrambling and Encryption are not the same:

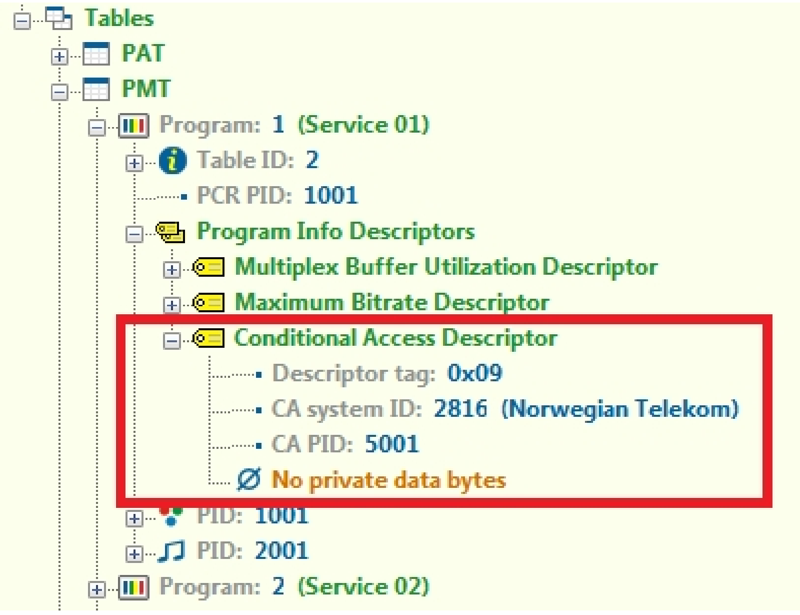
Components (Video/Audio) are scrambled (by the scrambler in the Mux)
Control Words are Encrypted (by the ECMG)

In general, services can be scrambled at service or component level, unless you are using Director, where only service level scrambling is available.

Scrambling / Encryption (the following values are examples, not real data)

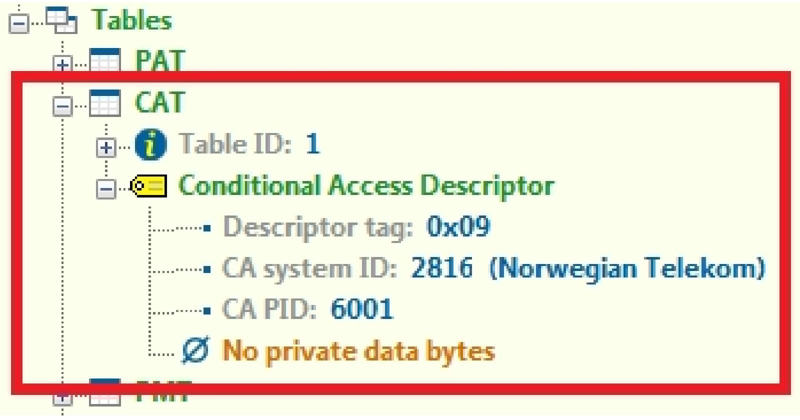
- String 0 0 1 0 1 0 0 1
- Scrambling 0 0 0 1 1 0 1 0
- Encryption 22 34 56 67 89

ECMs are referenced by ***PMT***



```
Tables
  PAT
  PMT
    Program: 1 (Service 01)
      Table ID: 2
      PCR PID: 1001
      Program Info Descriptors
        Multiplex Buffer Utilization Descriptor
        Maximum Bitrate Descriptor
        Conditional Access Descriptor
          Descriptor tag: 0x09
          CA system ID: 2816 (Norwegian Telekom)
          CA PID: 5001
          Ø No private data bytes
      PID: 1001
      PID: 2001
    Program: 2 (Service 02)
```

EMMs are referenced by ***CAT***



```
Tables
  PAT
  CAT
    Table ID: 1
    Conditional Access Descriptor
      Descriptor tag: 0x09
      CA system ID: 2816 (Norwegian Telekom)
      CA PID: 6001
      Ø No private data bytes
  PMT
```

ECMs are sent in the clear, but their contents are ***encrypted*** (not scrambled)

EIS in most cases is the control system (so nCompass for most of our demos)

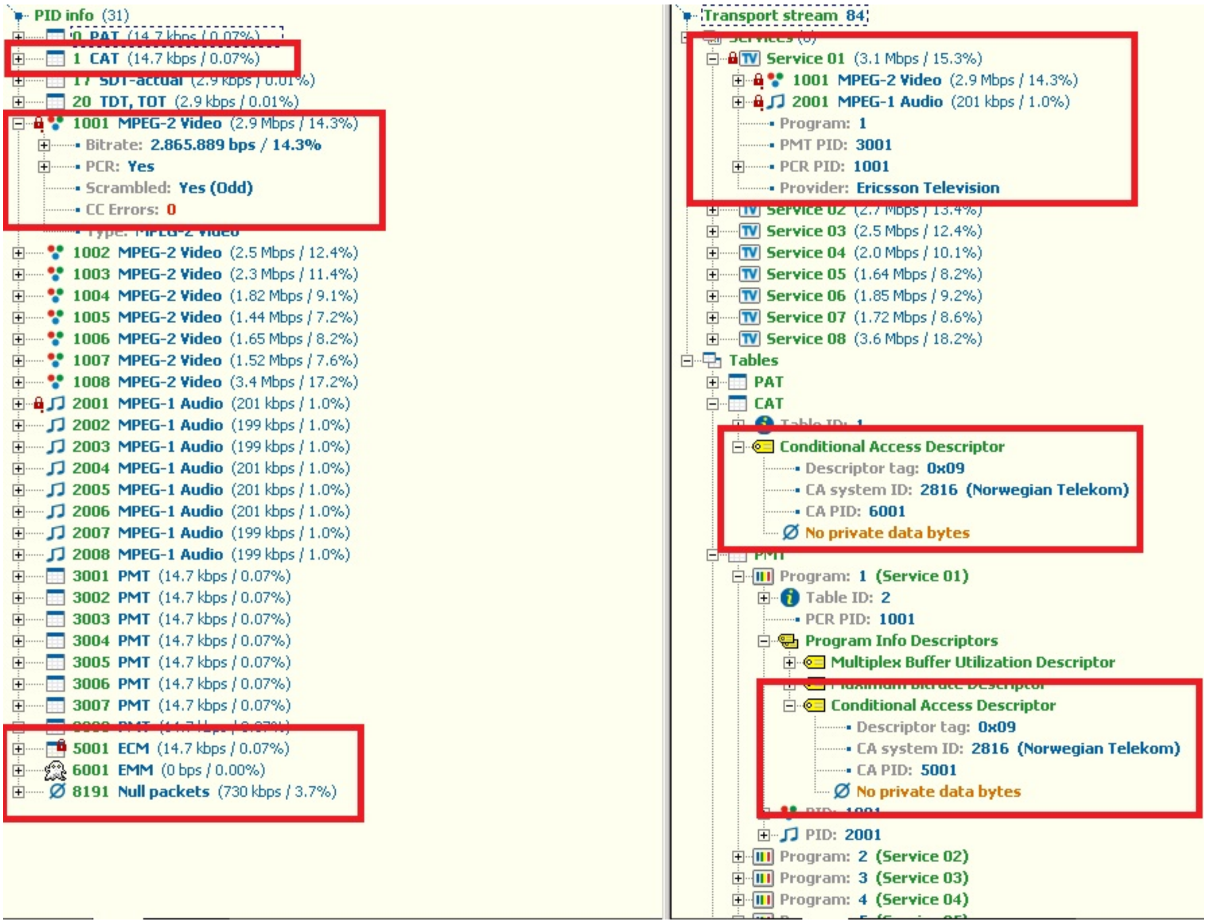
Mux and decoder times must be accurate with each other (for RX8200 you will need a TDT/TOT to set the time)

Director is based on Simulcrypt, but cannot be used for DTH

T22/T23 (ECM/EMM) is specific to Sky (NDS)

If using the Mux Control ports for CA (this only works for Director) then you still need to draw the CA connections to the Mux on the Map for routing purposes (from the ECM/EMM to the CA Port)

