



**Device Controls Integration Workgroup
Device Messaging Structure
(DCI DMS)**

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About HTNG

Hotel Technology Next Generation (HTNG) is a non-profit association with a mission to foster, through collaboration and partnership, the development of next-generation systems and solutions that will enable hoteliers and their technology vendors to do business globally in the 21st century; to be recognized as a leading voice of the global hotel community, articulating the technology requirements of hotel companies of all sizes to the vendor community; and to facilitate the development of technology models for hospitality that will foster innovation, improve the guest experience, increase the effectiveness and efficiency of hotels, and create a healthy ecosystem of technology suppliers.

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1 Document History

1.1 Document Changes

Version	Date	Author	Comments
0.9	17/02/2010	M Linck	Public Release Draft
0.92	25/05/2010	J Buenviaje	Minor edits and additions in section 4
0.93	09/06/2010	M Linck	Revisions from Zug – section 3 purpose and revision process
0.94	03/08/2010	M Linck / J Buenviaje	Updated Value Ranges
0.95	08/09/2010	J Buenviaje	Included partial template for message line items in 4.1
0.96	14/10/2010	M.Sorce	Message structure Framework–Expanded section 4
0.97	17/12/2010	J.Fenno /M.Sorce	Section 4.3 clarifications -
0.98	10/1/2011	M.Sorce	Document re-organization – clean-up
0.99	25/2/2011	Jon Buenviaje	Moved Use Case section and modified the intro to that section. Expanded on definitions section. Other minor formatting
1.00	15/3/2011	Jon Buenviaje	Minor formatting. Edits and comments from San Diego F2F meeting incorporated.

2 Document Information

2.1 Document Purpose

To provide a defined message set for the interoperability of In-Room Devices and Controls.
For Vendors:

1. To provide the description of the interface required at a functional level.
2. To provide a framework for technology neutral application interoperability.

For Hoteliers:

1. To provide a basic design specification for possible use in an RFP or as part of a checklist for development.
2. To provide hoteliers with a technology neutral framework to actively describe functionality.

2.2 Scope

In 2009 the former In-room Control Integration (ICI) Team (now Device Control Integration Workgroup) developed a base profile of devices and controls found in the typical guestroom. This document captures the messages and defined values that those devices and controls should utilize to insure full interoperability.

2.3 Audience

The initial public draft is for review by the general HTNG Membership. The workgroup looks forward to review comments from HTNG's membership.

2.4 Overview

The Device Control Integration - Device Messaging Structure (DCI-DMS) is a living document and will be expanded to include additional messages, values, devices and controls as the workgroup see fit. The DCI-DMS is not intended to replace existing industry standard transport protocols, rather to provide as a dictionary of messages and values for manufacturers and hoteliers developing and selecting products for the hospitality industry. It is also the intent of the workgroup to work with various industry standard transport protocol to ensure compatibility with the DCI-DMS.

2.5 Document Terms

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

Term	Definition
ADA	American Disabilities Act
DND	Do-Not-Disturb
HVAC	Heating Ventilation Air Conditioning
MUR	Make-Up-Room
PMS	Property Management System
ZCL	ZigBee Cluster Library

2.6 Device Types Included in the DCI DMS

1	Door Lock	Completed
2	Key	Completed
3	Thermostat	Completed
4	Lighting	Completed
5	DND-Housekeeping	Completed
6	Mini-bar	Completed
7	Safe	Completed
8	Occupancy Detection	Completed
9	Energizer	Completed
10	Drapes Control	Completed
11	Alarm Clock	Completed
12	Water Detection	Completed
13	Lanai-Window Monitor	Completed
14	Coffee Maker	Completed
15	Phone	Completed
16	Entry Camera	Completed
17	Location Service	Not implemented
18	Audio Control	Completed
19	Television Integration	Completed
20	Voice Activation	Not implemented
21	Portable Remote Control	Not implemented

3 Business Process

3.1 Overview

The Device Control Integration Workgroup has developed the DCI-DMS to ease the complexity of integrating devices from multiple vendors in turn lowering the cost of building interoperable guestrooms.

3.2 Use Cases

The following Use Cases were defined by former In-room Controls Integration Team on January 25, 2008. Use Cases based on events originating inside of the guest room are addressed by this document. Use Cases based on events originating outside of the guest room have been addressed and expanded by the Guest Room and Status Messaging Workgroup.

