Putting 1394 in a Set-Top Box

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The Living Room Today
Analog Connections

STB

CD

DVD

VCR

TAPE

RECEIVER

TV

∿ LANC
∿ Audio (L)
∿ Audio (R)
∿ Video
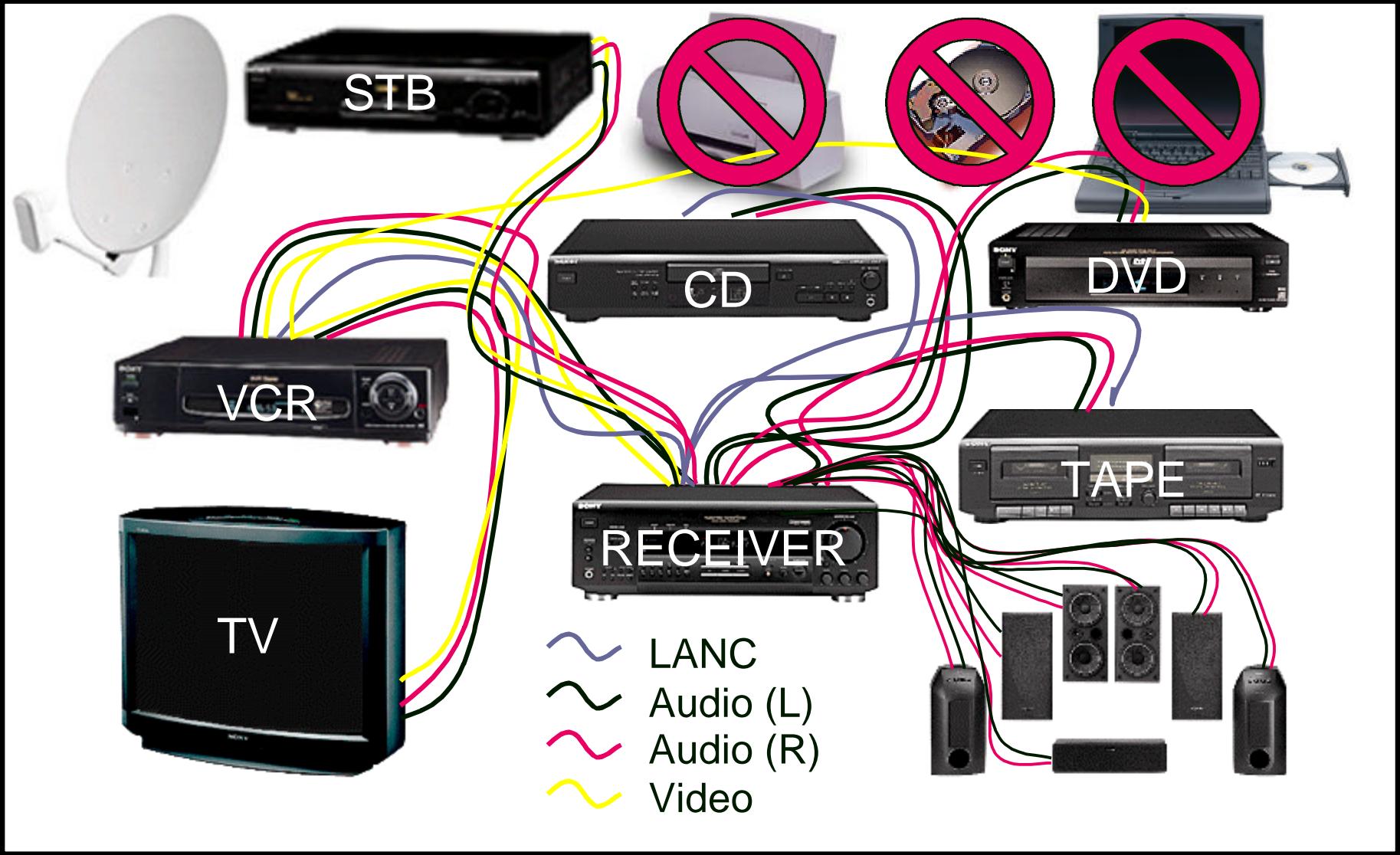
The Living Room Tomorrow

Digital Connections

DSTB

CD

DVD

DVCR

DAT

RECEIVER

DTV

~1394

Digital vs Analog
Advantages

- Easy to Configure
  - Single Connection Between Devices Capable of Transmitting Audio, Video and Control Data
  - All Devices "See" Each Other on the Bus
- Better Quality of Material
  - Better Signal from Transmitter
  - No Conversion Loss for Display
  - No Artifacts of Analog Recording Media

