SmarCAM-3.5 Generic Conax CIv1 non CP Technical Datasheet CI0355-CNX03-60 R1.3 (910470)

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- PURPOSE

The goal of this document is to give an overview of the capabilities of the SmarCAM-3.5 Generic Conax CI v1 Non Chipset Pairing Module.

This document describes the general hardware, software and physical characteristics of the module.

- DOCUMENT HISTORY

Product Version	Datasheet version	Description of changes	Author	Date
1.0	1.0	Initial product version	EG	Jun 2015
1.1	1.1	Software version updated	EG	Oct 2015
1.2	1.0	Software version updated	GME	Nov 2016
1.3	1.0	Software version updated	GME	July 2017

- OVERVIEW

The SmarCAM-3.5 is an electronic card following the PC Card standard and fully compliant with the DVB CI and CI Plus specification.
This module combined with an ISO 7816 Smart Card provided by a CA Vendor is able to descramble the Transport Stream, without any support of the Set Top Box/IDTV demux.
The complete Transport Stream and miscellaneous Data flow between Set Top Box/IDTV and the CA module are exchanged through the Common Interface.

- Reference documents

|	Title	Description	Date
[1]	EN50221	Common Interface Specifications for Conditional Access and other Digital Video Broadcasting Decoder Applications.	February 1997
[2]	R206-001	Guidelines for Implementation and Use of the Common Interface for DVB Decoder Applications	1998
[3]	ISO 7816	Information Technology Identification Card Integrated Circuit Cards with contacts	1996
[4]	ETSI TS 102 006	Digital Video Broadcasting Specification for System Software Update in DVB Systems	V1.2.1 Oct 2002
[5]	SPE-1546001	Packaging & Pallet Specification for CAM in individual bags - 250 units	Latest version

- GENERAL DESCRIPTION

The SmarCAM-3.5 Secure Module architecture has been designed to follow security requirements of Conditional Access Vendors, operators and content providers. The system is based on the following chip sets, linked as detailed below:

"Secure Conditional Access Processor (CAP 102) "
"Serial/Parallel Flash memory (Flash)"
"SDRAM"
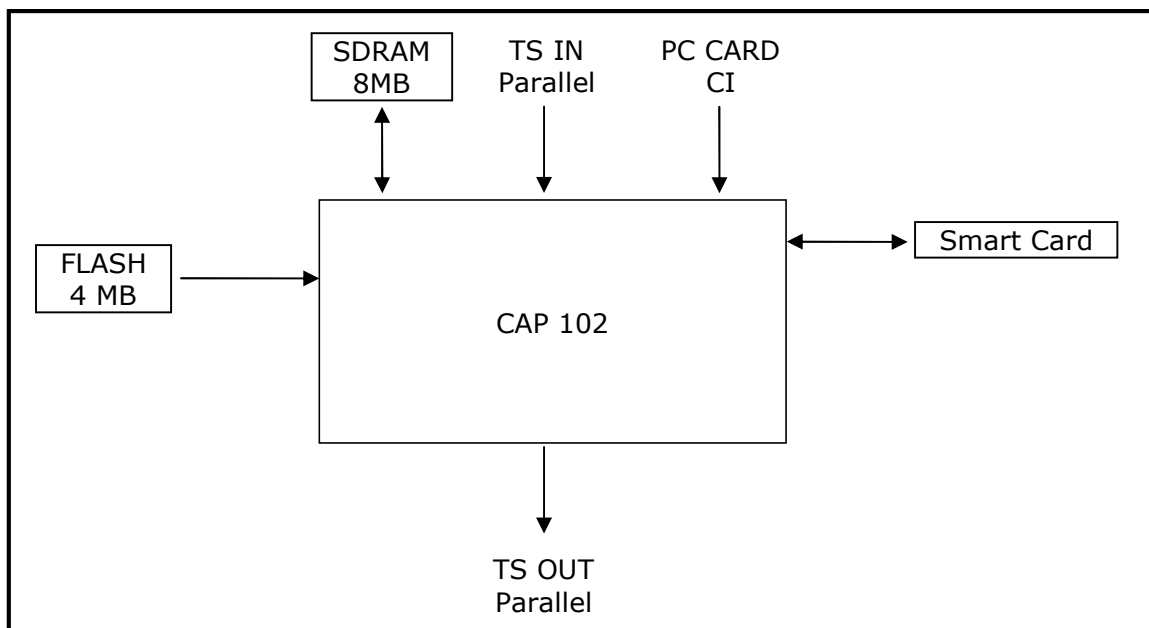
State-of-the-Art Secure Conditional Access Chipset

The **"CAP 102"** is a secure Conditional Access Processor designed to follow the latest CA vendors' requirements for chipsets.