3.2.1 Use Cases Based on Events Originating Outside the Guest Room

1. Check-in guest at front desk (or kiosk, etc.) – provision rooms per specifications. Specifications may be static (e.g. at a lower end hotel) or may be customized to the guest (at a luxury hotel) or to time of day or other factors. Program TV settings such as welcome message, language settings, input channel, brightness/contrast and volume depending on user preference.
2. Check-out guest at front desk (or video check-out, kiosk, etc.). De-provision the room devices e.g. lights, thermostats, TV, resetting them to a known state. Also potentially verify that the safe is open and alert guest/staff if not; and verify whether in-room refreshment center has been opened since it was last checked, so guest can be asked whether anything was consumed.
3. Move guest from one room to another – basically check out of one room and into another.
4. Pre-block room – when a hotel pre-assigns a guest to a specific room, that room can be pre-provisioned at a specific time (possibly based on the guest's expected arrival time, if known). This may include preprogramming the door lock to recognize a card or device, such as mobile phone, that the guest is carrying with them, so that they can bypass the check-in process altogether.
5. Verify status of devices in a guest room to determine that they are responsive and that there are no known faults. This could be done on a polled basis periodically, at check-in (to prevent checking a guest into a defective room), or at check-out (to dispatch engineering while the room is vacant). Open trouble tickets as necessary.
6. Initiate check-in of preapproved/preblocked guest from door lock when guest activates lock with a card, mobile phone, etc. that he/she is already carrying.
7. Make room and devices inaccessible to guest, for example when you want to lock out a guest with a credit problem so that they have to come to the front desk.
8. An external event occurs based on staff decision, climatic conditions, etc., that requires guest-room devices to change their state. For example, a desert resort might want to close all of the drapes in unoccupied south-facing rooms between certain hours of the day, based on outdoor temperature and sunlight. An emergency evacuation would also fit into this use case.
9. Change room status. Any event that changes the status of the room in ways that would cause default device settings to change – e.g. occupied, rented but unoccupied, vacant, out-of-order/do-not-rent, seasonally closed, etc. Note that some of these change might be driven from inside the room as well as from outside.

3.2.2 Use Cases Based on Events Originating Inside the Guest Room

1. Device detects a problem and opens a trouble ticket, or finds that the condition has cleared, and closes it. Examples would be battery low (need to notify engineering), or door ajar (perhaps notify guest on television).

2. Key inserted in door lock. Different situations depending on whether it is the guest's key, a staff key, or an invalid key. Information needs to be delivered to lock system but may also need to activate room devices e.g. lights, and enters into the intelligent determination of whether a guest room is currently occupied.
3. Occupancy detector senses status change (senses motion, or senses that no motion has occurred for a long enough period of time)
4. Doorbell pushed. This may play an audible signal in the room, but may do something different based on the setting of the Do Not Disturb light, or on the presence of ADA devices within the room.
5. Guest manually sets do-not-disturb or make-up-room light. DND might cause the phone system to hold calls; MUR might alert housekeeping.
6. Telephone rings. This could be used to, for example (and possibly based on guest preferences) to automatically mute the audio system or TV or turn on the Do Not Disturb light.
7. Telephone on or off hook. Same possibilities.
8. In-room refreshment center door opened/closed. This could trigger an action to turn on the TV and advise/warn the guest of the cost.
9. Safe door opened/closed; log event.
10. Window or lanai door opened/closed. This could cause HVAC to shut off or turn on, and could cause a change in the inferred occupancy status of the room.
11. Guest changes thermostat setting.
12. Someone presses a button or switch on a device in the room (thermostat, remote control, telephone, TV, etc.) and in doing so provides evidence that the room is occupied.
13. Door opens or closes; could cause a change in the inferred occupancy status of the room.
14. Guest enters a command on a generic controls keypad, to cause a change in state of a "foreign" device (one that the keypad cannot natively control).

3.3 Implementation/Deployment Requirements

This document represents a superset of functionality typically found in in-room applications. Vendors and hotels are encouraged to implement the highest possible level of functionality, in order to facilitate simpler planning and acknowledging some limitations, the DMS allows for several levels of certifications. Hotel brands, owner groups and individual properties can specify a subset of the DMS certification levels and depend on the specific needs. The identification and selection of the functions that are required to be deployed are negotiated between the hoteliers and vendors and are outside the HTNG realm. The workgroup strongly wishes that additional functionality and features that are being negotiated between the hoteliers and vendors are considered for donation into future revisions of the DMS specification. To facilitate this, the DMS will allow for reserved code spaces that can be used ad interim between a proprietary implementation and the final ratification into the DMS specification.

Upon release of the DMS, the workgroup will be in maintenance mode. In order to enhance the DMS specification, HTNG will designate a committee of hoteliers and vendors that will regularly convene to review submissions of additional functionality. This team shall be comprised of five voting members. The team shall be formed at the time the DMS is released. Over time, the Infrastructure and Device Forum chairs will appoint new members into this committee as required.

