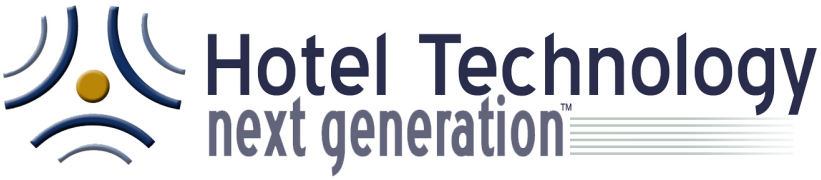

Minimum Specification of Next Generation In-room IP Set Top Box

Version 1.0

20-Feb-2008

In-room Technology Workgroup
Application and Device Integration Team

About HTNG

Hotel Technology Next Generation ("HTNG") is a nonprofit organization with global scope, formed in 2002 to facilitate the development of next-generation, customer-centric technologies to better meet the needs of the global hotel community. HTNG's mission is to provide leadership that will facilitate the creation of one (or more) industry solution set(s) for the lodging industry that:

- Are modeled around the customer and allow for a rich definition and distribution of hotel products, beyond simply sleeping rooms;
- Comprise best-of-breed software components from existing vendors, and enable vendors to collaboratively produce world-class software products encompassing all major areas of technology spending: hotel operations, telecommunications, in-room entertainment, customer information systems, and electronic distribution;
- Properly exploit and leverage a base system architecture that provides integration and interoperability through messaging; and that provides security, redundancy, and high availability;
- Target the needs of hotel companies up to several hundred properties, that are too small to solve the issues themselves;
- Will reduce technology management cost and complexity while improving reliability and scalability; and
- Can be deployed globally, managed remotely, and outsourced to service providers where needed.

In June 2005, HTNG announced the first-ever "Branding and Certification Program" for hotel technology. This program will enable vendors to certify their products against open HTNG specifications, and to use the "HTNG Certified" logo in their advertising and collateral materials.

It will enable hotels to determine which vendors have completed certification of their products against which specific capabilities, and the environments in which performance is certified. HTNG's vision is to achieve a flexible technical environment that will allow multiple vendors' systems to interoperate and that will facilitate vendor alliances and the consolidation of applications, in order to provide hotels with easily managed, continually evolving, cost-effective solutions to meet their complete technology needs on a global basis.

Table of Contents

1 Document History

1.1 Document Changes

Version	Date	Author	Comments
1.5 Draft	1/13/2008	V Ogle	
1.6 Draft	1/15/2008	B Fang	Added changes and comments from HTNG Dallas meeting
1.7 Draft	1/20/2008	B Fang	Transposed to HTNG preferred document format
2.0 Draft	2/17/2008	V Ogle	Added final corrections from HTNG feedback
1.0 Final	2/25/2008	V Ogle	Final

2 Document Information

2.1 Document Purpose

The purpose of this document is to provide a specification for implementation of the HTNG open-standards solution for a In-room high definition IP set top box.

This specification was developed by the Application and Device Integration Team of the HTNG In-Room Technology

2.2 Scope

The scope of this document includes, directly or by reference, all information required to implement a HD IP Set Top Box as described. It does not include information needed to implement other specifications developed by the HTNG In-Room Technology Workgroup.

2.3 Audience

The intended audience of this document is developers wishing to implement a HD IP Set Top Box.

2.4 Overview

Section 3, Business Processes, defines how the Set Top Box is used in a typical hotel environment.
Section 4, Matrix outlines the feature set required for the Set Top Box

2.5 Document Terms

For the purpose of this document the following terms have been defined as follows:

Term	Definition
Mandatory	This feature must be supported in order to meet the requirements of this specification.
Optional	This feature should be supported if possible (desirable) but is not a mandatory requirement of this specification.
STB	Set Top Box
IAP	Intelligent Auxiliary Panel
VOD	Video On Demand
API	Software Application Programming Interface
MiddleWare	Software resides between the device driver software and the application software
IP	Internet Protocol
RF	Radio Frequency (Typical Analog Modulation Schema)

2.6 Referenced Documents

The following table shows the documents upon which this document depends:

Name	Location
HTNG Intelligent Auxiliary Panel Specification Version D	ADI Workgroup, 15 Jan 2008, www.opengroup.org
White Paper, Next Gen Converged Media STB, Guest Room Technology Convergence	HTNG, In-Room Technology group, June 19, 2006

3 Scope

The document scope includes the design and specification of a next-generation high-definition IP set top box for the Hospitality Industry (STB).