PDG goes at network level
EMM at TS level
ECM can be service or component level



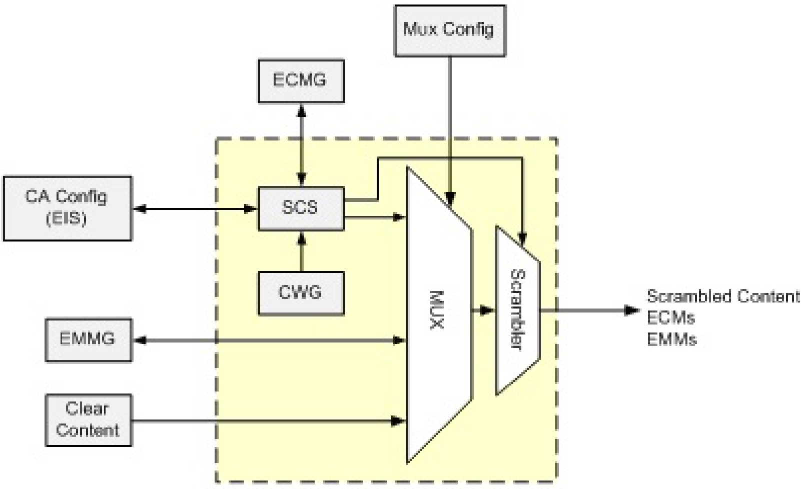
```
PID info (31)
 ⊞ 0 PAT (14.7 kbps / 0.07%)
 ⊞ 1 CAT (14.7 kbps / 0.07%)
 ⊞ 17 SDT-actual (2.9 kbps / 0.01%)
 ⊞ 20 TDT, TOT (2.9 kbps / 0.01%)
 ⊟ 1001 MPEG-2 Video (2.9 Mbps / 14.3%)
    ⊞ Bitrate: 2.865.889 bps / 14.3%
    ⊞ PCR: Yes
      Scrambled: Yes (Odd)
      CC Errors: 0
      Type: MPEG-2 Video
 ⊞ 1002 MPEG-2 Video (2.5 Mbps / 12.4%)
 ⊞ 1003 MPEG-2 Video (2.3 Mbps / 11.4%)
 ⊞ 1004 MPEG-2 Video (1.82 Mbps / 9.1%)
 ⊞ 1005 MPEG-2 Video (1.44 Mbps / 7.2%)
 ⊞ 1006 MPEG-2 Video (1.65 Mbps / 8.2%)
 ⊞ 1007 MPEG-2 Video (1.52 Mbps / 7.6%)
 ⊞ 1008 MPEG-2 Video (3.4 Mbps / 17.2%)
 ⊞ 2001 MPEG-1 Audio (201 kbps / 1.0%)
 ⊞ 2002 MPEG-1 Audio (199 kbps / 1.0%)
 ⊞ 2003 MPEG-1 Audio (199 kbps / 1.0%)
 ⊞ 2004 MPEG-1 Audio (201 kbps / 1.0%)
 ⊞ 2005 MPEG-1 Audio (201 kbps / 1.0%)
 ⊞ 2006 MPEG-1 Audio (201 kbps / 1.0%)
 ⊞ 2007 MPEG-1 Audio (199 kbps / 1.0%)
 ⊞ 2008 MPEG-1 Audio (199 kbps / 1.0%)
 ⊞ 3001 PMT (14.7 kbps / 0.07%)
 ⊞ 3002 PMT (14.7 kbps / 0.07%)
 ⊞ 3003 PMT (14.7 kbps / 0.07%)
 ⊞ 3004 PMT (14.7 kbps / 0.07%)
 ⊞ 3005 PMT (14.7 kbps / 0.07%)
 ⊞ 3006 PMT (14.7 kbps / 0.07%)
 ⊞ 3007 PMT (14.7 kbps / 0.07%)
 ⊞ 3008 PMT (14.7 kbps / 0.07%)
 ⊞ 5001 ECM (14.7 kbps / 0.07%)
 ⊞ 6001 EMM (0 bps / 0.00%)
 ⊞ 8191 Null packets (730 kbps / 3.7%)
```

```
Transport stream 84
 ⊟ Services (8)
    ⊟ Service 01 (3.1 Mbps / 15.3%)
       ⊞ 1001 MPEG-2 Video (2.9 Mbps / 14.3%)
       ⊞ 2001 MPEG-1 Audio (201 kbps / 1.0%)
         Program: 1
         PMT PID: 3001
       ⊞ PCR PID: 1001
         Provider: Ericsson Television
    ⊞ Service 02 (2.7 Mbps / 13.4%)
    ⊞ Service 03 (2.5 Mbps / 12.4%)
    ⊞ Service 04 (2.0 Mbps / 10.1%)
    ⊞ Service 05 (1.64 Mbps / 8.2%)
    ⊞ Service 06 (1.85 Mbps / 9.2%)
    ⊞ Service 07 (1.72 Mbps / 8.6%)
    ⊞ Service 08 (3.6 Mbps / 18.2%)
 ⊟ Tables
    ⊞ PAT
    ⊟ CAT
       ⊞ Table ID: 1
       ⊟ Conditional Access Descriptor
            Descriptor tag: 0x09
            CA system ID: 2816 (Norwegian Telekom)
            CA PID: 6001
            No private data bytes
    ⊟ PMT
       ⊟ Program: 1 (Service 01)
          ⊞ Table ID: 2
            PCR PID: 1001
          ⊟ Program Info Descriptors
             ⊞ Multiplex Buffer Utilization Descriptor
             ⊞ Maximum Bitrate Descriptor
             ⊟ Conditional Access Descriptor
                  Descriptor tag: 0x09
                  CA system ID: 2816 (Norwegian Telekom)
                  CA PID: 5001
                  No private data bytes
          ⊞ PID: 1001
          ⊞ PID: 2001
       ⊞ Program: 2 (Service 02)
       ⊞ Program: 3 (Service 03)
       ⊞ Program: 4 (Service 04)
       ⊞ Program: 5 (Service 05)
```

Scrambling

The ***SCS*** in the Mux sends two ***Control Words (CW)*** from the Mux ***Control Word Generator (CWG)*** in packets to the ***ECMG***, the ***ECMG*** encrypts the ***CWs*** and sends them back as ***ECMs*** with added vendor specific criteria.

The ***SCS*** also forwards the ***Access Criteria (AC)*** (obtained from the CA configuration) to the ***ECMG***.



The yellow dotted box in the diagram is the Mux

ECMs are passed along to the ***scrambler*** (***CSA*** in Mux) which uses the vendor specific information to scramble the content; ***ECMs*** are also passed in the Transport Stream (***TS***).

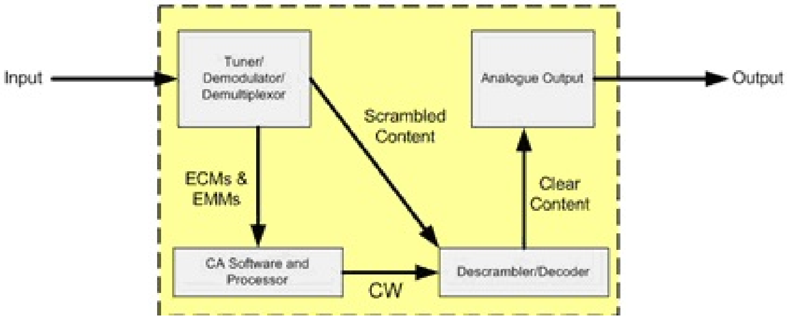
The ECM typically contains the following:

- The ***Access Criteria (AC)*** which must be satisfied before the STB can descramble the incoming services/components.
- The ***Control Word (CW)*** used to scramble the required services/components

Descrambling

EMMs provide authorization details to the Decoder/STB. These details must match the ***Access Criteria*** that is recovered from the ***ECM***. The ***EMMs*** relate to the content of the subscription that the viewer has paid for. The ***EMMs*** can be targeted to individual STBs or groups of STB. The STB will only act on the ***EMM*** if it contains target information in its header that relates to the STB

The STB/Decoder passes the TS to the descrambler, and the ECM to the CA Processor (Smart Card/CAM module).



If the ECM matches the TS components (is the correct ECM for those components) and the EMM has the correct entitlement (you are allowed to descramble those components) then descrambling will start.

Adding items to nCompass map

Before attempting to configure CA, please ensure you have a working system that is running in the clear

To enable Conditional Access, the map has to be altered, the main steps are:

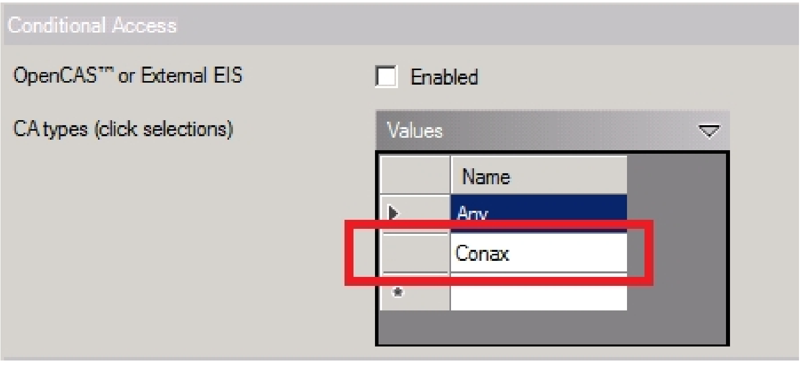
Add EMM/ECM components to the map

Edit Mux Static Parameters to include:

- Set Map Global Settings
- Add EMMG/ECMG to Map
- Mux CA Ethernet Interface IP Address:Port
- EMMG Parameters
- ECMG Parameters
- EIS/SCS Parameters (if using external devices)
- Control / CA Static Routes
- CA Mode / CSA Version

Set Map Global Settings

From the Equipment Setup application, open the Maps Global Settings (Edit → Global Settings…)


Conditional Access

OpenCAS™ or External EIS ☐ Enabled

CA types (click selections)

	Name
▶	Any
	Conax
*	

Look for the '***Conditional Access***' section, it will just have a single entry labelled '***Any***'

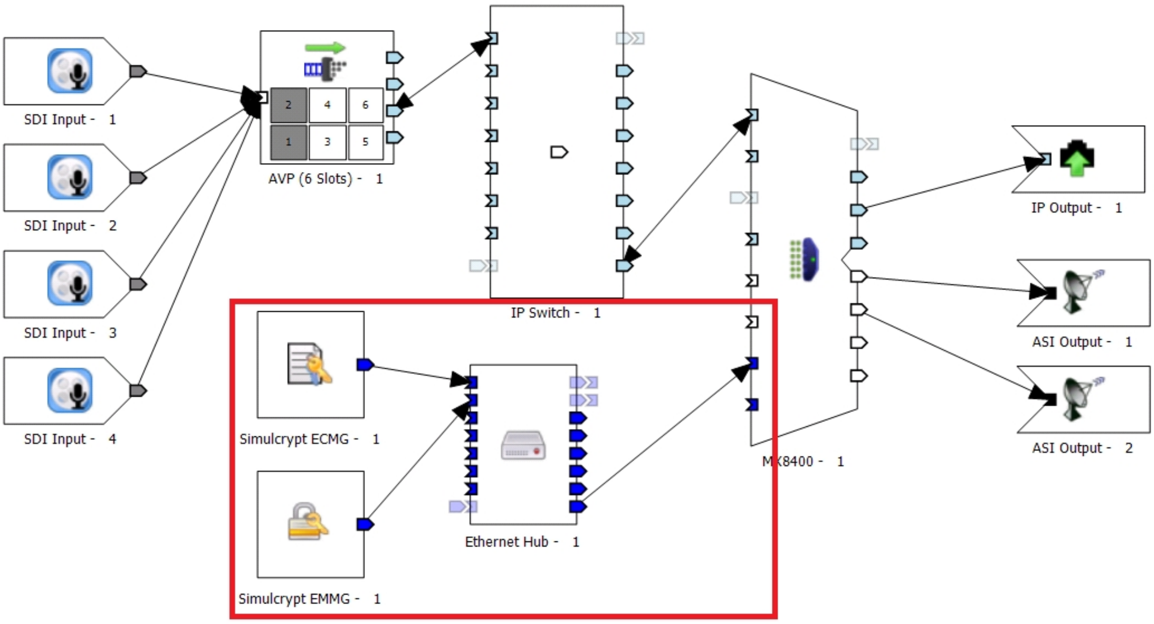
Enter the type of CA you are configuring (Conax, Nagra etc.) This box is just a label, and anything can be entered here. This entry will be visible is further menus when configuring CA.