Submission of new materials, proposals and change requests will be accepted via a published email address managed by HTNG staff. A formal review of new submissions will be held six months after the initial DMS release, and thereafter follow a yearly pattern. It is desirable that this yearly review be held alternating in the Americas and Europe, ideally around the September and October meetings respectively. The review produces a new revision which will be followed by a 30 day review phase to request comments of the Infrastructure and Device Forum members. The committee will review the comments, update the document and publish a final draft once more for 30 days for final comments. Lacking additional inputs, the updated draft will be voted on by the Infrastructure and Device Forum members.

3.4 Certification

Certification doesn't apply to this initial release but is planned for a future release.

4 Messaging Structure

4.1 Message definition nomenclature

Each message should begin with a header that would contain high level message information, addressing information and, authentication information. The actual payload associated with message typically follows the header and may be of variable size.

Since the actual definition of the header is often times associated with the technology used it is outside the scope of this document to define header message structure. When using web services we recommend referring to HTNG Header definition.

In this document we will focus on defining the Message payload which, is inspired by the ZigBee Cluster Library (ZCL) attribute record format. While this method of payload encoding incurs some extra overhead, it does provide a high degree of flexibility and facilitates forwards and backwards compatibility while being technology agnostic.

4.2 Attribute Record Format

Each attribute record begins with a 16-bit identifier, followed by a 1-byte attribute data type descriptor, and, then by the value of the attribute. For example, in 'C' we can define the Device ID as

unsigned short DeviceID;

To do the same, a system/message specific attribute ID is used to uniquely identify this record (unsigned short in this case) followed by the actual value.

2 bytes	1 byte	Variable
Attribute identifier	Attribute data type <i>UINT16 in this example</i>	Attribute Data <i>2 bytes in this example</i>

Message specific payload may contain any number of attribute records. A special attribute, EOS (End of Stream), will signal the end of stream. For example, lock audit messages may contain several records of the same type, (each audit actions), within a single message.

4.3 Attribute Identifier Format Definition

Each attribute record will contain an Attribute Identifier of 2 bytes which will represent a unique message. Following is the bit format of the Attribute identifier along with some proposed values and example of sample values:

Class Attribute Type Identification (CATID)

MSB		16 Bits										LSB			
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Type		Message Class						Message Class Sub-item Index							

Field Name	Description
Type	This field identifies the type of the message 0x00 = Status message 0x01 = Command 0x02 = Event 0x03 = Vendor specific
Message Class	This field identifies the major class of devices that the message is for. 0x00 = Reserved for system 0x01 = Lock 0x02 = Lighting 0x03 = HVAC ...
Message Class Sub-item Index	This field identifies a specific command, event, or status 0x00 = Reserved for transaction ID 0x01 = Thumbturn 0x02 = IsDoorAjar 0x03 = ... 0xFF = Message EOS

For example, a Thumbturn Event message attribute identification from a Lock system would have the following identifier value: 0x8101.

To simplify, for the first 16 classes or types of system, the first nibble of the MSB-byte (left) of the CATID is as follow:

- 0xC = Vendor Specific up (where y=0 first 32 classes)
- 0x4 = Command (where y=0 first 32 classes)
- 0x8 = Event (where y=0 first 32 classes)
- 0x0 = Status

The second nibble of the MSB-byte (left) of the CATID is equal to the Message Class ID. In our example, Message Class ID = 01 was the Lock system.

4.4 Common Reserved Attributes

To facilitate the processing of messages the following common reserved attributes are defined:

Attribute Name	Attr. ID	Attr. Type	Attribute Description	M/O
TransactionID	0xC000	UINT32	Transaction ID associated with this message.	O
MessageEOS	0xC0FF	No data	This attribute terminates the current message. Data after this attribute will be discarded.	M

4.5 Attribute Data Types and Formats

There are several basic data types representing 8/16/32 bits signed and unsigned data plus data types to accommodate variable size data up to 65535 bytes.

Type Class	Data Type ID	Data Type	Length of Data	Data Format
Null	0x00	No data	0	-
General	0x08	8-bit data	1	0-0xff
	0x09	16-bit data	2	0-0xffff
	0x0b	32-bit data	4	0-0xffffffff
Logical	0x10	Boolean	1	0-1
Bitmap	0x18	8-bit bitmap	1	0-0xff
	0x19	16-bit bitmap	2	0-0xffff
	0x1b	32-bit bitmap	4	0-0xffffffff
Unsigned integer	0x20	Unsigned 8-bit integer	1	0-0xff
	0x21	Unsigned 16-bit integer	2	0-0xffff
	0x23	Unsigned 32-bit integer	4	0-0xffffffff
Signed integer	0x28	Signed 8-bit integer	1	0-0xff
	0x29	Signed 16-bit integer	2	0-0xffff
	0x2b	Signed 32-bit integer	4	0-0xffffffff
Enumeration	0x30	8-bit enum	1	0-0xfe
	0x31	16-bit enum	2	0-0xfffe
String	0x41	Octet string	1+length of string	First byte is length
	0x42	Char string	1+length of string	First byte is length
	0x43	Long octet string	2+length of string	First 2 bytes is length
	0x44	Long char string	2+length of string	First 2 bytes is length
Order sequence	0x4c	Structure	2+length of structure	First 2 bytes is length
Date Time	0x4D	string	10	yymmddhhmm
VendorEscapCode	0x4E	Structure	2+3VendorEscape Code ID +length of structure	First 3 bytes is length We suggest to use IEEE –OUI standard (An OUI or 'company_id' is a 24-bit globally unique assigned number referenced by various standards)
Blob	0xfe	Blob	4+length of blob	First 4 bytes is length

