Digital Addressable Controller (DAC)

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DAC Administrator
Digital Addressable Controller

- Set Top Box Requirements
- Components of an interactive network
- Set Top diagnostics
- CableCARDs
Digital Set Tops need:

- In Band data delivered by Headend Devices
  - MPEG2 Digital video stream
  - “Digital Lock” Encryption Code
- Out of band data delivered by an Out of Band Modulator
  - Code – Firmware, TVG Software, VOD Software
  - Service Authorizations
  - Maps
  - “Digital Key” Decryption Code
Set Top Commands

- **Types of Hits**
  - **COLD** – Flush and Fill code. Deletes personal settings
  - **INIT** – Loads code. Deletes personal settings
  - **HIT** – Update map and services
Digital Addressable Controller

- Holds and manages set top database
- Holds and distributes channel maps
- Creates encryption and decryption messages
- Polls set tops and collected PPV buys
The Interactive Loop

- Digital Set Top
- Return Path Receiver
- Network Controller
- Out of Band Modulator
The Interactive Loop

BILLING SYSTEM

ADDRESSABLE CONTROLLER

VIDEO HEADEND

VOD SERVERS

OOB MODULATOR

The Interactive Loop

NETWORK CONTROLLER

RETURN PATH RECEIVER

SET TOP BOX
Network Controller

- Assigns IP addresses for each set top
- Communicates with the VOD Server
- Adjusts return RF levels in the set top
Out of Band Modulator

- Delivers Addressable Controller Data
- Delivers VOD commands from Network Controller

Return Path Receiver

- Transports VOD and “Trick Play” requests to VOD Server
- Transports HIT and Poll responses to DAC
Set Top Box

- Contains up to three tuners – One for OOB Data
- Return Path Transmitter delivers a QPSK carrier between 8 and 15MHz, between 38 and 60dBmv
- Diagnostics can verify 2-way communications
## Set Top Diagnostics

### Forward – OOB Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OOB Frequency</td>
<td>075.25 MHz</td>
</tr>
<tr>
<td>Carrier Lock</td>
<td>YES</td>
</tr>
<tr>
<td>Data</td>
<td>YES</td>
</tr>
<tr>
<td>EMM Data</td>
<td>YES</td>
</tr>
<tr>
<td>SNR</td>
<td>22.1 dB</td>
</tr>
<tr>
<td>AGC</td>
<td>23 %</td>
</tr>
<tr>
<td>Network PID</td>
<td>100C</td>
</tr>
<tr>
<td>EMM PID</td>
<td>1003</td>
</tr>
<tr>
<td>EMM Provider ID</td>
<td>100A</td>
</tr>
</tbody>
</table>

### Return – Interactive Info

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Address</td>
<td>0.0.0.0</td>
</tr>
<tr>
<td>UPM</td>
<td>00000021</td>
</tr>
<tr>
<td>Upstream ID</td>
<td>0000</td>
</tr>
<tr>
<td>Downstream ID</td>
<td>0000</td>
</tr>
<tr>
<td>State</td>
<td>UNCONFIG</td>
</tr>
<tr>
<td>MAC Abort Counter</td>
<td>0000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socket Port State</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>UNUSED</td>
</tr>
<tr>
<td>1</td>
<td>UNUSED</td>
</tr>
<tr>
<td>2</td>
<td>UNUSED</td>
</tr>
<tr>
<td>3</td>
<td>UNUSED</td>
</tr>
<tr>
<td>4</td>
<td>UNUSED</td>
</tr>
</tbody>
</table>
Set Top Diagnostics

- **OOB Data**
  - Carrier Lock
  - EMM Data

- **Interactive Info**
  - State = RUNNING
  - IP Address Populated
CableCARDs

FCC Mandated
Separable Security
Required 7/1/07
CableCARD and Host

- **Hosts**
  - TVs
  - DVR/STB
  - Tivo

- **CableCARD**
  - Manages decryption
  - Receives channel map
  - Manages Copy Protection
CableCARD Types

- **S** – Single Stream
  - Supports One Tuner

- **M** – Multi Stream
  - Two Way
  - Multiple Tuners
CableCARD Initialization

- Cards received from manufacturer and entered into billing system by Warehouse

- CableCARD requires 3 HITs from the DAC:
  - INIT (initialization) hit – Configures card.
  - HIT - Sends map and services.
  - Validation hit – Validates card is useable.
Content Copy Protection

- CCI – Copy Control Information
  - Determines how Card to Host interface treats High Valued Services

- CCI Levels
  - Copy Freely
  - Copy Once
  - Copy Never

- CRL – Certificate Revocation List
CPMS

- Copy Protection Management System
  - Holds CRL
  - Deploys validation messages
CableCARD Validation

BILLING SYSTEM
ADDRESSABLE CONTROLLER
CPMS
OOB MODULATOR
NETWORK CONTROLLER
RETURN PATH RECEIVER
DCR TV
DVD RECORDER
CableCARD
BILLING SYSTEM
ADDRESSABLE CONTROLLER
CPMS
OOB MODULATOR
NETWORK CONTROLLER
RETURN PATH RECEIVER
DCR TV
DVD RECORDER
CableCARD
CableCARD Validation

- CableCARD Pairing Information
  - CableCARD number
  - Host number
  - Data number

In order to start cable service for this device, please contact your cable provider.

CableCARD(tm): 000-385-880-143-8
Host: 002-543-784-963-5
Data: 338-588-805-38

UnitAddress: 000-03858-80143-046

Press MENU to return
Cable module channels available
CableCARD Validation

- Manual Pairing-Validation
  - Use MMI (Man-Machine Interface)
  - Send Validation HIT

- Automatic Pairing
  - Available on 2-way hosts
  - Send a validation hit from billing system
  - Terminal will populate pairing information in the DAC and validate with the CPMS
Yet to Come

- DSG – DOCSIS Set-top Gateway
  - Replaces Out of band and Return path with DOCSIS path
  - Set Top box or host would need to be DOCSIS capable.
  - Will allow multiple vendor equipment to be used.
Questions?