Click 'Ok' to close this section, save the map.

Add EMMG/ECMG to Map

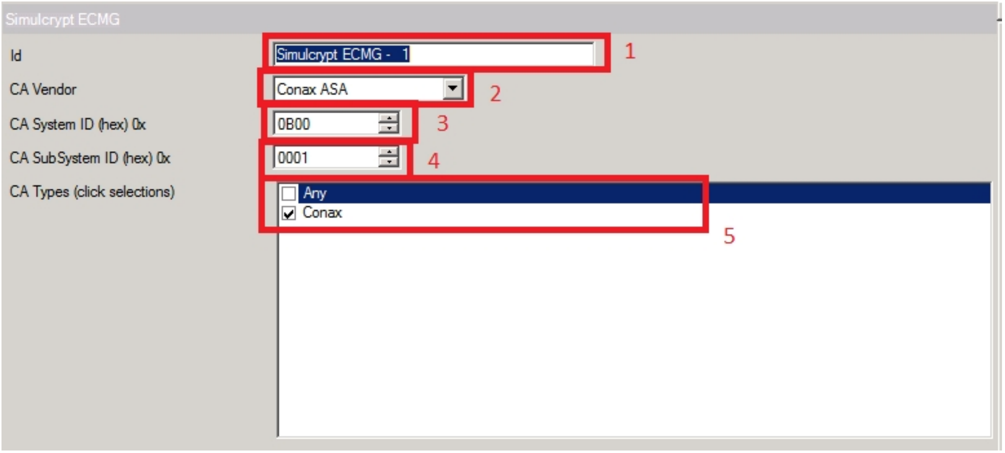
To start Add the following components to the Physical Map

- Simulcrypt ECMG
- Simulcrypt EMMG
- Ethernet Hub



Double Click the Simulcrypt ECMG icon to show the properties.

Connect the Simulcrypt components to the hub, and then connect the hub to the CA port of the Multiplexer(s). A hub is required on the map as the Mux only has a single CA interface.


Simulcrypt ECMG

Id: Simulcrypt ECMG - 1 (1)
CA Vendor: Conax ASA (2)
CA System ID (hex) 0x: 0B00 (3)
CA SubSystem ID (hex) 0x: 0001 (4)
CA Types (click selections): ☐ Any ☑ Conax (5)

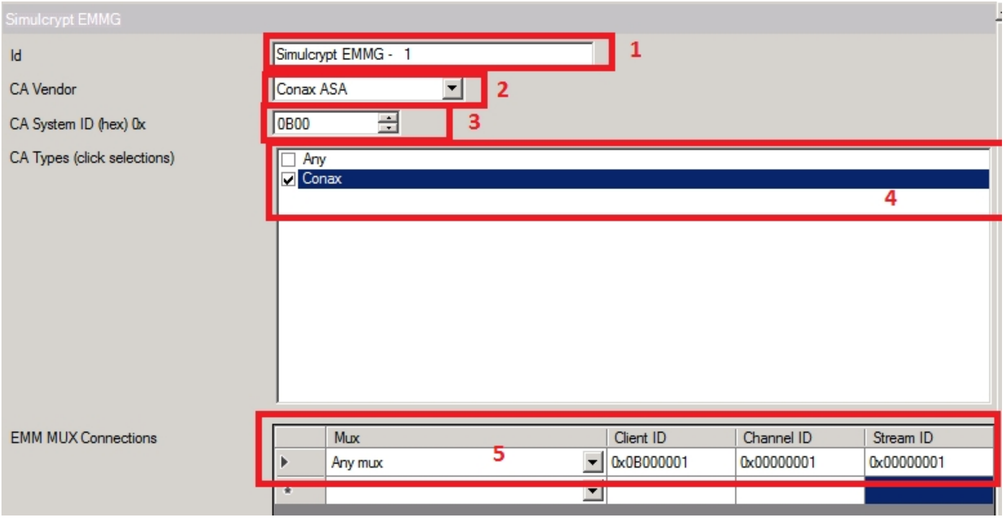
Edit the information in the relevant sections.

1. ID – This is just a label to describe this ECMG map item
2. CA Vendor – Use this drop down list to add your CA Vendor

3. CA System ID – This will be supplied by the CA Vendor / customer
4. CA SubSystem ID – This will be supplied by the CA Vendor / customer
5. CA Types – This list comes from the list you edited in the map Global Settings

Remember - SuperCas = CaSystem ID + CA SubSystem ID Click OK to close this window

Double Click the Simulcrypt EMMG icon to show the properties.



Simulcrypt EMMG

Id: Simulcrypt EMMG - 1

CA Vendor: Conax ASA

CA System ID (hex) 0x: 0B00

CA Types (click selections):
□ Any
☑ Conax

EMM MUX Connections

Mux	Client ID	Channel ID	Stream ID
Any mux	0x0B000001	0x00000001	0x00000001

Edit the information in the relevant sections.

- ID – This is just a label to describe this ECMG map item
- CA Vendor – Use this drop down list to add your CA Vendor
- CA System ID – This will be supplied by the CA Vendor / customer
- CA Types – This list comes from the list you edited in the map Global Settings
- EMM Mux Connectors - This will be supplied by the CA Vendor / customer. You can chose a Mux (this is populated from the Mux) but in general, set ‘Any Mux’

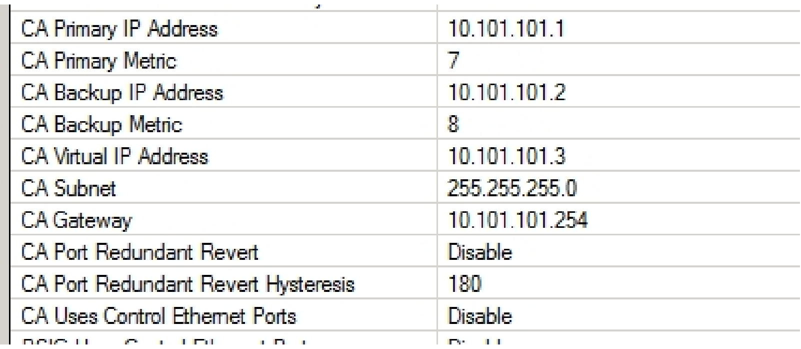
Click OK to close this window

Mux Static Parameters

Mux CA Ethernet Interface IP Address:Port

On the physical Map, double click the Mux icon, then click ‘Edit’

This is where the IP Address of the CA Interfaces on the Mux are defined. There are three IP Addresses per configuration (there are two interfaces running as a redundant pair.

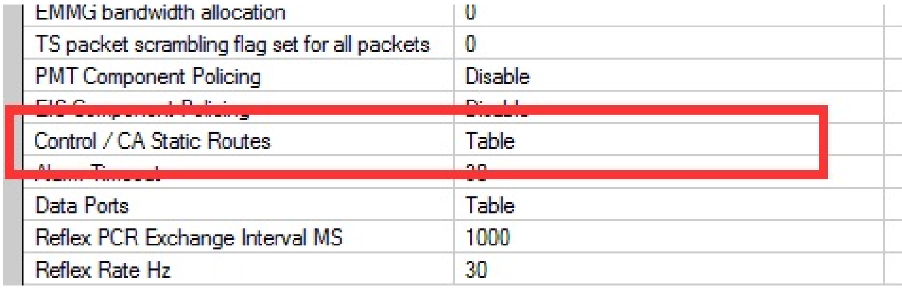


CA Primary IP Address	10.101.101.1
CA Primary Metric	7
CA Backup IP Address	10.101.101.2
CA Backup Metric	8
CA Virtual IP Address	10.101.101.3
CA Subnet	255.255.255.0
CA Gateway	10.101.101.254
CA Port Redundant Revert	Disable
CA Port Redundant Revert Hysteresis	180
CA Uses Control Ethernet Ports	Disable

Enter the Primary, Backup and Virtual IP Address details.

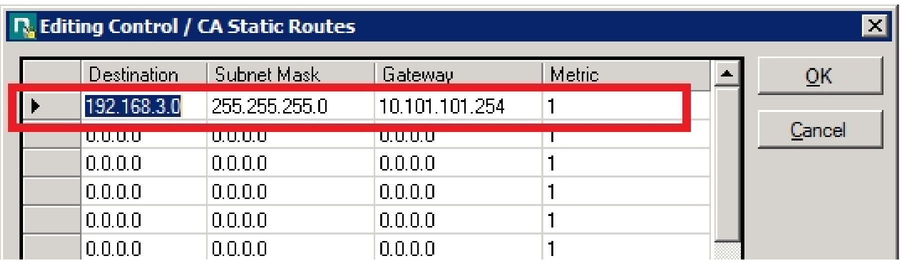
Control / CA Static Routes

If the network that hosts the ECMG/EMMG is not directly reachable from the CA network, you may need to add a static route.



EMMG bandwidth allocation	0
TS packet scrambling flag set for all packets	0
PMT Component Policing	Disable
EIS Component Policing	Disable
Control / CA Static Routes	Table
Alarm Timeout	30
Data Ports	Table
Reflex PCR Exchange Interval MS	1000
Reflex Rate Hz	30

In the Mux Static Parameters there is a section called 'Control / CA Static Routes' this is a table, double click this to open the table.



Editing Control / CA Static Routes

Destination	Subnet Mask	Gateway	Metric
192.168.3.0	255.255.255.0	10.101.101.254	1
0.0.0.0	0.0.0.0	0.0.0.0	1
0.0.0.0	0.0.0.0	0.0.0.0	1
0.0.0.0	0.0.0.0	0.0.0.0	1
0.0.0.0	0.0.0.0	0.0.0.0	1
0.0.0.0	0.0.0.0	0.0.0.0	1

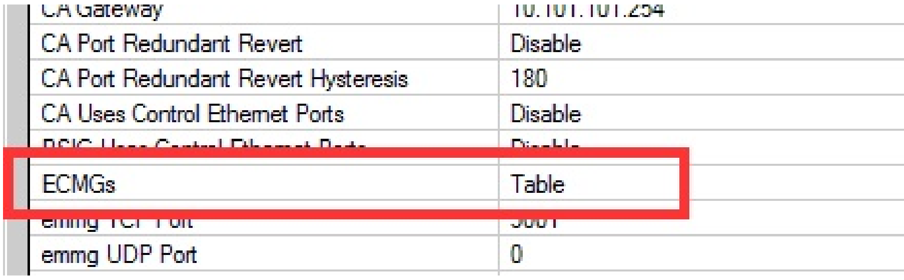
Add the desired routing information (this will come from the customer, as it will be their network you are connecting to). Click OK to close this window.