4.6 Payload Example

Taken from the DCI Device Message Structure :

Event	Thumbturn	Set Reset	Boolean	- -	0x81	0x03
-------	-----------	--------------	---------	--------	------	------

For example, the payload can translate into: 0x8103 – 0x10 – 0x00

0x8103

Attribute identifier – must be unique – it is user definable.

0x10

Boolean - refer to Attribute Data Type - Logical - length is 1 byte.

Allowed Boolean values:

0x00 Thumbturn is retracted
0x01 Thumbturn is Set

An XML representation of the same payload could look like this:

```
<AttributeMsg>  
  <AttributeID>33027</AttributeID> -- decimal representation of 0x8103  
  <AttributeType>2</AttributeType> -- decimal representation of 0x01  
  <Value>false</Value>  
</AttributeMsg>
```

5 Messaging Definition

5.1 Door Lock

Message Class: 01 = DOOR LOCK

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Remote On-Line Status Change	Set to Offline Set to Online	Boolean	0 = Set to Offline 1 = Set to Online	0x41	0x01
Command	Remote Set Lock Status (Lockout)	Duration (from - to) Set to Lock Set to Unlock Set to Normal Lock Operations	String	Start YY:MM:DD:hh :mm + new status End YY:MM:DD:hh :mm + new status	0x41	0x02
Command	Remote Set DND status	Set to DND - on Set to DND - off	Bitmap	0 = Clear 1 = Set 2 = Toggle x = Report Status	0x41	0x03
Command	Remote Check-in	Authorize Key ID at Lock #	String	-	0x41	0x04
Command	Remote Check-in with data Write Room Check in Data to key	Authorize Key ID at Lock # Check in date, time Check-in Data (options) Check out date, time	String	Per PMS Card Data	0x41	0x05
Command	Remote Check-out	Deauthorize Key ID at Lock #	String	-	0x41	0x06
Event	Functional Status Change	Reports Normal Reports Malfunction	Unsigned integer	00 = Normal 01 to 99 = Event Detail Messages	0x81	0x01
Event	Deadbolt Activated Deadbolt Deactivated	Deadbolt Activated Deadbolt Deactivated	Boolean	- -	0x81	0x02
Event	Thumbturn	Set Reset	Boolean	- -	0x81	0x03
Event	Privacy/DND	DND Activated DND Deactivated	Boolean	- -	0x81	0x04
Event	Lock Status	Locked Unlocked	Boolean	- -	0x81	0x05
Event	Door Status (open/closed)	Door Opened (Ajar) Door Closed	Enumeration (8bits)	- -	0x81	0x06

Event	Door Opened from interior	Door Opened from interior	Boolean	-	0x81	0x07
Event	Use of Mechanical Key to unlock	Use of Mechanical Key to unlock	Null	-	0x81	0x08
Event	Door Forced Opening	Door Forced Opening	Null	-	0x81	0x09
Event	Low Battery	Set to Battery Okay Set Battery to Change Recommended Set to Low Battery	Enumeration (8bits)	Change of status to Battery Okay Change of status to change recommended Change of status to Low Battery	0x81	0x0A
Event	Guest Entry	Date, time Guest ID = Room #, Generation, Key #	String	See PMS standards	0x81	0x0B
Event	New Guest	Report new guest key	Null	New Guest Unlock	0x81	0x0C
Event	Staff Entry	Date, time Staff Key ID Privilege Level	String	- - Privilege Level 1 - 5	0x81	0x0D
Event	Standing Intruder	Wrong Key Shown	Null	-	0x81	0x0E
Event	Wandering Intruder	Wrong Key Shown Multiple doors	Null	- -	0x81	0x0F
Event	Unauthorized Key Attempt	Unauthorized Key Attempt	Null	-	0x81	0x10
Event	Report Card Presented	Report Card Presented	Unsigned integer	000 to 999 = Event Detail Messages	0x81	0x11
Status	On-Line Status	On-line Off-line	Boolean	- -	0x01	0x01
Status	Functional Status	Normal Malfunction	Boolean	- -	0x01	0x02
Status	Battery	Battery Okay Low Battery	Boolean	Battery Okay Change recommended Low Battery	0x01	0x03
Status	Deadbolt Status	Thrown Not thrown	Boolean	- -	0x01	0x04
Status	Thumbturn	Turned Not turned	Boolean	- -	0x01	0x05
Status	Privacy/DND	DND On DND Off	Boolean	- -	0x01	0x06
Status	Lock Status	Locked Unlocked	Boolean	- -	0x01	0x07
Status	Door Status (open/closed)	Open (Door ajar) Closed	Boolean	- -	0x01	0x08