A key requirement is that this device will be able to support IP streaming over Ethernet and Coax. The product must be able to host the necessary hospitality applications. The provision for RF input is an option in this document to accommodate possible hybrid architectures that may be used to accommodate existing building infrastructure. The hybrid architecture may have separate features using different transportation methods to the room (ie:Video over traditional QAM and IP data and Menus over DOCSIS).

This specification includes all variations of mounting for these type of devices, Set Top, Set Back, and Integrated. The nomenclature STB is a generic term meant to encompass the technical aspects of the product, regardless of mounting structure.

3.1 Inputs and Outputs

On each Set Top Box (STB), the Hotelier needs to evaluate the required inputs and outputs that fit the in-room environment. These I/O's relate to Video, Audio, Control, Network, and power. The combined I/O of the system selected is critical. The Auxiliary Panel, Display Device, Remote Control, and STB need to be tested as a system prior to final selection and installation.

Inputs		
Audio/Video Inputs	**Input Type**	**Connector Type**
RF Input	Optional ATSC / QAM / (NTSC or PAL) /DVB	F Connector
HDMI	Auxiliary Panel Support or Direct A/V input	HDMI 1.3
Analog Audio	Stereo Audio	3.5mm Mini-Jack or RCA
Networking		
IP Networking	RJ45 -100 Ethernet	RJ 45
IP over COAX	DOCSIS 2.0 or EURODOCIS 2.0	F Connector
Control and Power		
MTI Port	Hospitality control for Display and PPV	RJ 12 (2)
USB	USB 2.0 (x2)	USB 2.0 (2)
IR Input	TTL or IR	
RS 232	Serial Control	D-Sub 9 Pin
AC Power	110/220 Power Supply	

Outputs		
Video Outputs	**Output Type**	**Connector Type**
HDMI	HDCP	HDMI 1.2/1.3
Audio Outputs		
Analog Audio	L/R Audio output (for DVI-HDCP devices)	RCA (2)
Digital Output	S/PDIF or Optical	RCA (1) or Optical jack

Optional Configuration

Networking	DOCSIS or EURODOCSIS Interface for IP over RF cabling Ethernet Switch with VLAN and QoS support RF Tuner input to support Hybrid architecture

NOTE: While DOCSIS/EURODOCSIS may be used to deliver IP to the room over COAX cabling, it is up to the VOD vendor to choose the interaction of their Hybrid architecture. Many hybrid architectures at this time are planning to use the COAX cabling (DOCSIS) to transfer menu data and command structure and the video will remain on the non-DOCSIS transportation (traditional QAM). Note that bandwidth constraints of different coaxial cable topologies should be taken into account.

3.2 Supporting of CODECs and Media

Decoding of content encoded in the following formats/codecs:

- Video:
  - MPEG-2 4:2:0, SD MP@ML and HD MP@HL (transport streams)
  - MPEG-2 decoding compliant with specifications ISO/IEC CD 13818-1, ISO/IEC CD 13818-2 and ISO/IEC 13818-3.
  - H.264 (MPEG-4, Part 10)
  - Windows Media 9 (Optional)

- Audio:
  - MPEG-1 (layer 2)
  - AC-3
  - MP3 (MPEG-1 layer 3)
  - AAC
  - WM9

- Video resolutions:
  - NTSC (480i)
  - PAL (576i)*
  - 480p
  - 576p*
  - 720p
  - 1080i
  - 1080p (Optional)

- Audio modes:
  - Stereo
  - Dolby Digital 5.1
  - Downmix of 5.1 channels to 2 channel Stereo

- Aspect Ratios:
  - 4:3
  - 16:9 letterbox format

3.3 Software

The software on the STB platform is one of the most difficult to understand and the most critical for reliable performance. It is vital that one company take full responsibility all of the software related to basic STB performance (Drivers, API, MiddleWare, Browser Interface). There will be third party applications (from VOD vendor or Content provider) that will reside on the STB API interface. The application on the browser layer will create the user interface for the guest and the hotelier.