EMMG Parameters

The only parameter we have to supply for the EMM connection is a port (TCP/UDP) But the CA vendor will need to put the CA Port address of the Mux in to the EMMG so that the EMMs are sent to the Mux CA Port.

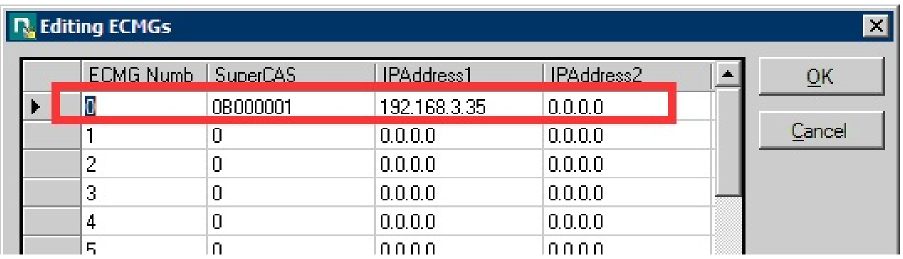
ECMG Parameters

In the Mux Static Parameters, there is an entry entitled 'ECMGs' This is a table that lists the available ECMG servers (on a real system, there may be redundant servers).



CA Gateway	10.101.101.254
CA Port Redundant Revert	Disable
CA Port Redundant Revert Hysteresis	180
CA Uses Control Ethernet Ports	Disable
BSIG Uses Control Ethernet Ports	Disable
ECMGs	Table
emmg TCP Port	5001
emmg UDP Port	0

Double click the ECGMs entry to open the table.



ECMG Numb	SuperCAS	IPAddress1	IPAddress2
0	0B000001	192.168.3.35	0.0.0.0
1	0	0.0.0.0	0.0.0.0
2	0	0.0.0.0	0.0.0.0
3	0	0.0.0.0	0.0.0.0
4	0	0.0.0.0	0.0.0.0
5	0	0.0.0.0	0.0.0.0

Add each server in the table as shown. In this example the ECMG server address is 192.168.3.35. Again this information will come from the CA Vendor / Customer.

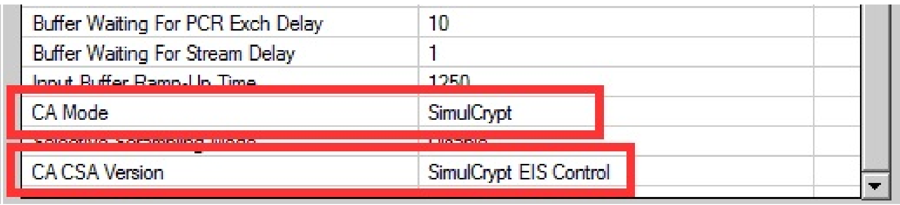
Don't forget to scroll along and add the ECMG Port to the ECMG settings above.

EIS/SCS Parameters (if using external devices)

EIS/SCS parameters will only be used if there is an external scheduler or scrambling system being implemented; normally these settings are not used when the Ericsson Mux is doing the scrambling.

Mux Static Parameters – Control / CA Static Routes

At the end of the Mux Static Parameters list there are two entries that we need to configure



Buffer Waiting For PCR Exch Delay	10
Buffer Waiting For Stream Delay	1
Input Buffer Ramp-Up Time	1250
CA Mode	SimulCrypt
[illegible]	[illegible]
CA CSA Version	SimulCrypt EIS Control

The CA Mode is by default set to 'None' this needs to be changed to 'SimulCrypt'

The CA CSA Version is set to 'SimulCrypt EIS Control' by default. This is generally fine but can be set to 'Force CSA1' or 'Force CSA2'

After all of these changes, please do the following

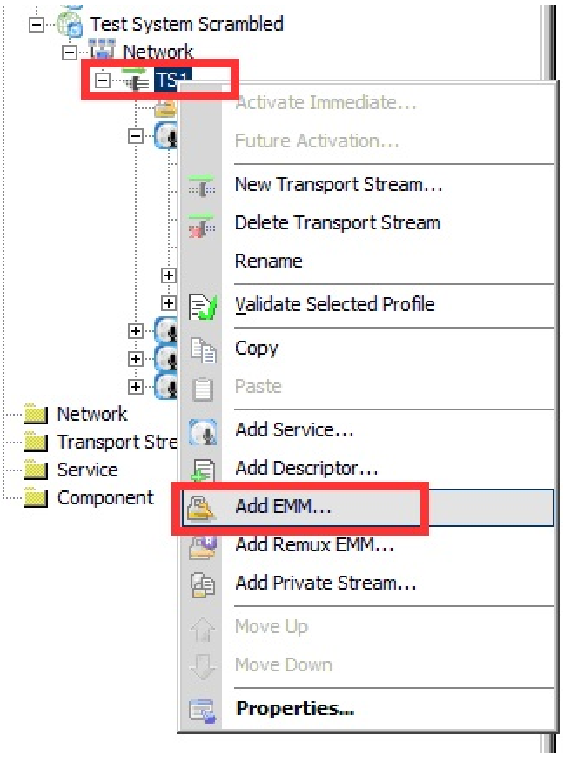
- Close all windows and accept any changes you made
- Save the Map (if you only have the original map then create a copy)
- Upload the Map
- Once uploaded, reboot the Mux for any IP Address / Parameter changes to take effect

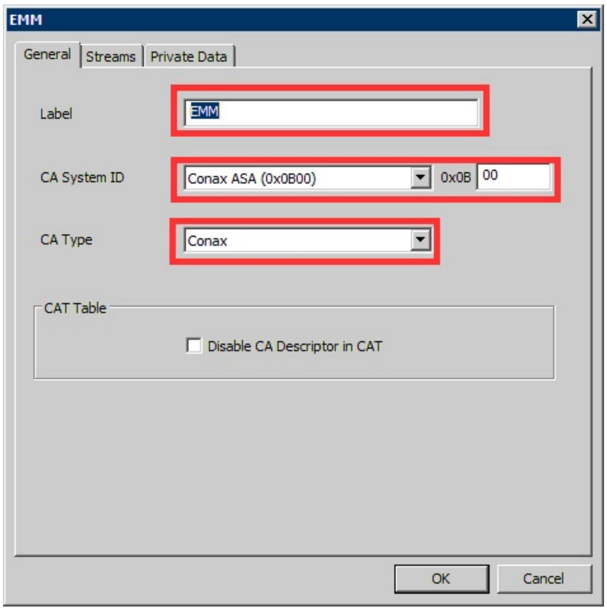
Profile Manager

Having configured the components on the Map and the Mux Static Parameters, we need to add the relevant components to the Profile, set the scrambling and schedule the profile to start the CA Configuration.

Adding an EMM

EMMs are added at the Transport Stream (TS) level. To add an EMM right click your profile at the TS level and from the menu select 'Add EMM…'



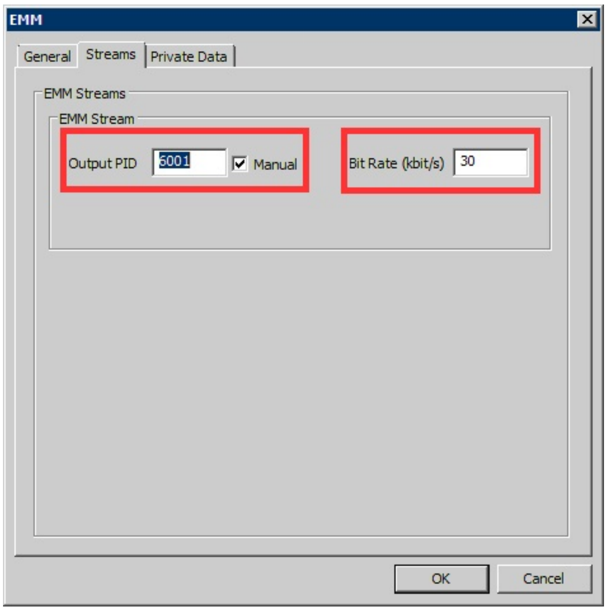


Label: EMM

CA System ID: Conax ASA (0x0B00) 0x0B 00

CA Type: Conax

□ Disable CA Descriptor in CAT



Output PID: 6001 ☑ Manual

Bit Rate (kbit/s): 30

Most of the information required here will come from the Customer or CA Vendor. If you do not have this information you will not be able to proceed.

Fill out the General and Streams tabs, the Private Data is not required in this example.

General Tab

Label - This is just a label to allow you to identify this EMM in your TS configuration ***CA System ID*** - Select the correct CA type from this list ***CA Type*** - This list is populated from the entries made in the map Global Settings

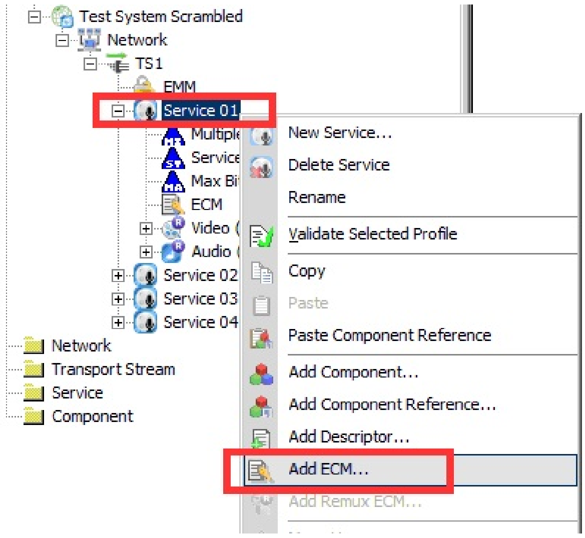
Streams Tab

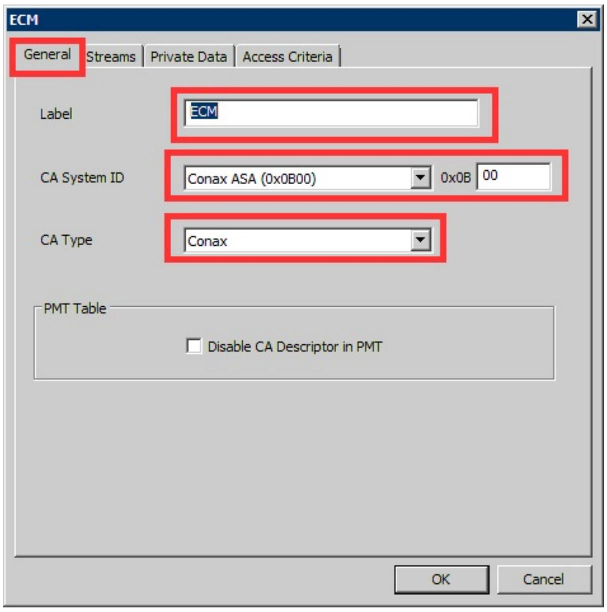
Output PID - The PID you wish to assign to this component. ***Bit Rate*** - Bit rate of EMM (this is used by nCompass for TS size calculations)

Adding an ECM

ECMs can be added at Component or Service level to scramble just a single component or the entire list of components in a service.