5.2 Key

Message Class: 02 = KEY

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Status	ID	List Key ID RFID UID	String	Device Type (Data Format) Owners ID Code - Loyalty Number Track 2 - ID	0x02	0x01
Status	Key Type	GUEST STAFF ENG MGT	Enumeration (8bits)	GUEST STAFF ENG MGT	0x02	0x02
Status	Guest Room Data	Room# Key # Check In Time, Date Check Out Time, Date	String	Room# Key # Check In Time, Date Check Out Time, Date	0x02	0x03
Status	Options Data	Defined by manufacturer	VendorEscapCode	[Optional]	0x02	0x04

5.3 Thermostat (HVAC)

Message Class: 03 = HVAC

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Temp Set	COOL HEAT AUTO		100*Centigrade	0x43	0x01
Command	Fan Speed	DISCRETE VFD		1..3, 1-100	0x43	0x02
Command	Set Mode	OFF FIXED_FAN AUTO		- - -	0x43	0x03
Command	Green Mode	CLEAR SET		- -	0x43	0x04
Command	C/F Selection	CENTIGRADE FAHRENHEIT		- -	0x43	0x05
Event	Guest Change Temp	COOL HEAT AUTO		100*Centigrade	0x83	0x06
Event	Guest Change Fan	DISCRETE VFD		1..3, 1-100	0x83	0x07
Event	Guest Change Mode	OFF FIXED_FAN AUTO		- - -	0x83	0x08
Event	Guest Change Green Mode	CLEAR SET	Boolean	- -	0x83	0x09
Event	Temp Level	INTEGER 0.01C		-50 C – 150 C	0x83	0x0A
Event	Lanai Door	CLOSE OPEN	Boolean	- -	0x83	0x0B
Event	C/F Selection	CENTIGRADE FAHRENHEIT		- -	0x83	0x0C
Status	Current Temp	INTEGER 0.01C		-50 C – 150 C	0x03	0x0D
Status	Current Set Point	COOL HEAT AUTO		100*Centigrade	0x03	0x0E
Status	Fan Run Time	INTEGER		0-65535 Hours	0x03	0x0F
Status	CO Level	Parts Per Million (PPM)		0 – 1,000,000,000	0x03	0x10
Status	Humidity Level	INTEGER 1%		0 – 100	0x03	0x11
Status	Occupancy	CLEAR SET	Boolean	- -	0x03	0x12
Status	Green Mode	CLEAR SET	Boolean	- -	0x03	0x13
Status	Lanai Door open/closed	CLOSE OPEN	Boolean	- -	0x03	0x14
Status	Filter Status	NORMAL DIRTY	Boolean	- -	0x03	0x15
Status	C/F Selection	CENTIGRADE FAHRENHEIT		- -	0x03	0x16

5.4 Lighting

Message Class: 04 = LIGHTING

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Lamp On/Off	Set to On Set to Off	Boolean	- -	0x44	0x01
Command	Lamp Dim Level	Set Level		0-100	0x44	0x02
Command	Scene/Mood	Set to Scene		1-32	0x44	0x03
Command	Green Mode	Set to Active Set to Inactive	Boolean	- -	0x44	0x04
Event	Lamp Turned On/Off	Set to On Set to Off	Boolean	- -	0x84	0x05
Event	Lamp Dim Level Changed	Set to Level		0-100	0x84	0x06
Event	Lamp Out	Set to Lamp Out		Yes/No	0x84	0x07
Event	Device Failure	Set to No Response		Yes/No	0x84	0x08
Event	Scene/Mood	Set to 1-32		1-32	0x84	0x09
Event	Green Mode	Set to Active Set to Inactive	Boolean	- -	0x84	0x0A
Status	Lamp On/Off or Dim Level	Lamp Level		0-100	0x04	0x0B
Status	Device Failure	Failure		Yes/No	0x04	0x0C
Status	Lamp Outage	Lamp Out		Yes/No	0x04	0x0D
Status	Scene/Mood	1-32		-	0x04	0x0E
Status	Lamp usage time	Minutes X>0		>0	0x04	0x0F
Status	Green Mode	Active Inactive	Boolean	- -	0x04	0x10

