Pay TV Transport Chip / STB SOC Security

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Presentation to the Copy Protection Technology Working Group (CPTWG)

Introduction

- Cryptography Research, Inc (CRI) is deploying security hardware (the CryptoFirewall™) in transport chips / STB SOC (System on Chip) used in set top boxes
- SypherMedia International (SMI) is building software solutions (the SypherMedia Kernel) that support the CryptoFirewall and provide a high level of security for Pay TV and other STB security applications

CryptoFirewall™ in Transport chip (SOC)
- Security ASIC core
- Provides the most tamper resistant hardware security available using standard silicon manufacturing processes
- Deployed in >50M devices, typically in smart cards
- Perfect security track record

SypherMedia Kernel™ in Set Top Box
- Receives and processes Kernel section of EMM and ECMs
- Manages encrypted keys and CF interface

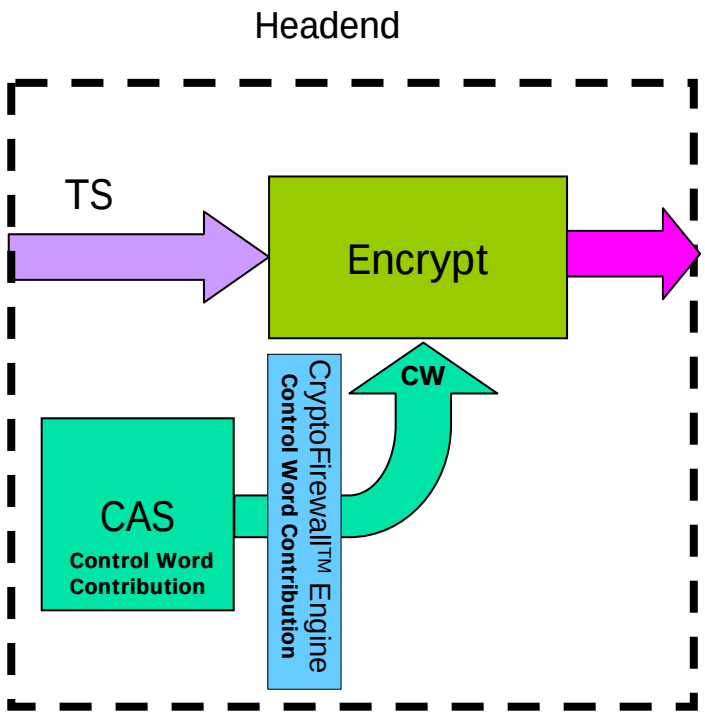
SypherMedia Gatekeyper™ in Headend
- Interface to broadcast distribution
- Bitmap and Encrypted key generation
- Generates Kernel Section of EMM & ECMs

Key advantages

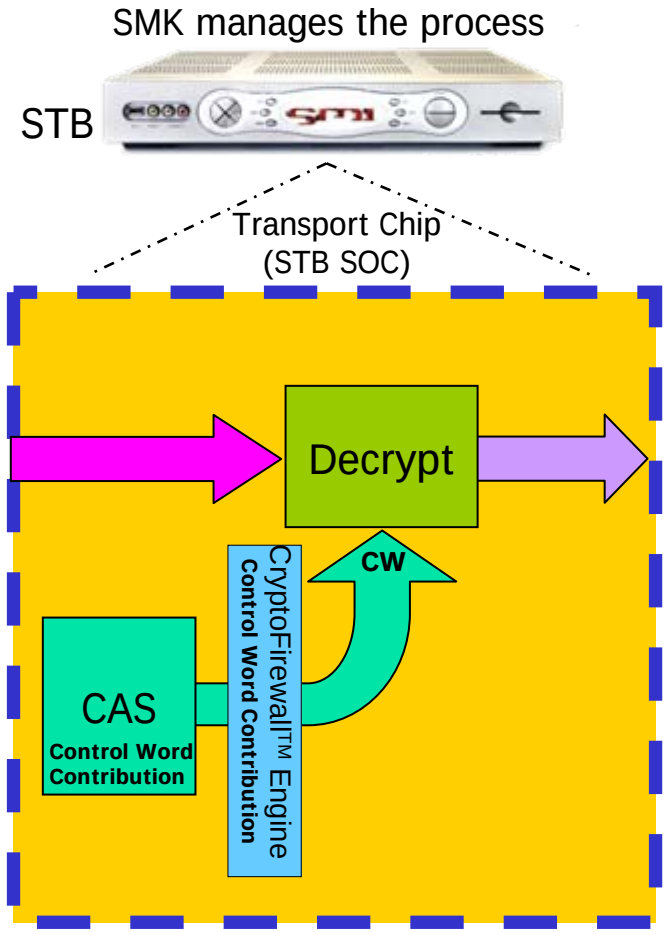
- CryptoFirewall and SypherMedia Kernel are independent technologies that work together
  - SMK can work on non-CryptoFirewall platforms, but the CF adds hardware security
  - CryptoFirewall supports other software/CA layers, but the SMK provides a complete solution
- CF+SMK are a compelling STB security solution:
  - Security enforced in silicon
    - Does not assume software is trusted
  - Supports all major distribution channels
    - Satellite, Cable, Digital Terrestrial, IPTV
    - Enables STB subscription, eliminates Free-to-Air STB attacks
  - Can be incorporated by any Transport Chip vendor
    - Designed for straightforward head-end integration
    - Complementary to CA systems and existing smart card functionality
  - Cost effective
    - Less expensive and more secure than separate chips/cards/modules