To add an ECM, right click the desired service in the profile, and from the list select 'Add ECM…'



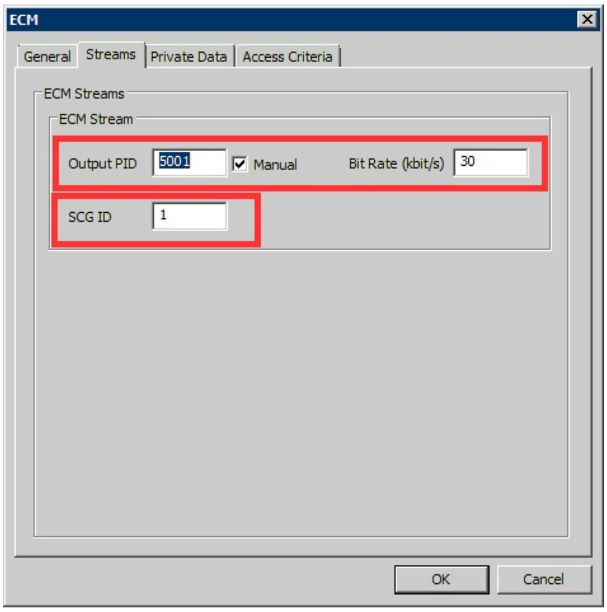


Label: ECM

CA System ID: Conax ASA (0x0B00) 0x0B 00

CA Type: Conax

□ Disable CA Descriptor in PMT



Output PID: 5001 ☑ Manual Bit Rate (kbit/s): 30

SCG ID: 1

General Tab

Label - This is just a label to allow you to identify this EMM in your TS configuration ***CA System ID*** - Select the correct CA type from this list ***CA Type*** - This list is populated from the entries made in the map Global Settings ***SGD ID*** - Scrambling Control Group ID

Scrambling Control Group ID (SGC ID)

The SGD ID is the Scrambling Group ID, this must be unique per TS. The SGD ID can be used to give several components the same access, where access is controlled by the EMM via the smart card.

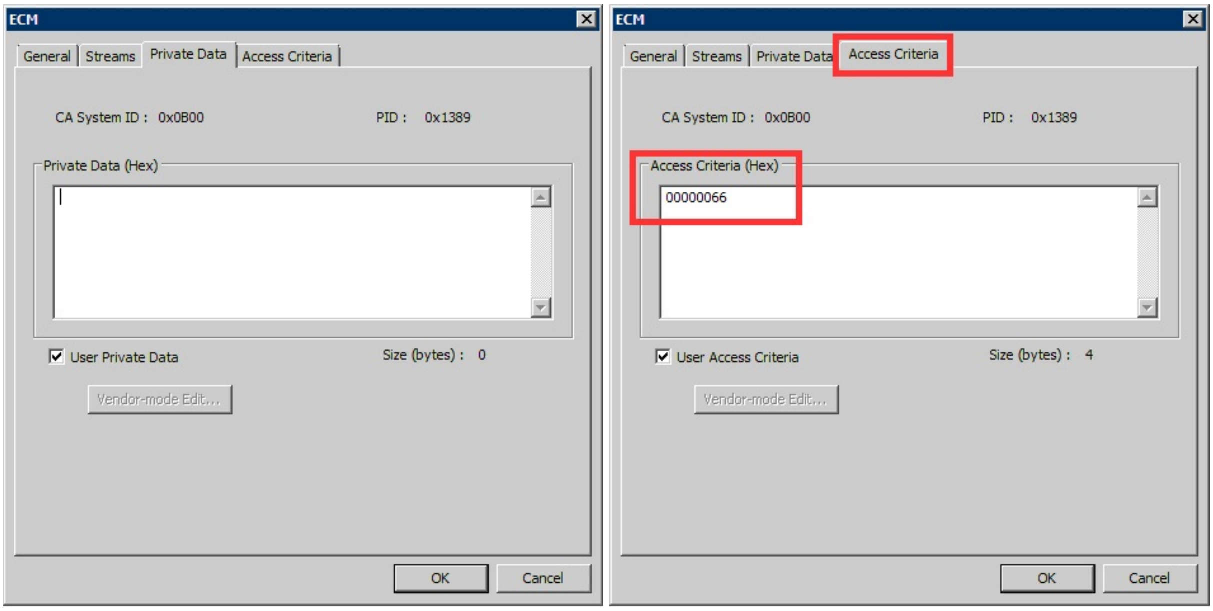
```
    Vendor 1
Service 1   Video     AC 1
    Audio    AC 1
    Audio    AC2
Service 2   Video    AC2
    Audio    AC2
    Audio    AC1
Service 3   Video    AC3
    Audio    AC3
    Audio    AC1
```

In the above example, the SGC ID is an example of using different SGD IDs. If the Smart Card being used only allows for SGD ID 1, then you can only descramble any components marked AC1.

This only really works like this if ECMs are at component level, if ECMs are at Service Level,

Streams Tab

Output PID - The PID you wish to assign to this component. Bit Rate - Bit rate of EMM (this is used by nCompass for TS size calculations) SGD ID - TBC



CA System ID : 0x0B00 PID : 0x1389

Private Data (Hex)

☑ User Private Data Size (bytes) : 0

CA System ID : 0x0B00 PID : 0x1389

Access Criteria (Hex)

00000066

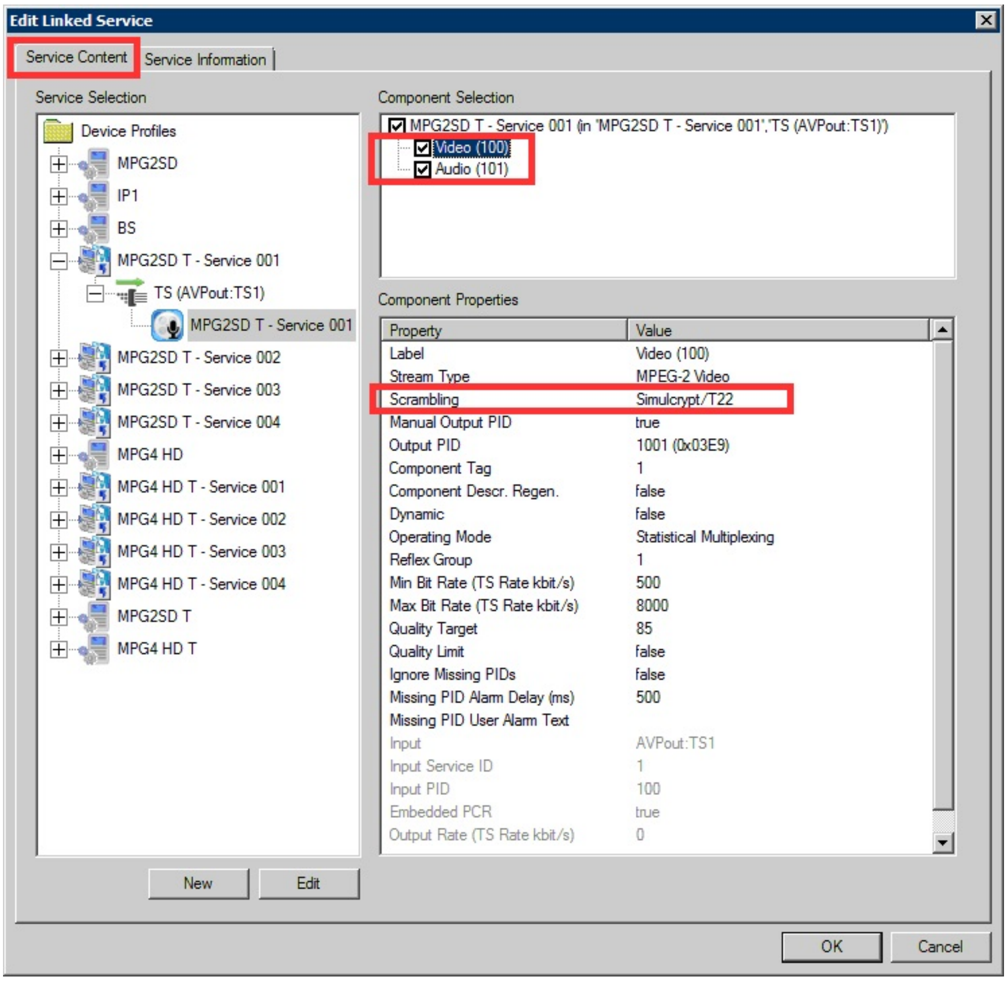
☑ User Access Criteria Size (bytes) : 4

Private Data is not required in this example.

The Access Criteria (AC) will be supplied by the CA Vendor.

Device Profile Properties

Having added all of the required components to the transport stream, the profile for the service to be scrambled must be edited.