Each **CAP102** is programmed with a Unique Identifier, Unique keys provided by Conditional Access Vendor. All keys are securely fused inside the CAP102 so can't be overwritten.

The **CAP102** debug interface is disabled by fuse for enhanced security.

The embedded security features offer new possibilities:
- ♦ Chipset pairing with the Conditional Access Smart Card
- ♦ Memory pairing with the Flash containing the SW libraries and applications.
- ♦ Secure boot loader (SHA-256 and RSA 2048)
- ♦ Secure startup with CA vendor public key
- ♦ Authentication mechanism
- ♦ Encryption of content

♦ SDRAM encryption

CAP102 is in charge of the real time transport streams processing (filtering and descrambling). It integrates DVB-CI interfaces and Transport Stream interfaces, Smart Card interface (capable of driving 2 Cards), SDRAM and flash memory interface. It is based around an ARC625, 32 bits RISC microprocessor.

Memory chipset

The **Flash memory** is a 4MB flash memory issued from the computer market. Its size is widely enough to store the embedded software. Flash is mandatory to offer download capability.

The **SDRAM** is a 8 MB SDRAM memory dedicated to software copy, filter buffers, and dynamic allocation.

All three main chipsets (CAP102, Flash, and SDRAM) use BGA packages for an additional element of security protection. The SmarCAM-3.5 contains additional security elements such as the use of OTP Flash memory and a secure boot loader. These security elements help the SmarCAM-3.5 CAM to comply with the latest security requirements of leading Conditional Access Vendors

- FEATURES

Hardware

The CAP102 manages the initialization, the buffer size exchange protocol, and the commands exchange between the host and the SmarCAM-3.5 secure module.

The CAP102 provides additional system features for an Access Control module including:

♦ Full DVB Support

TS input Interface
- o Serial or Parallel interface
- o Support up to 96 Mbit/s input streams
- o 5V tolerant input

DeCiphering
- ♦ Descrambles up to 32 Elementary Streams (Audio, Video, Data)
- ♦ DVB-CSA2
- ♦ DES/TDES 64 bits key length
- ♦ DES/TDES 192 bits key length
- ♦ AES 128 bits key length

Filtering
- ♦ 32 Programmable filters for filtering of packets as EMM/ECM/NIT

Smart Card interface

♦ Standard ISO7816/EMV2000 universal interface

♦ T=0, T=1 and T=14 asynchronous protocol and synchronous protocol

♦ Data transfer from 9600bauds to 115 Kbauds

♦ Support Dual SmartCard

Microprocessor unit

♦ Structured around a 32 Bits RISC ARC625 core

♦ Running up to 200Mhz

SDRAM Interface unit

♦ Operates at 100MHz – Universal interface
♦ 16 bits data, with support to up to 2x64Mbytes SDRAM

SPI Interface for Flash

♦ Support Motorola/TI and National Semiconductor protocols.
♦ Operating up to 33Mbit/s

Miscellaneous
♦ 3.3V and 5V tolerant on its inputs

Security

♦ BGA packaging of CPU and Flash

♦ OTP Flash memory

♦ Secure boot loader

Software

♦ Full DVB CI:
Resource manager,
Application Information,
CA support (CA_PMT),
MMI management,
Date and Time

♦ Secured Download over the air compliant with Conax Secure Loader specification.

Module Characteristics

Power Consumption and Dissipation

- ◆ The SmarCAM-3.5 secure module needs less than 300mA, while running CA applications and Smart Card dialogs.
- ◆ The power dissipation is reduced to approximately 1.25 W, to be dissipated on one of the metallic surface of the module casing.
- ◆ The module is compliant to CE standards (EN60065&EN60950) and requirements:
  - host functional and ambient temperature: +5 to +40°C
  - maximum ambient temperature around the PC-Card : +50°C

SmarCAM-3.5 module durability

- ◆ The module is specified for following number of operations:
  - PCMCIA Connector   10 000 cycles
  - Smart Card Connector   10 000 cycles
  - Flash erase/program   10 000 cycles
  - Data Retention time   10 years
  - Expected MTBF   14 000 hours

- ◆ Other components are specified to work more than 10 years in the normal temperature range.