5.5 DND-Housekeeping

Message Class: 05 = DND-HOUSEKEEPING

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Set Room Status	CLEAN DIRTY CHECK			0x45	0x01
Command	Set DND	CLEAR SET	Boolean		0x45	0x02
Command	Butler/Valet Call	CLEAR SET	Boolean		0x45	0x03
Event	Change of Room State	CLEAN DIRTY CHECK			0x85	0x04
Event	Change of DND	CLEAR SET	Boolean		0x85	0x05
Event	Butler/Valet Call	CLEAR SET	Boolean		0x85	0x06
Status	Room State	CLEAN DIRTY CHECK			0x05	0x07
Status	DND	CLEAR SET	Boolean		0x05	0x08
Status	Butler/Valet Call	CLEAR SET	Boolean		0x05	0x09

5.6 In-room Refreshment Center

Message Class: 06 = IN-ROOM REFRESHMENT CENTER

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Access Audit Trail	Defined by manufacturer			0x46	0x01
Command	Lock/Unlock	Set to Lock Set to Unlock	Boolean	- -	0x46	0x02
Command	Inventory Flag	Clear Set	Boolean	- -	0x46	0x03
Command	Temp Alarm	Set Low Threshold Set High Threshold		0-100 0-100	0x46	0x04
Event	Open/Close	Opened Closed	Boolean	- -	0x06	0x05
Event	Temp Alarm	Low Threshold High Threshold		0-100 0-100	0x06	0x06
Event	Inventory Change	Check Inventory Flag Inventory Item Quantity Change		Item ID, Quan	0x06	0x07
Status	Open	Opened Closed	Boolean	- -	0x06	0x08
Status	Temp	Temp		Degrees C or F	0x06	0x09
Status	Inventory	Inventory Flag Inventory Item List		Item ID, Quan	0x06	0x0A

5.7 Safe

Message Class: 07 = SAFE

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Access Audit Trail	Defined by manufacturer			0x47	0x01
Event	Open/Closed	Open Closed	Boolean		0x87	0x02
Event	Locked/Unlocked	Set to Locked Set to Unlocked	Boolean		0x87	0x03
Event	Decode	True	Null		0x87	0x04
Status	Locked/Unlocked	Locked Unlocked	Boolean		0x07	0x05
Status	Contents	Yes No	Boolean		0x07	0x06

5.8 Occupancy Detection

Message Class: 08 = OCCUPANCY DETECTION

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Check Occupancy	Set to Occupied Set to Unoccupied	Boolean	-	0x48	0x01
Event	Change of Occupied/Unoccupied	Set to Occupied Set to Unoccupied	Boolean	-	0x88	0x02
Event	Last time/date occupied	Time/Date		MM:DD:YY:hh: mm:ss	0x88	0x03
Event	Low Power	% of Battery Power		10	0x88	0x04
Status	Occupied/Unoccupied	Occupied Unoccupied	Boolean	-	0x08	0x05
Status	Battery Level	% of Battery Power		0-100	0x08	0x06
Status	Location	X,Y,Z location			0x08	0x07

5.9 Energizer

Message Class: 09 = ENERGIZER

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Event	Last time/date Key Used	Time/Date		MM:DD:YY:hh:mm:ss	0x89	0x01
Event	Key Inserted	Set to Occupied		-	0x89	0x02
Event	Key Removed	Set to Unoccupied		-	0x89	0x03
Event	Key Specific Identification	GUEST STAFF ENG MGT		- - -	0x89	0x04
Status	Occupied/Unoccupied	Occupied Unoccupied	Boolean	-	0x09	0x05
Status	Key Inserted/Removed	Occupied Unoccupied	Boolean	-	0x09	0x06
Status	Key Identification	GUEST STAFF ENG MGT		- - -	0x09	0x07

5.10 Drapes Control

Message Class: 10 = DRAPES CONTROL

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Blackout/Sheer - Adjust Level	Set to Level		0-100	0x4A	0x01
Command	Scene/Mood	Set to Scene		1-32	0x4A	0x02
Event	Change of Drape Setting	Set to Level		0-100	0x4A	0x03
Event	Scene/Mood	Set to Scene		1-32	0x8A	0x04
Status	Open/Close/Set point	Level		0-100	0x8A	0x05