Component Selection

☑ MPG2SD T - Service 001 (in 'MPG2SD T - Service 001','TS (AVPout:TS1)')
- ☑ Video (100)
- ☑ Audio (101)

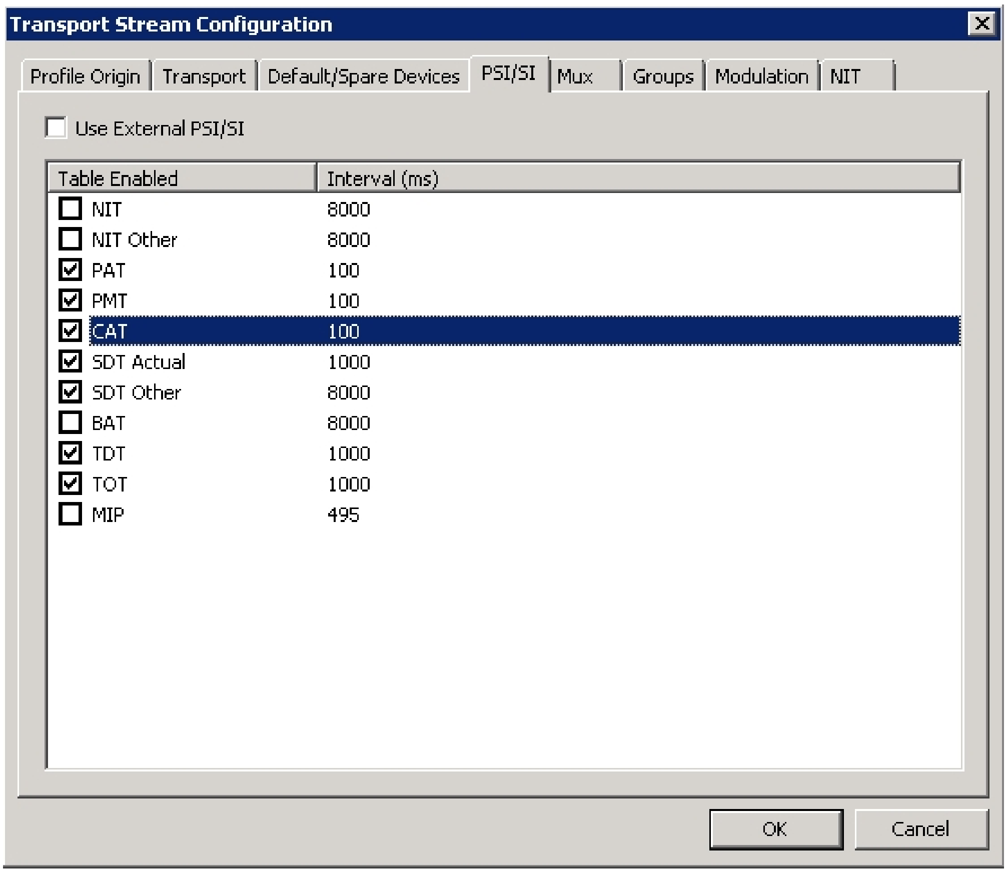
Component Properties

Property	Value
Label	Video (100)
Stream Type	MPEG-2 Video
Scrambling	Simulcrypt/T22
Manual Output PID	true
Output PID	1001 (0x03E9)
Component Tag	1
Component Descr. Regen.	false
Dynamic	false
Operating Mode	Statistical Multiplexing
Reflex Group	1
Min Bit Rate (TS Rate kbit/s)	500
Max Bit Rate (TS Rate kbit/s)	8000
Quality Target	85
Quality Limit	false
Ignore Missing PIDs	false
Missing PID Alarm Delay (ms)	500
Missing PID User Alarm Text	
Input	AVPout:TS1
Input Service ID	1
Input PID	100
Embedded PCR	true
Output Rate (TS Rate kbit/s)	0

Each component must be selected and the Scrambling changed

PSI/SI Transport Stream Settings

If you have been running in the clear, then chances are that you are not generating a Conditional Access Table (***CAT***). This will now need to be added.



☐ Use External PSI/SI

Table Enabled	Interval (ms)
☐ NIT	8000
☐ NIT Other	8000
☑ PAT	100
☑ PMT	100
☑ CAT	100
☑ SDT Actual	1000
☑ SDT Other	8000
☐ BAT	8000
☑ TDT	1000
☑ TOT	1000
☐ MIP	495

From the Transport Stream settings in the Profile Manager, ensure to select the CAT table.

MX8400 Telnet Menu

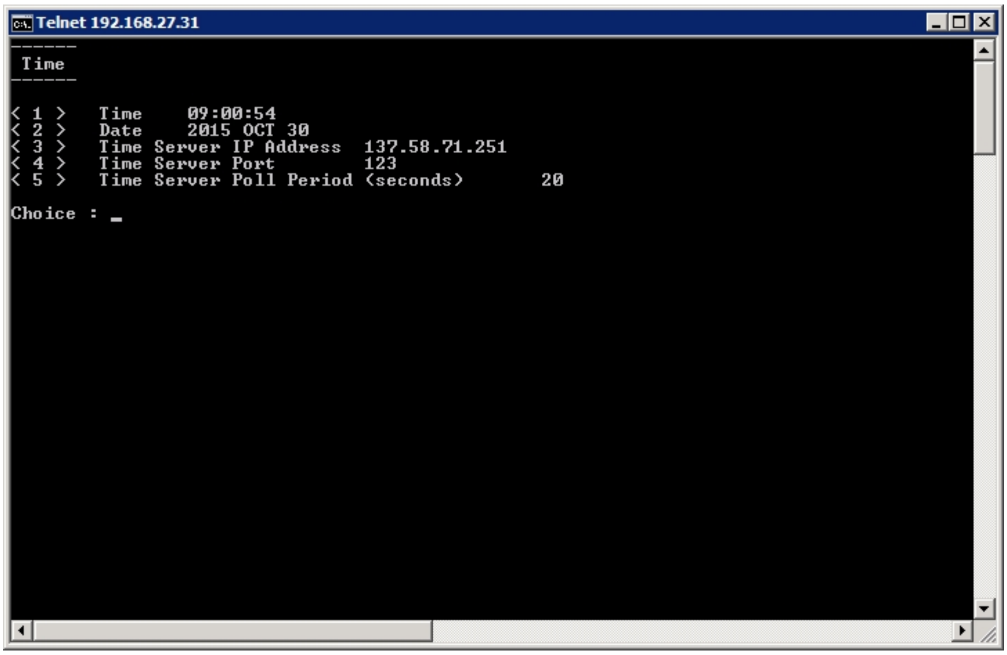
We can test the connectivity between the CA servers and the MX8400 Mux using some Telnet menus, Telnet to the MX8400 and login using:

```
engineer
engineer
```

Time Configuration

If the time of the MX8400 is out, then CA will at some point stop working, as it will assume all the CA messages are out of date.

From the Telnet Menu select ***1,1 Time (1. Configuration, 1. Time)***



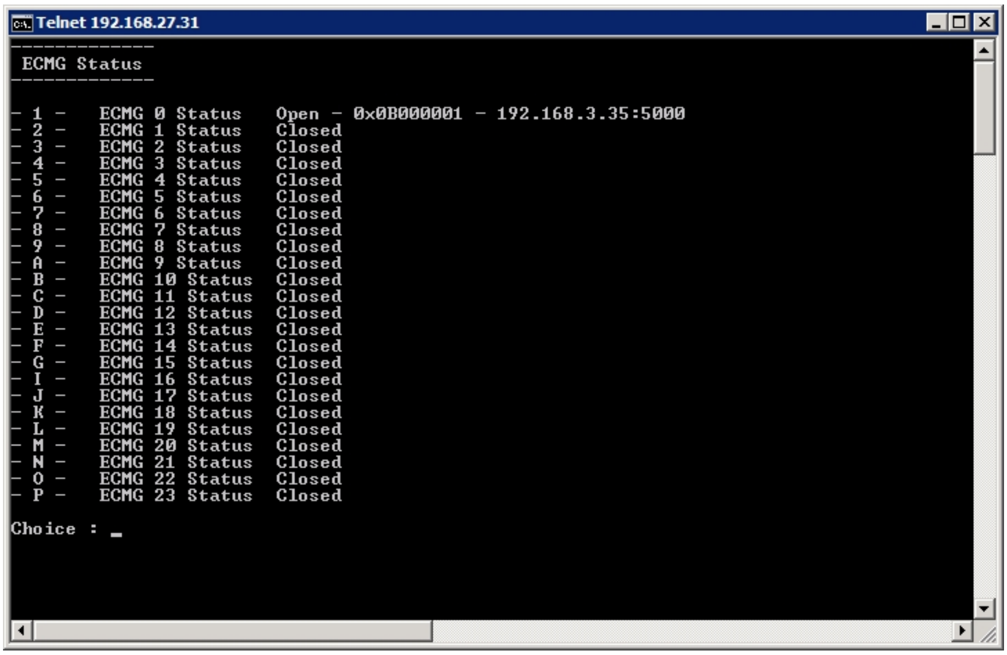
```
------
 Time
------

< 1 >   Time     09:00:54
< 2 >   Date     2015 OCT 30
< 3 >   Time Server IP Address  137.58.71.251
< 4 >   Time Server Port        123
< 5 >   Time Server Poll Period (seconds)       20

Choice : _
```

Here the Mux time can be seen, if this time is incorrect, then you may not be able to descramble any components.

ECMG Status

To test the ***ECMG*** status, use the following menu selection.