Digital vs Analog
Advantages Continued

- Easy to Upgrade

- Able to "Bridge the Gap" between PC and Consumer Devices

- Opens New Possibilities

The Digital Consumer
Scenarios

- **Same Features as Today**
  - ◆ "Time Shift"
  - ◆ Record One Show, Watch Another
  - ◆ Picture-in-Picture
- **New Features**
  - ◆ "Real-Time Pause"
  - ◆ Live Video Display (Video Conferencing)
  - ◆ New Storage Mediums (HDD, DVD, CD-ROM)

Standards

PC

Device Bay	SBP-2	RBC
IETF -IP/1394	MMC-2	

1394

1394-1995	P1394b	P1394.1
P1394a	Power Mgmt.	P1212r

Consumer

IEC61883	EIA R-4.7	CPTWG/5C	Camera Spec
VESA-HN	EIA R-4.1	DAVIC	HAVi

Working	Frozen	Official

Standards

Standards related to 1394 specifically

- IEEE Std 1394-1995

- Power Management
  - Cable Power
  - Suspend / Resume
  - Power State Management
- P1212r

Standards

1394 Standards and Consumer Devices

- IEC-61883
- EIA R-4.7, R-4.1
- CPTWG / 5C
- HAVi
- CableLabs
- IETF - IP/1394
- VESA HN

Standards

1394 Standards and Consumer Devices

- **IEC-61883**
  - ◆ Describes Packet Format, Data Flow Management, and Connection Management
  - ◆ Defines Connection Management Protocol (CMP)
  - ◆ Defines Function Control Protocol (FCP)
- **EIA R4.7 - R4.1**
  - ◆ 1394 Specified as the DTV Connection
  - ◆ AV/C or CAL?

Standards

1394 Standards and Consumer Devices

- CableLabs
  - ◆ OpenCable Specifies 1394
  - ◆ Network Architecture Being Defined
- Home Audio/Video Interoperability Architecture
  - ◆ Addresses Legacy Devices prior to HAVi
 - ◆ Defines API for Tuner and VCR

Standards

1394 Standards and Consumer Devices

- ## IETF - IP/1394

  - ◆ Defines Internet Protocol (version 4) over IEEE 1394

- ## VESA HN

  - ◆ Defines Interoperability Specification for Multiple Devices
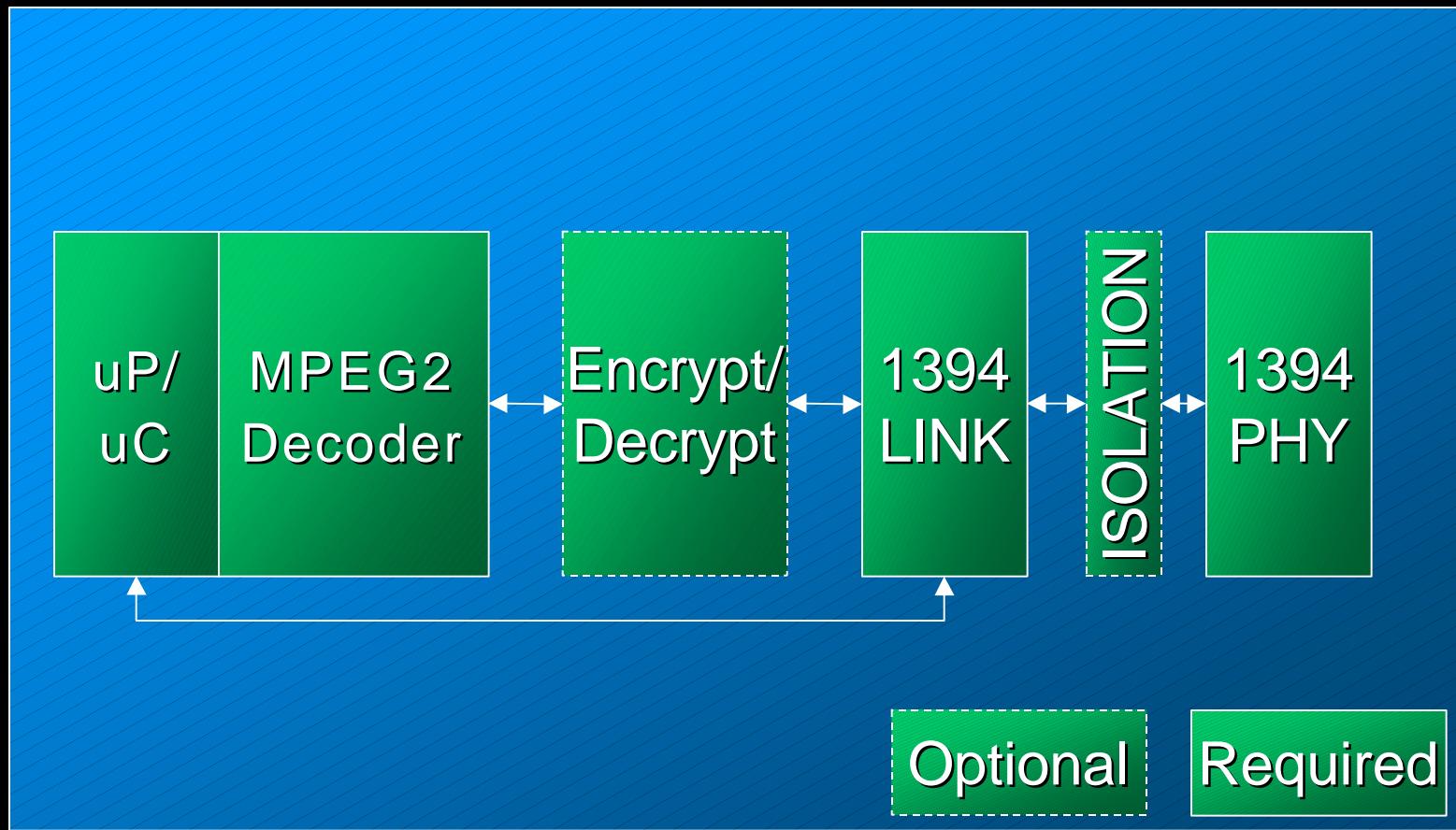
Link Layer
Features