The below recommendations are only to give the hotelier a frame of reference for basic system performance and requirements. There is no replacement to speaking with your Service Providers (VOD and Display Device vendors) to select a STB product that is integrated and tested with their equipment and systems. Each individual feature offered to the guest is dependent on the offerings of each Video on Demand supplier. There are many possible architectures that will give you this basic functionality. Each VOD vendor may also have their own specifications required on security or performance to work with their current content contracts and streaming servers.

- Display and GUI support, technologies such as:
  - Browser
  - HTML 4.0
  - ECMA-262 (JavaScript 5.5)
  - Flash 6.0 or above plug-in
  - 32 bit graphics overlay with frame buffer access

  NOTE: This browser support may only be used by the VOD vendor for menus. There is no obligation of the VOD vendor to offer guest browsing. Please discuss guest access requirements with the VOD Vendor.

- IP Networking supported via the following:
  - TCP/IP
  - NTP
  - DHCP
  - IGMP

- IP Streaming supported via the following:
  - Unicast/Multicast (UDP)
  - Real-Time Protocol (RTP)
  - DHCP
  - RTSP

- Control
  - RS 232 Interface Protocol Specification (Vendor Specific)
  - Smart Port/MTI/MPI control protocol (Vendor Specific)
  - HDMI CEC protocol including the "to be determined" Lodging extension (Optional)

- Security:
  - 128 bit decryption
  - Session based Watermarking (Optional)
  - HDMI with HDCP to protect video output

  NOTE: The 128 bit decryption may be implemented in hardware or software. These implementations may not compatible.

4 Specification Matrix

AUDIO/VIDEO/GRAPHICS	Current	Future
CODECs (*MPEG2, H.264 MPEG4 Part 10*	✓	✓
Codec's VC-1	·	✓
16 x 9 and 4 x 3 Format	✓	✓
Video (*720p and 1080i, NTSC/PAL)*	✓	✓
Audio (*MPEG1 level2, AC-3, MP3, AAC, WM9)*	✓	✓
Graphics/Text/OSD (720p full screen)	✓	✓
Unicode/Double Byte Support	✓	✓
Video (720p, 1080i and *1080p)*	·	✓
Graphics/Text/OSD (1080p full screen)	·	✓
Unicode/Double Byte Support with bi-directional text rendering algorithm	·	✓

CONNECTIONS	Current	Future
HDMI 1.2 output	✓	✓
Network Port- RJ-45 Connector, 100Mbps or RF DOCSIS 2.0/EuroDOCSIS 2.0 *(or compatible with DOCSIS or EuroDOCSIS*	✓	✓
Serial RS232/SmartPort/MTI/MPI lodging display controls (including IR passthrough from TV)	✓	✓
USB 2.0	✓	✓
RF input for hybrid architecture (QAM, ATSC, NTSC, PAL, DVB)	Optional	Optional
HDMI 1.3 with active CEC display control	·	✓
Audio Outputs – Analog (*3.5 mm Mini-Jack) / Digital (S/PDIF, RCA)*	✓	✓
2nd Ethernet - RJ-45	·	✓
(Ethernet Bridge with VLAN support and QoS)	·	
HDMI Input – AUX Panel Connectivity	✓	✓
Wireless - 802.11a/b/g/n, USB wireless or Zigbee	·	✓
Serial Control (full RS-232 specifications/third party applications)	✓	✓
IR/RF/Bluetooth/Zigbee Control	·	✓
Additional USB 2.0	·	✓

PROCESSING	Current	Future
300 MHz MIPS / 200 MHz DDR Memory Interface *(or similar performance)*	✓	
64 MB DRAM/16 MB Flash Memory	✓	
Simple Browser support (System to display Opera 9 or equivalent)	✓	✓
Browser supports HTML 4.0	✓	✓
Browser supports ECMA-262 (JavaScript 5.5)	✓	✓
2D Hardware Graphics Acceleration	✓	✓
500 MHz / 333 MHz DDR Memory Interface (or similar performance)		✓
Browser supports Flash 6.0 or above		✓
3D Hardware Graphics Acceleration		✓

DIGITAL RIGHTS MANAGEMENT	Current	Future
AES 128 DRM or equivalent in software or hardware implementation	✓	✓
HDCP	✓	✓
Forensic Water-Marking (*8 digit minimum, unique identifier, analog survivable)*		✓