Overview

SypherMedia Gatekeyper generates and distributes encrypted keys

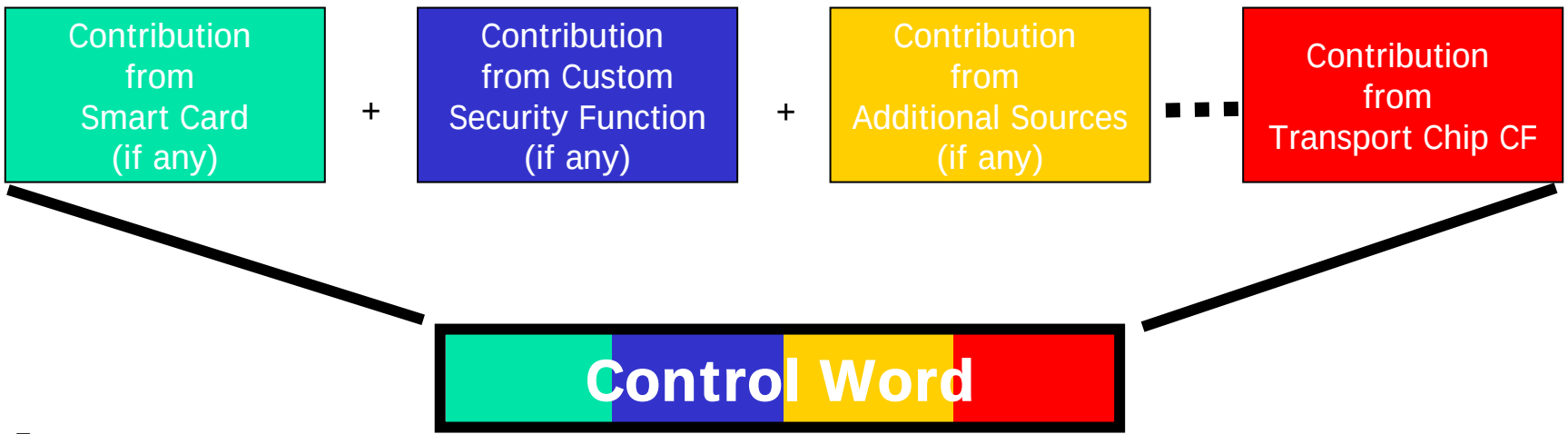


SMK manages the process



Control word generation

- Traditional control word generation consists of manipulating pre-existing bits in the ECM
- With this system, Control Words are no longer incorporated solely as part of the broadcast stream
  - Built “on the fly” from various contributors



Flexible key distribution

- System can be run by broadcast operators or the Conditional Access (CA) provider
  - Works in conjunction with but does not replace CA system
- HW enforced key distribution controlled by the SypherMedia Gatekeyper™ in the Headend
  - System employs bitmap technology for efficient service/channel allocation to key distribution
- CryptoFirewall™ core provides hardware enforcement of these policies
  - General addressed keys
  - Unique addressed keys
- Algorithmic separation between broadcasters and transport chip vendors

Development and integration

- Fab integrates CryptoFirewall™ with Transport Chip / STB SOC
  - Provides hardware security embedded in a single transport chip
  - STB unique keys delivered in Kernel section of EMMs
  - CryptoFirewall™ output mixed with final CA Control Word (if present) and fed directly into secure key cache
    - Hardware path
- STB cannot generate control words if it does not receive “renewals” from the SypherMedia Gatekeyper™ head-end
  - Eliminates use of FTA boxes
  - Eliminates Internet-based Dream Box attacks
  - Trusted silicon core for protecting IPTV platforms and other systems currently lacking hardware security

Business process

- CryptoFirewall is a selectable feature in Transport Chips / STB SOC
  - Purchasing process same as for optional chip features
  - Chip maker enables hardware fuse on chips where the license fee was paid
- Headend and STB/Transport design provided in general CF license at no additional cost
  - If custom solutions are required, SMI can develop headend and STB software for client for time & materials
- For more information on business and licensing:

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