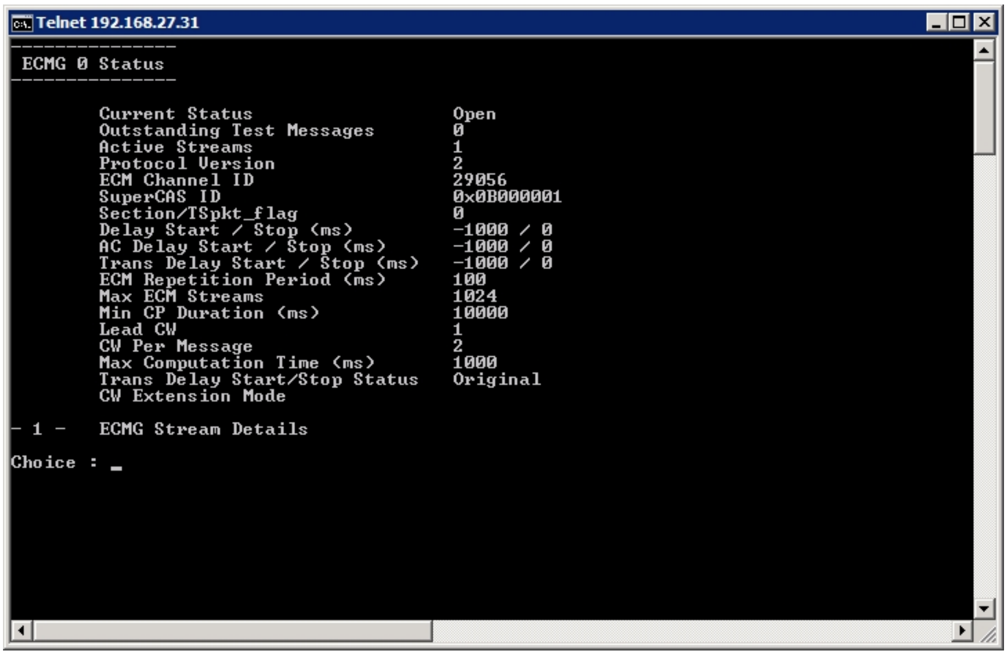
2,4,1 (2. Status, 4. Conditional Access, 1. ECMG Status) (go back to main menu first)



```
-------------
 ECMG Status
-------------

- 1 -   ECMG 0 Status   Open - 0x0B000001 - 192.168.3.35:5000
- 2 -   ECMG 1 Status   Closed
- 3 -   ECMG 2 Status   Closed
- 4 -   ECMG 3 Status   Closed
- 5 -   ECMG 4 Status   Closed
- 6 -   ECMG 5 Status   Closed
- 7 -   ECMG 6 Status   Closed
- 8 -   ECMG 7 Status   Closed
- 9 -   ECMG 8 Status   Closed
- A -   ECMG 9 Status   Closed
- B -   ECMG 10 Status  Closed
- C -   ECMG 11 Status  Closed
- D -   ECMG 12 Status  Closed
- E -   ECMG 13 Status  Closed
- F -   ECMG 14 Status  Closed
- G -   ECMG 15 Status  Closed
- I -   ECMG 16 Status  Closed
- J -   ECMG 17 Status  Closed
- K -   ECMG 18 Status  Closed
- L -   ECMG 19 Status  Closed
- M -   ECMG 20 Status  Closed
- N -   ECMG 21 Status  Closed
- O -   ECMG 22 Status  Closed
- P -   ECMG 23 Status  Closed

Choice : _
```

Here it can be seen that there is an active connection to the ECMG.

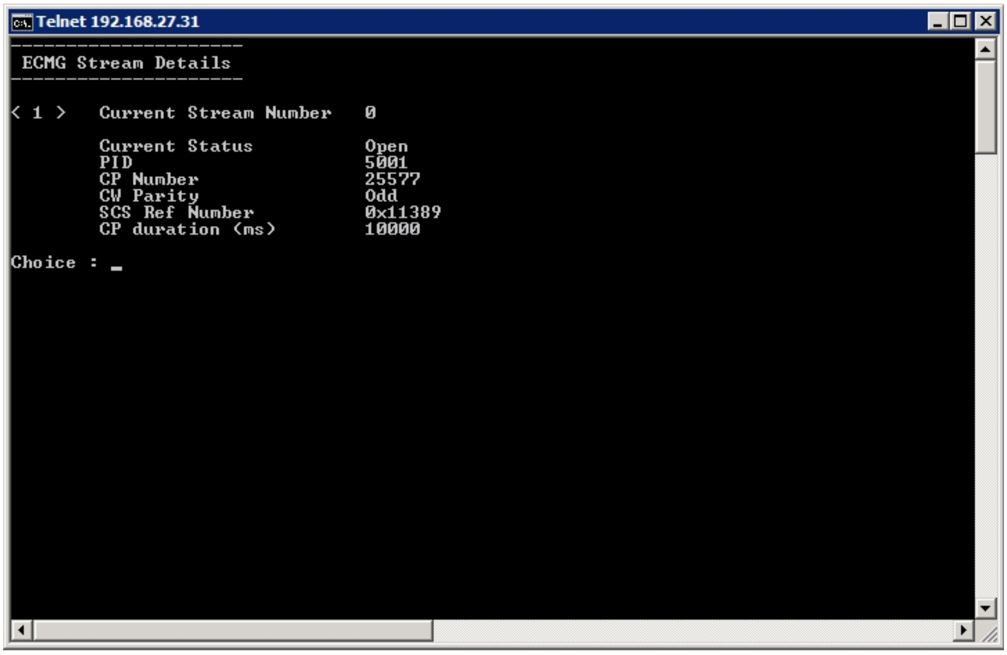
Press 1 again – ECMG Status



```
---------------
 ECMG 0 Status
---------------

        Current Status                  Open
        Outstanding Test Messages       0
        Active Streams                  1
        Protocol Version                2
        ECM Channel ID                  29056
        SuperCAS ID                     0x0B000001
        Section/TSpkt_flag              0
        Delay Start / Stop (ms)         -1000 / 0
        AC Delay Start / Stop (ms)      -1000 / 0
        Trans Delay Start / Stop (ms)   -1000 / 0
        ECM Repetition Period (ms)      100
        Max ECM Streams                 1024
        Min CP Duration (ms)            10000
        Lead CW                         1
        CW Per Message                  2
        Max Computation Time (ms)       1000
        Trans Delay Start/Stop Status   Original
        CW Extension Mode

- 1 -   ECMG Stream Details

Choice : _
```

Here we can see the status of the ECM, the SuperCAS ID, Channel ID etc.

Press 1 again – ECMG Details



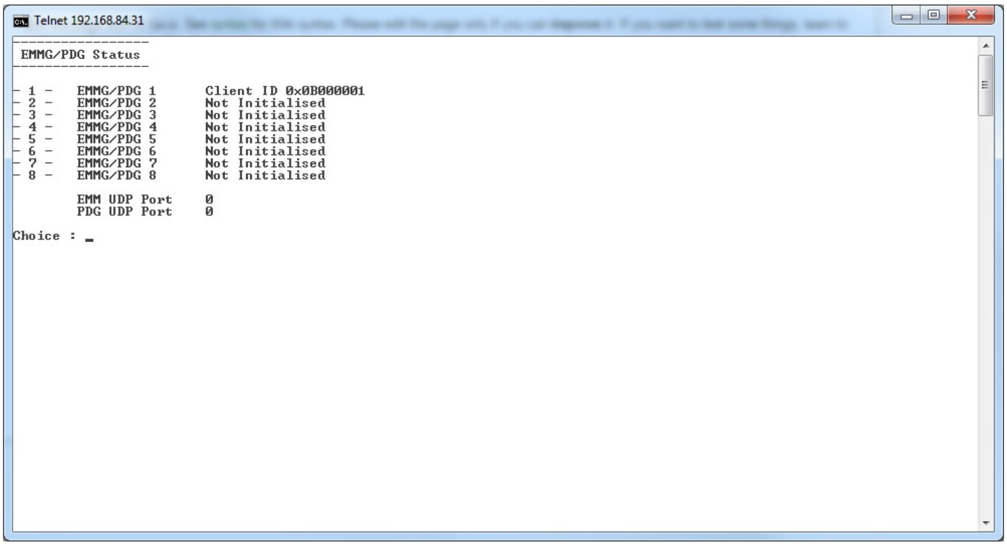
```
---------------------
 ECMG Stream Details
---------------------

< 1 >   Current Stream Number   0

        Current Status          Open
        PID                     5001
        CP Number               25577
        CW Parity               Odd
        SCS Ref Number          0x11389
        CP duration (ms)        10000

Choice : _
```

Here we can see the Stream Details, CP Parity (CP is Crypto Period) and the CP duration (10s by default)

EMMG Status

To test the ***EMMG*** status, use the following menu selection.

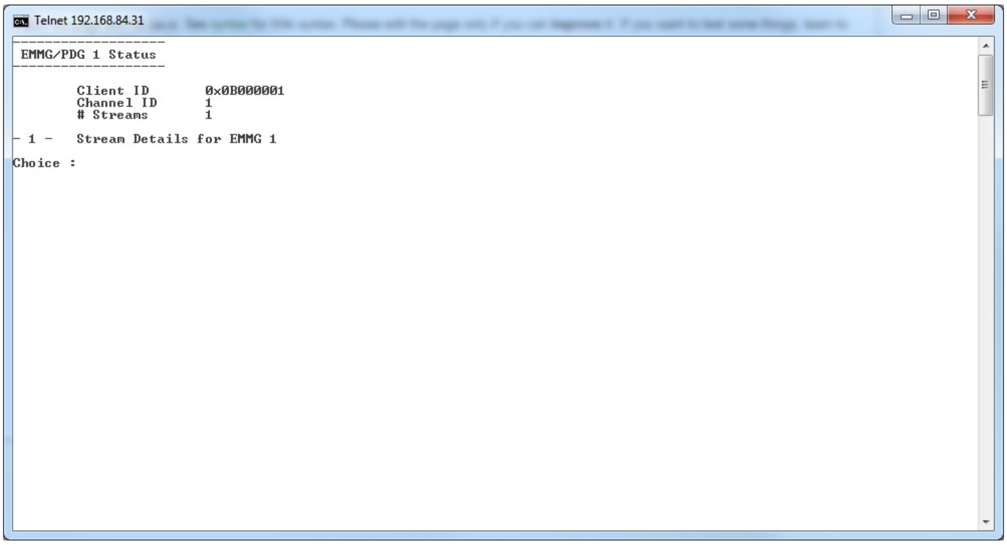
2,4,2 (2. Status, 4. Conditional Access, 2. EMMG/PDG Status) (go back to main menu first)



```
------------------
 EMMG/PDG Status
------------------

- 1 -   EMMG/PDG 1      Client ID 0x0B000001
- 2 -   EMMG/PDG 2      Not Initialised
- 3 -   EMMG/PDG 3      Not Initialised
- 4 -   EMMG/PDG 4      Not Initialised
- 5 -   EMMG/PDG 5      Not Initialised
- 6 -   EMMG/PDG 6      Not Initialised
- 7 -   EMMG/PDG 7      Not Initialised
- 8 -   EMMG/PDG 8      Not Initialised

        EMM UDP Port    0
        PDG UDP Port    0

Choice : _
```

Here we can see the EMMG Status (Client ID 0x00000001 in this example) As we only have as single EMM we only see one connection in this example.