Module production quality

- ◆ Each Module is tested at our production facility.

Module Qualifications and standards approvals

- ◆ The product is CE compliant in the B category.
- ◆ All the test specifications are detailed in the following standards:
  - CEM immunity   EN55024:1998
  - CEM emissions   EN55022:1997

Mechanical protection

The metal housing is made of 0.18mm stainless steal, with a SmarDTV specific shape compliant with the PC-Card standard

Hardware

Hardware	
SmarDTV Platform	SmarCAM-3.5
Physical Interface	PCMCIA
Flash Memory	4MB
RAM Memory	8MB
SIM card slot (yes or no)	No

CAS Features

Conditional Access features	
Conditional Access System	Conax
CAK version number(s)	Contengo
Smart Card protocol	T=0
Pairing	yes
Link protection	yes
PPV	no
Host data	no

Other Features
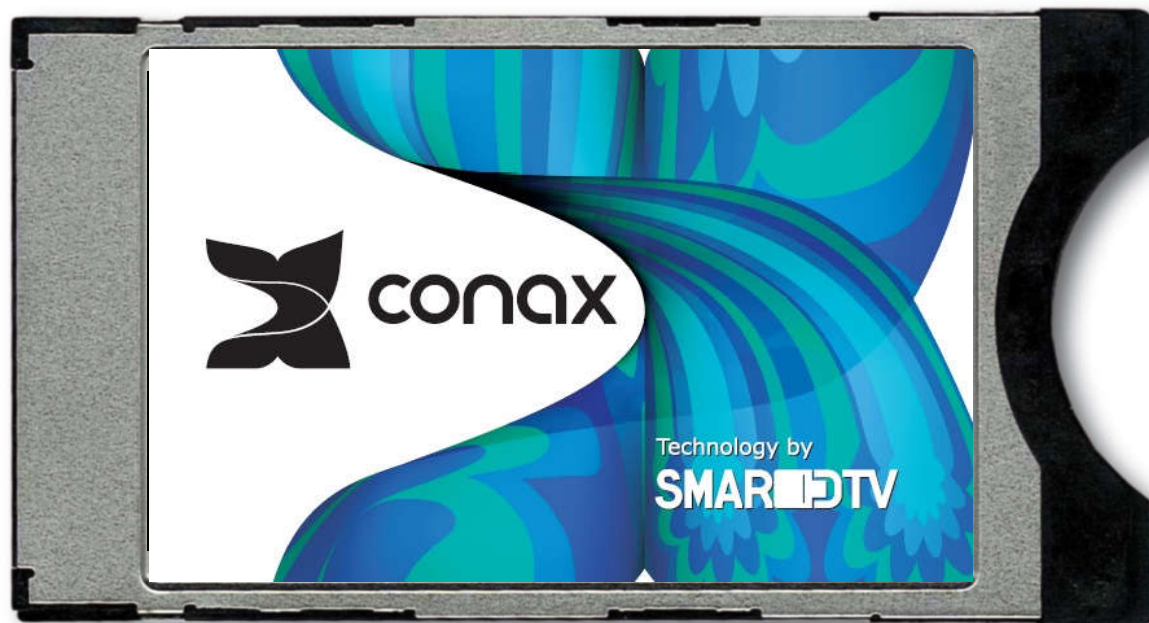
Other features	
Multi-stream support	No
HD support	yes
Multilingual support	yes
List of languages (default first)	Automatic (Default TV language), English, French, Swedish, Norwegian, Danish, Finnish, Italian, German, Spanish, Dutch, Russian, Ukrainian, Polish, Hungarian, Chinese, Romanian, Portuguese, Croatian, Serbian
Customized messages	yes
PIN Code management	yes
CIPlus version	N/A
CIv1 compatibility	yes

Software Version

Software release	
SW release date	July 13th, 2016

SmarDTV SW version	20.00.01.01.00.29

PACKAGING AND LABEL

Top label:

Bottom label:

SmarCAM-3.5 Generic Conax CIv1 non CP
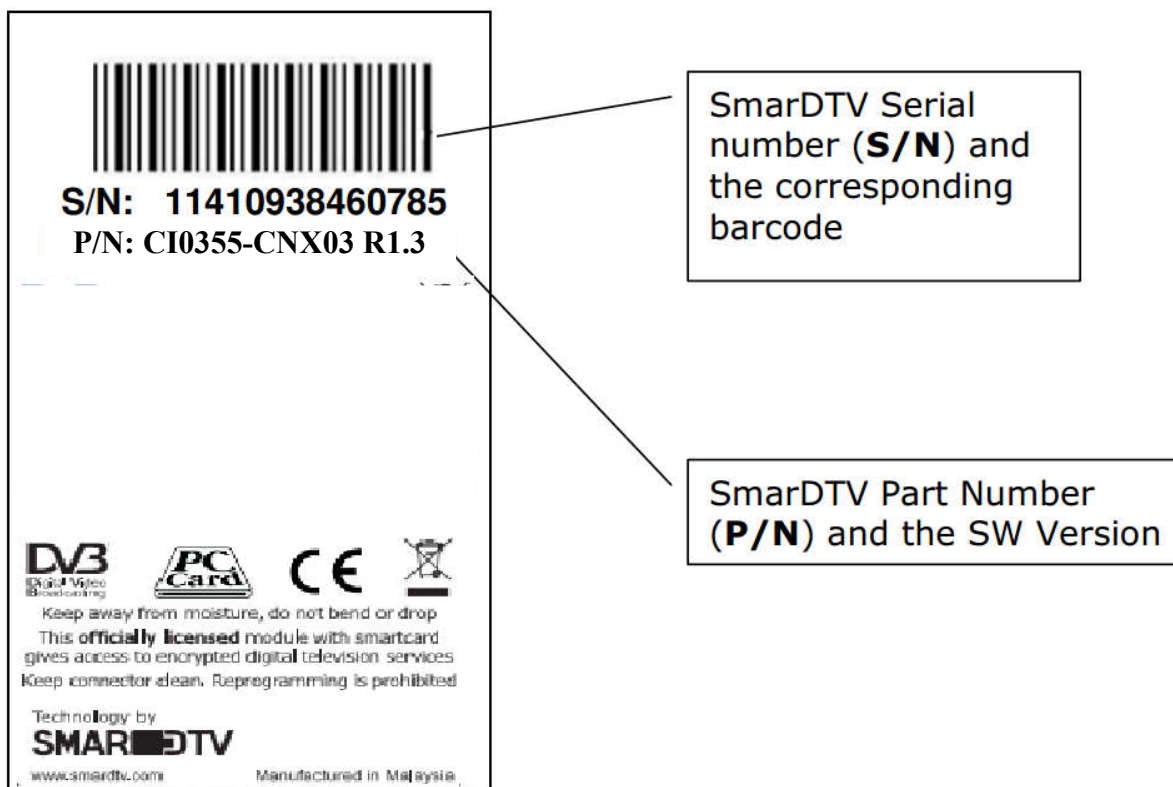Technical Datasheet, 1.0, Approved, GME

SERIALIZATION PROCEDURE

Each module has the following, unique, serialization elements:

- **SmarDTV Serial Number** in the following, 14 digits format, with the corresponding barcode in the 128B standard:
    - PPPPYYWWSNNNNN
    - PPPP = platform type
    - YY = production year on 2 digits
    - WW = production week number on 2 digits
    - S = manufacturing site
    - NNNNN= incremental number for each week
- **SmarDTV Part Number** or P/N, with Revision: CI0355-CNX03 R1.3

Example of the Serialization Procedure:

S/N: 11410938460785

P/N: CI0355-CNX03 R1.3

SmarDTV Serial number (**S/N**) and the corresponding barcode

SmarDTV Part Number (**P/N**) and the SW Version

DVB Digital Video Broadcasting | PC Card | CE |

Keep away from moisture, do not bend or drop
This **officially licensed** module with smartcard gives access to encrypted digital television services
Keep connector clean. Reprogramming is prohibited

Technology by
SMARDTV
www.smardtv.com   Manufactured in Malaysia

Packaging:

The product is delivered within an ESD plastic bag inserted into a carton as specified in [5].

Shipping report:

A sample packing list with the following format is described below:

Box Number : 123000100

Product :   CI0355-CNX03-60 SC3.5 Conax   Qty: 2

SEQ   Serial number
1   11411230400001
2   11411230405500

- Contacts

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