

Digital Addressable Controller (DAC)

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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

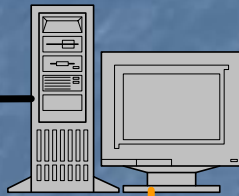
The Interactive Loop

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

BILLING SYSTEM



ADDRESSABLE CONTROLLER



VOD SERVERS



VIDEO HEADEND



OOB MODULATOR



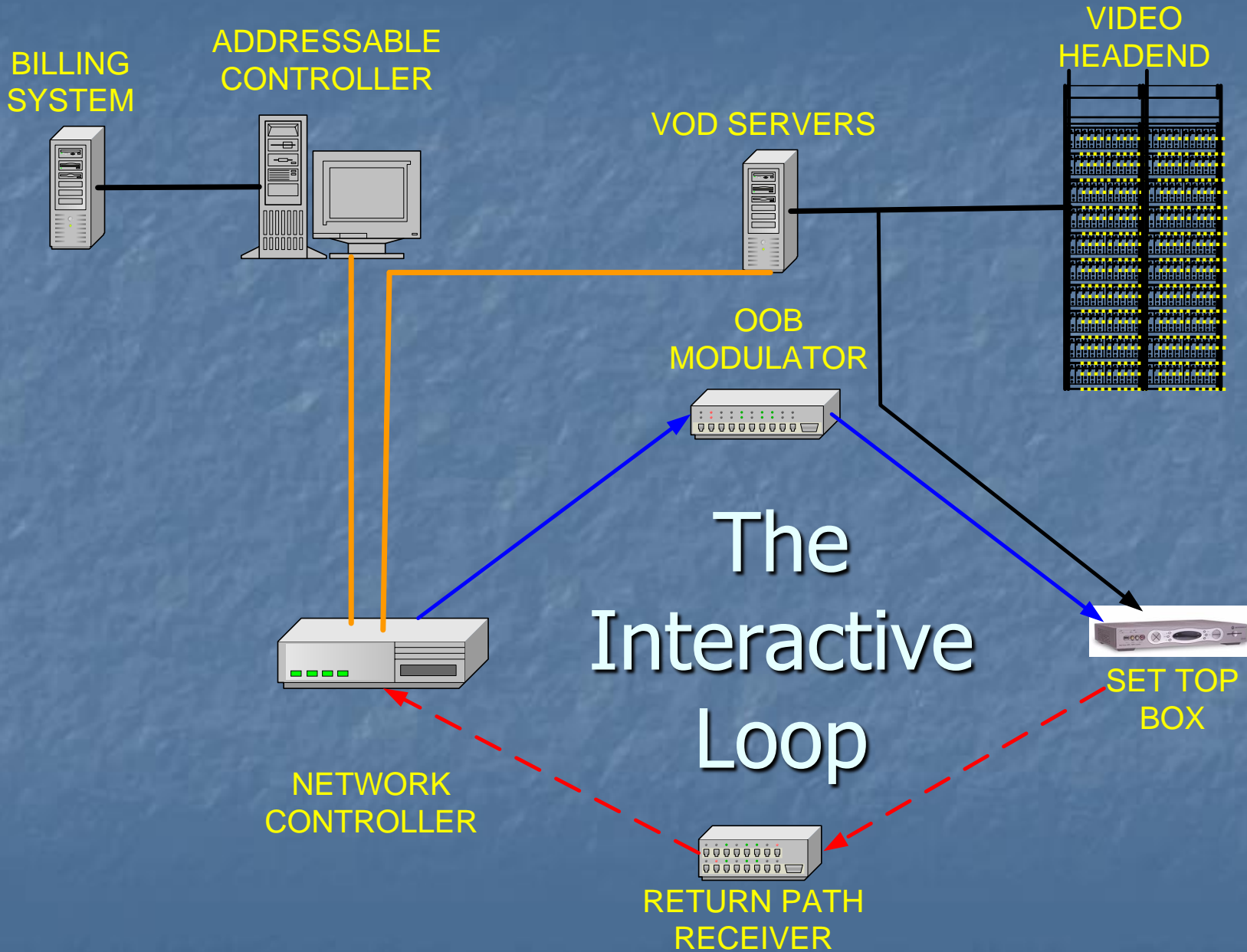
The Interactive Loop

NETWORK CONTROLLER



SET TOP BOX

RETURN PATH RECEIVER



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

OOB DIAGNOSTIC

OOB FREQUENCY:	075.25	MHz
CARRIER LOCK:	YES	
DATA:	YES	
EMM DATA:	YES	
SNR:	22.1 dB	GOOD
AGC:	23 %	FAIR
NETWORK PID:	100C	
EMM PID:	1003	
EMM PROVIDER ID:	100A	

INTERACTIVE INFO

IP ADDRESS:	0.0.0.0
UPM:	00000021
UPSTREAM ID:	0000
DOWNSTREAM ID:	0000
STATE:	UNCONFIG
MAC ABORT COUNTER:	0000

SOCKET PORT STATE:

0	UNUSED
1	UNUSED
2	UNUSED
3	UNUSED
4	UNUSED

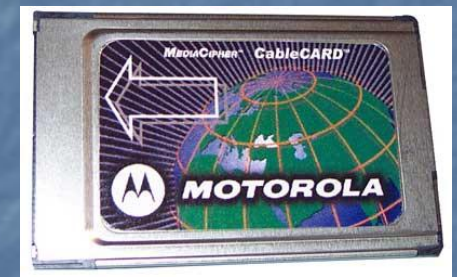
Forward – OOB Data

Return – Interactive Info

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.