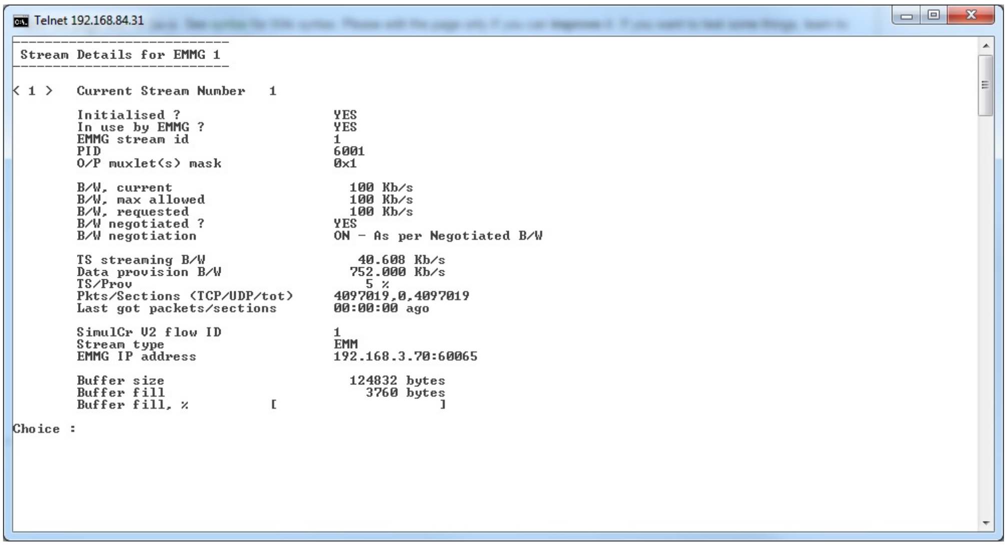
Select '1' to see the EMMG Details.



```
--------------------
 EMMG/PDG 1 Status
--------------------

        Client ID       0x0B000001
        Channel ID      1
        # Streams       1

- 1 -   Stream Details for EMMG 1

Choice :
```

Here we can see the Client ID, Channel ID and number of Streams.

Press '1' for the Stream Details



```
---------------------------
 Stream Details for EMMG 1
---------------------------

< 1 >   Current Stream Number   1

        Initialised ?                   YES
        In use by EMMG ?                YES
        EMMG stream id                  1
        PID                             6001
        O/P muxlet(s) mask              0x1

        B/W, current                      100 Kb/s
        B/W, max allowed                  100 Kb/s
        B/W, requested                    100 Kb/s
        B/W negotiated ?                YES
        B/W negotiation                 ON - As per Negotiated B/W

        TS streaming B/W                   40.608 Kb/s
        Data provision B/W                752.000 Kb/s
        TS/Prov                              5 %
        Pkts/Sections (TCP/UDP/tot)     4097019,0,4097019
        Last got packets/sections       00:00:00 ago

        SimulCr V2 flow ID              1
        Stream type                     EMM
        EMMG IP address                 192.168.3.70:60065

        Buffer size                       124832 bytes
        Buffer fill                         3760 bytes
        Buffer fill, %          [                       ]

Choice :
```

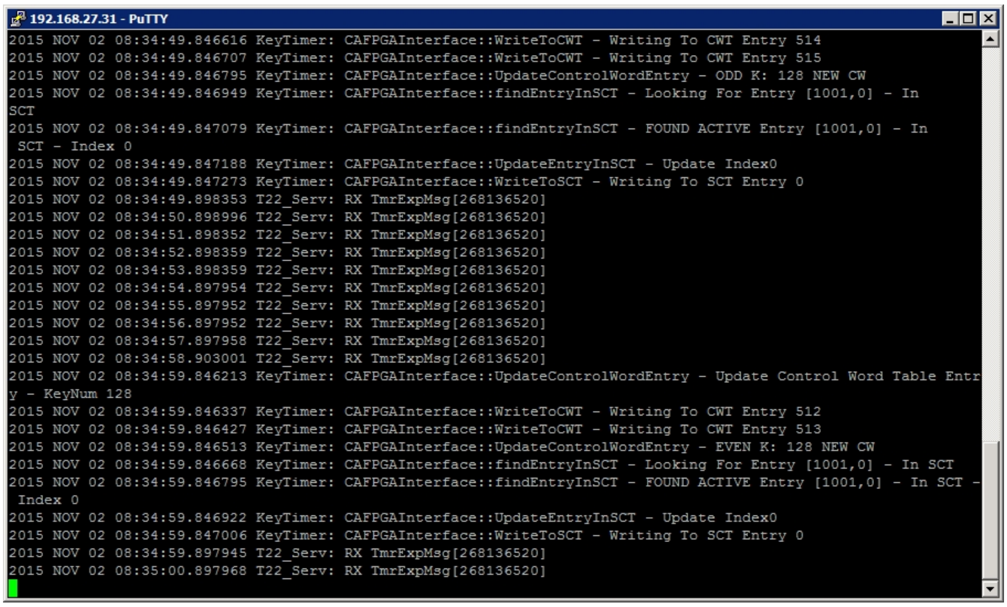
Here we can see that the EMMG is initialised, that it is un use and we can see Bandwidth useage etc.

Mux RS232 Telnet redirection

The RS232 port on the Mux displays some more information about the Mux status, this is quite useful. However if you do not have an RS232 cable, or port on your laptop, then you can use this method.

The RS232 messages are redirected to port 12, so you can Telnet to port 12 (instead of the normal port 21)

Telnet ‘mux-control-address:12’ e.g. ***Telnet 192.168.27.31:12***



```
2015 NOV 02 08:34:49.846616 KeyTimer: CAFPGAInterface::WriteToCWT - Writing To CWT Entry 514
2015 NOV 02 08:34:49.846707 KeyTimer: CAFPGAInterface::WriteToCWT - Writing To CWT Entry 515
2015 NOV 02 08:34:49.846795 KeyTimer: CAFPGAInterface::UpdateControlWordEntry - ODD K: 128 NEW CW
2015 NOV 02 08:34:49.846949 KeyTimer: CAFPGAInterface::findEntryInSCT - Looking For Entry [1001,0] - In
SCT
2015 NOV 02 08:34:49.847079 KeyTimer: CAFPGAInterface::findEntryInSCT - FOUND ACTIVE Entry [1001,0] - In
 SCT - Index 0
2015 NOV 02 08:34:49.847188 KeyTimer: CAFPGAInterface::UpdateEntryInSCT - Update Index0
2015 NOV 02 08:34:49.847273 KeyTimer: CAFPGAInterface::WriteToSCT - Writing To SCT Entry 0
2015 NOV 02 08:34:49.898353 T22_Serv: RX TmrExpMsg[268136520]
2015 NOV 02 08:34:50.898996 T22_Serv: RX TmrExpMsg[268136520]
2015 NOV 02 08:34:51.898352 T22_Serv: RX TmrExpMsg[268136520]
2015 NOV 02 08:34:52.898359 T22_Serv: RX TmrExpMsg[268136520]
2015 NOV 02 08:34:53.898359 T22_Serv: RX TmrExpMsg[268136520]
2015 NOV 02 08:34:54.897954 T22_Serv: RX TmrExpMsg[268136520]
2015 NOV 02 08:34:55.897952 T22_Serv: RX TmrExpMsg[268136520]
2015 NOV 02 08:34:56.897952 T22_Serv: RX TmrExpMsg[268136520]
2015 NOV 02 08:34:57.897958 T22_Serv: RX TmrExpMsg[268136520]
2015 NOV 02 08:34:58.903001 T22_Serv: RX TmrExpMsg[268136520]
2015 NOV 02 08:34:59.846213 KeyTimer: CAFPGAInterface::UpdateControlWordEntry - Update Control Word Table Entr
y - KeyNum 128
2015 NOV 02 08:34:59.846337 KeyTimer: CAFPGAInterface::WriteToCWT - Writing To CWT Entry 512
2015 NOV 02 08:34:59.846427 KeyTimer: CAFPGAInterface::WriteToCWT - Writing To CWT Entry 513
2015 NOV 02 08:34:59.846513 KeyTimer: CAFPGAInterface::UpdateControlWordEntry - EVEN K: 128 NEW CW
2015 NOV 02 08:34:59.846668 KeyTimer: CAFPGAInterface::findEntryInSCT - Looking For Entry [1001,0] - In SCT
2015 NOV 02 08:34:59.846795 KeyTimer: CAFPGAInterface::findEntryInSCT - FOUND ACTIVE Entry [1001,0] - In SCT -
 Index 0
2015 NOV 02 08:34:59.846922 KeyTimer: CAFPGAInterface::UpdateEntryInSCT - Update Index0
2015 NOV 02 08:34:59.847006 KeyTimer: CAFPGAInterface::WriteToSCT - Writing To SCT Entry 0
2015 NOV 02 08:34:59.897945 T22_Serv: RX TmrExpMsg[268136520]
2015 NOV 02 08:35:00.897968 T22_Serv: RX TmrExpMsg[268136520]
```

This display can be very useful to see what errors the mux is trying to report.

Ericsson CA Test System Parameters

For Test System Mux ONLY
These parameters will only work in demos (due to routing) and will only work on our Mux.

```
Alan Walker Demos    Ext Num                        Provided By:
                                                                        Rob O’Neill
Date    Current 16-11-15
    Review    06-01-16
Link        To Room    Patch panel ID
F54 – CAPEN V&I Int 11      G7
Network     Gateway            SCS 1            SCS 2
10.101.101.x/24 10.101.101.254  10.101.101.3    10.101.101.6
ECMG      CAS ID  SubSystem ID    IP            Port    AC            TS Section/Packet    Max ECMs
Conax     0B00      0001            192.168.3.70    5000    00000066    Packet                    25
Irdeto    0604      0000            192.168.3.90    4350                Packet                    25
EMMG      CAS ID  SubSystem ID  TCP Port    UDP Port    TS Section/Packet   Bandwidth (KbS)  Channel
Stream
Conax     0B00      0001            5001        -            Packet                100                   1
1
Irdeto    0604      0000            5001                Packet                50                   0
0
CAM                     CAM sn          Type        Smartcard    AC                    Valid Until
Smit Icecrypt SVT 81    OAK1T134500097    Single Svc    10075964063    90010006000100010065    Review
```

```
date
```

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