5.11 Alarm Clock

Message Class: 11 = ALARM CLOCK

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Set Date/Time	Date/Time		MM:DD:YY:hh:mm:ss	0x4B	0x01
Command	Clear Alarms	Clear	Null	-	0x4B	0x02
Command	Set Time zone(s)	Timezone		Three Char Timezone (EST)	0x4B	0x03
Command	Set Alarm	Add Alarm		MM:DD:YY:hh:mm:ss	0x4B	0x04
Command	Set Radio/Audio	Set Audio Source		FM XXX.X (102.5) AM XXXX (970) AUX DOCK	0x4B	0x05
Command	Set Preset	Preset Number Source		Preset (1-10) FM XXX.X (102.5) AM XXXX (970)	0x4B	0x06
Command	Daylight Savings	TZ Format		-	0x4B	0x07
Event	Change of Settings	True	Null	-	0x8B	0x08
Event	Low Power	Low Power Alert Batt Level		1-100	0x8B	0x09
Status	Alarm Set	Alarm list [number, date:time]		MM:DD:YY:hh:mm:ss	0x0B	0x0A
Status	Time	Date/Time		MM:DD:YY:hh:mm:ss	0x0B	0x0B
Status	Radio/Audio	Audio Source		OFF FM XXX.X (102.5) AM XXXX (970) AUX DOCK	0x0B	0x0C
Status	Battery	Battery Level		1-100%	0x0B	0x0D

5.12 Water Detection

Message Class: 12 = WATER DETECTION

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Event	Overflow	Overflow Alarm Flag		Yes/No	0x8C	0x01
Status	Overflow (toilet, sink, tub, hot tub)	True False	Boolean	-	0x0C	0x02
Status	Consumption	Gallons		1-1000	0x0C	0x03
Status	Quality	TBD			0x0C	0x04
Status	Humidity Level	Humidity Level		0-100%	0x0C	0x05
Status	Pressure	Pressure PSI		0-100	0x0C	0x06

5.13 Lanai-Window Monitor

Message Class: 13 = LANAI-WINDOW MONITOR

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Event	Open / Closed	Opened Closed	Boolean		0x8D	0x01
Status	Open / Closed	Open Closed	Boolean		0x0D	0x02

5.14 Coffee Maker

Message Class: 14 = COFFEE MAKER

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	On/Off	On Off	Boolean	-	0x4E	0x01
Command	Timer Set	Date/Time		MM:DD:YY:hh: mm:ss	0x4E	0x02
Event	On/Off	On Off	Boolean		0x8E	0x03
Event	Timer Status	Date/Time		MM:DD:YY:hh: mm:ss	0x8E	0x04
Event	Consumables Status	Water Full Water Empty Coffee Available Coffee Empty		- - - -	0x8E	0x05
Status	On/Off	On Off	Boolean	-	0x0E	0x06
Status	Timer Status	Date/Time		MM:DD:YY:hh: mm:ss	0x0E	0x07
Status	Consumables Status	Water Full Water Empty Coffee Available Coffee Empty		- - - -	0x0E	0x08
Status	Water	True False	Boolean	-	0x0E	0x09

5.15 Phone

Message Class: 15 = PHONE

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Set DND		Null		0x4F	0x01
Event	DND change				0x8F	0x02
Event	On-hook/Off-hook		Boolean		0x8F	0x03
Event	Ringing with Caller ID				0x8F	0x04
Status	DND change		Null		0x0F	0x05
Status	On-hook/Off-hook		Boolean		0x0F	0x06
Status	Ringing with Caller ID				0x0F	0x07
						0x08

5.16 Entry Camera

Message Class: 16 = Entry Camera

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	View Camera (eg. route to PIP or touch panel display)	PIP		-	0x50	0x01
Command	Adjust Focus	FOCUS_LVL		0-255 (0=near)	0x50	0x02
Command	Adjust Pan	PAN_LVL		0-255 (0=left)	0x50	0x03
Command	Adjust Tilt	TILT_LVL		0-255 (0=down)	0x50	0x04
Command	Adjust IRIS	IRIS_LVL		0-255 (0=closed)	0x50	0x05
Command	Adjust Zoom	ZOOM_LVL		0-255 (0=out/wide)	0x50	0x06
Command	setAutoFocusOn(state)	AUTO_FOCUS_ON	Null	-	0x50	0x07
Command	getCameraPreset()	?CAMERAPRESET		-	0x50	0x08
Event	On / Off	PWR_ON PWR_OFF	Boolean	-	0x90	0x09
Event	Doorbell	Ring_on	Null	-	0x90	0x0A
Event	Presence	SENSOR_VALUE		SENSOR_VALUE	0x90	0x0B
Status	processDeviceOnlineEvent(boolean)	DEVICE_COMMUNICATING		-	0x10	0x0C
Command	Non-Functional	DEBUG-<state>		1-4 for ERROR WARNING DEBUG INFO	0x50	0x0D

5.17 Location Service

Message Class: 17 = Location Service

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Object present at specified location trigger specified action				0x51	0x01
Event	New Object (Linen, Room Service Tray, Main Cart, etc) at location				0x91	0x02
Event	Object in motion past point				0x91	0x03
Event	Detect Staff Location				0x91	0x04
Event	Detect Asset Location				0x91	0x05
Event	Object response action triggered				0x91	0x06
Event	Remote query for inventory				0x91	0x07
Status	Object Location				0x11	0x08
Status	Direction of Travel (Staff/Object/Asset)				0x11	0x09
Status	Staff Location				0x11	0x0A
Status	Asset Location				0x11	0x0B
Status	Inventory Status				0x11	0x0C
Status	Object response action required				0x11	0x0D