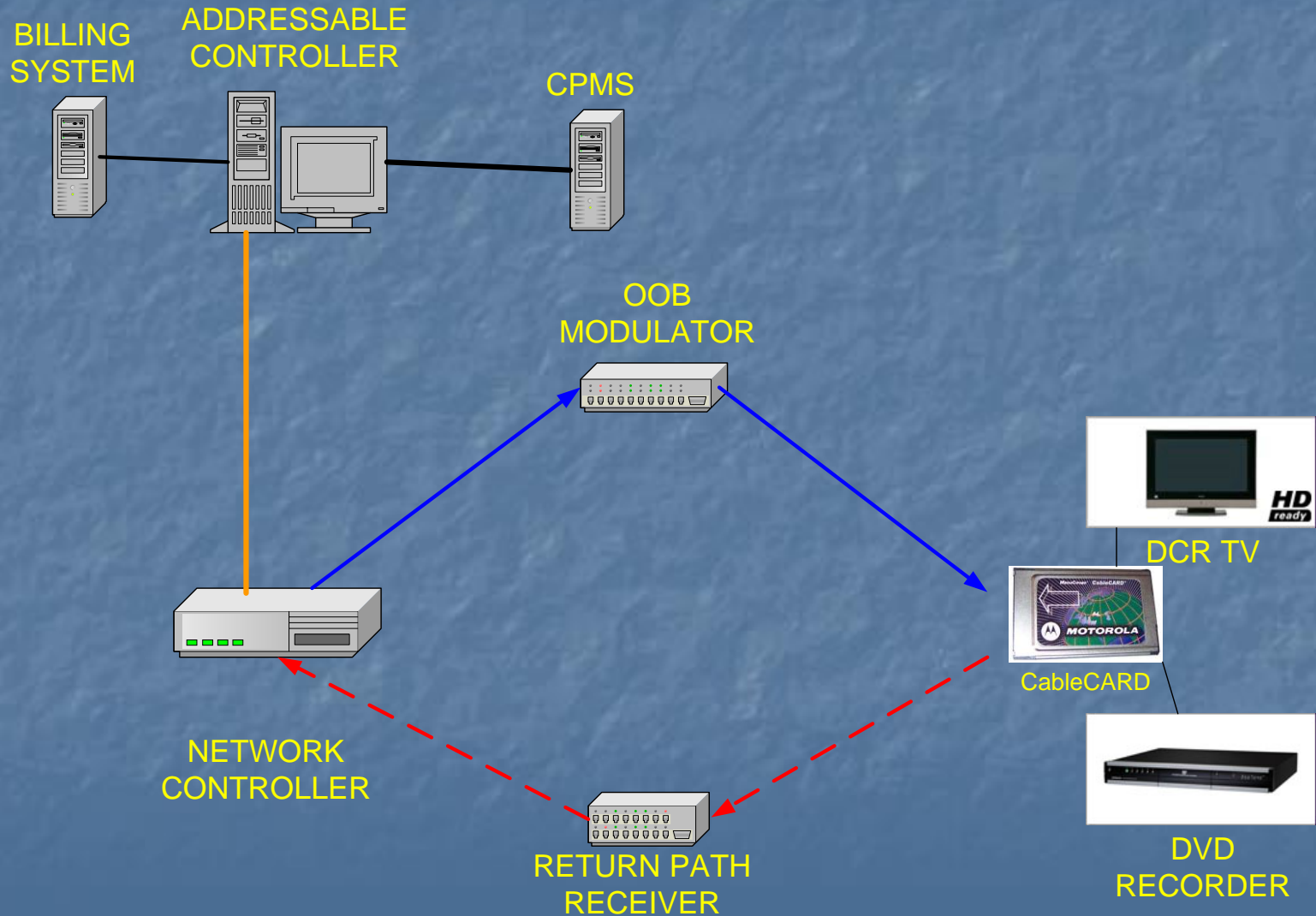
Content Copy Protection

- 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

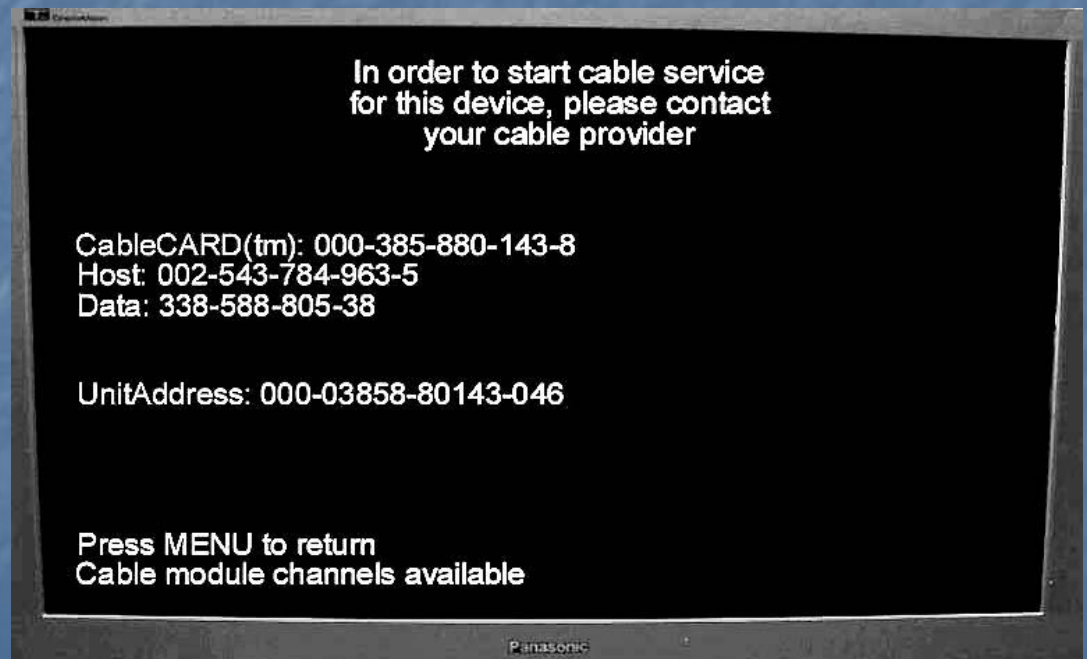
- Copy Protection Management System
 - Holds CRL
 - Deploys validation messages

CableCARD Validation



CableCARD Validation

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



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?