- High Speed Interface for MPEG, ISO, and ASYNCH data

- uC/uP Interface for Control

- Able to Handle Bi-Directional MPEG Data

- Conform to IEC61883 for communication with DVCR, DTV

- Able to Implement Isolation

Physical Layer
Features

- Two or Three Ports for Daisy-Chaining or Branching

- Low Power Consumer

- S200 Minimum, S400 Pass-Thru

- Able to Implement Isolation

STB Solution
Texas Instruments

- **Link Layer**
  - TSB12LV41 - MPEG2Lynx
- **Physical Layer**
  - TSB41LV02 or TSB41LV03
- **Isolation**
  - TI Bus Holder (Single Capacitor) Isolation

Texas Instruments STB Solution

TSB12LV41 - MPEG2Lynx

- Multi-mode 8/16 bit µC/µP interface supports multiple controllers including Motorola's 68XXX and Intel's 80XX architectures

- 8k x 8bit FIFO supports full bi-directional Asynchronous, Isochronus, and DVB/DSS data

- Interfaces directly to TI's TSB11LV01, TSB21LV03, and TSB41LV0X physical layer (PHY) devices at 100/200 Mbps transfer rates

Texas Instruments STB Solution

TSB41LV0x
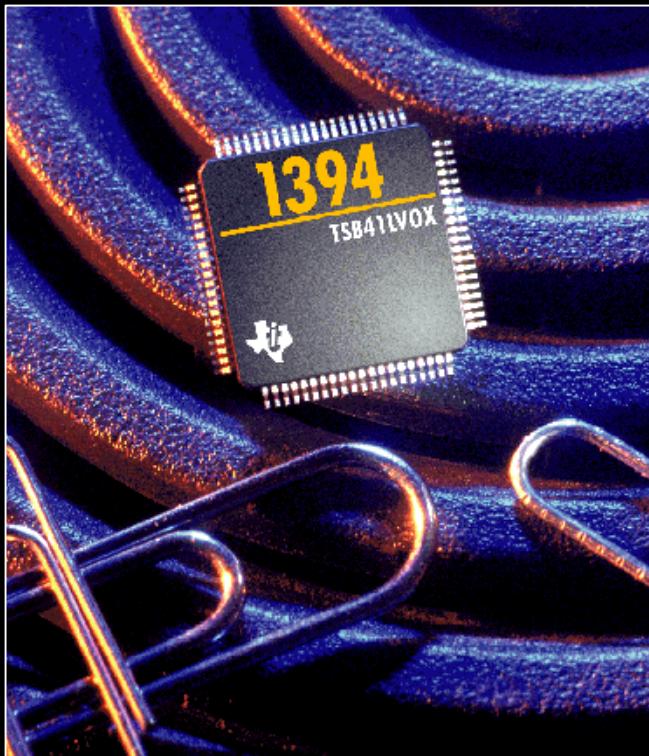
- Devices will be offered in multiple pin count/package types with 2,3,4, & 6 ports to fit a variety of applications

- Interfaces directly with TI's link layer devices and will support serial bus data rates of 100, 200, and 400 Mbps

- Provides bus holding buffers for simple and cost effective single capacitor isolation

For More Information
Web Sites

- www.ti.com/sc/1394
- www.1394ta.org
- www.ietf.com
- www.opencable.com
- www.vesa.org
- www.intel.com/solutions/archive/issue7/stories/top4.htm