5.18 Audio Control

Message Class: 18 = Audio Control

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Set Power on / Set Power off	PWR_ON PWR_OFF	Boolean	-	0x52	0x01
					0x52	0x02
Command	Mute/Unmute	setVolumeMuteOn(state)	Boolean	-	0x52	0x03
Command	Volume Level Change	setVolume(level)		0-255	0x52	0x04
Command	Zone Control (on/off)	setZone()		toggle = on/off	0x52	0x05
Command	Source Selection (TV, AM/FM/XM/Sirius/Internet Radio, CD/DVD. MP3 player)	setInputSource()		?INPUT	0x52	0x06
Command	Station Selection (AM/FM/XM/Sirius/Internet Radio)	setStation()		-	0x52	0x07
Command	Alarm Clock Setting Activated	setAlarms()		-	0x52	0x08
Event	Zone change	setZone(index)		index = 1 - n	0x92	0x09
Event	Source change	setInputSource(index)		index = 1 - n	0x92	0x0A
Event	Station change	setInputSource(index)		-	0x92	0x0B
Event	Station Down	decrementStation()		decrement	0x92	0x0C
Event	Station up	incrementStation()		Increment	0x92	0x0D
Event	Alarm Clock Activated	processAlarmsEvent(arg,alarms)		-	0x92	0x0E
Status	Mute Status	Vol Mute On	Boolean		0x12	0x0F
Status	Volume level	getVolume(level)			0x12	0x10
Status	Current Zone	getZone()			0x12	0x11
Status	Current Source	getInputSource()			0x12	0x12
Status	Current Station	getInputStation()			0x12	0x13
Status	Alarm Active	getAlarms()			0x12	0x14

5.19 Television Integration

Message Class: 19 = Television Integration

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Power On	tvOn()	string integer integer	tv monitor interactive 1-999 0-100	0x53	0x01
Command	Standby	tvStandby()	Null		0x53	0x02
Command	Mute/Unmute	tvSetMute()	Boolean	noSound sound	0x53	0x03
Command	Volume Level Change	tvSetVolume()	integer	0-100	0x53	0x04
Command	Source Selection	tvSetSource()	string integer	coax composite video component vga hDMI 1-5	0x53	0x05
Command	Channel Change	tvSetChannel()	integer	1-999	0x53	0x06
Command	Return Previous Channel	tvLastChannel()	Null		0x53	0x07
Command	Adjust Backlighting Level	setBacklight()	integer	0-100	0x53	0x08
Command	VOD active	isVodActive()	Null		0x53	0x09
Command	Display Message	displayText()	string	text	0x53	0x0A
Command	Application Invocation	applicationStart()	string	text	0x53	0x0B
Event	Power On/Standby/Off	Status	string	on standby off	0x93	0x0C
Event	Mute/Unmute change	Status	Boolean	noSound sound	0x93	0x0D
Event	Volume level change	Status	integer	0-100	0x93	0x0E
Event	Source Change	source sequence	string integer	coax composite video component vga hDMI 1-5	0x93	0x0F
Event	Channel Change	Channel	integer	1-999	0x93	0x10
Event	Backlighting Level Change	Level	integer	0-100	0x93	0x11
Event	VOD start	True	Null		0x93	0x12
Event	Message Displayed	True	string	text	0x93	0x13
Event	Application event	Event ID	string	text	0x93	0x14
Status	Power Status	status	string	on standby	0x13	0x15
Status	Mute Status	status	Boolean	noSound sound	0x13	0x16

Status	Volume level	volume	integer	0-100	0x13	0x17
Status	Current Source	source sequence	string integer	coax composite video component vga hDMI 1-5	0x13	0x18
Status	Current channel	channel	integer	1-999	0x13	0x19
Status	Current Backlighting Level	Level	integer	0-100	0x13	0x1A
Status	VOD Playing	True	Null		0x13	0x1B

5.20 Voice Activation

Message Class: 21 = Voice Activation

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Enable /Disable	True False	Boolean		0x54	0x01
Command	Voice Command	TBD			0x54	0x02
Event	Enabled	True			0x94	0x03
Event	Recognize Command (Vocabulary)	TBD			0x94	0x04
Status	Enabled	True False	Boolean		0x14	0x05
Status	Command Made	TBD			0x14	0x06

5.21 Portable Remote Control

Message Class: 21 = Portable Remote Control

Message Description					HTNG CODE	
Type	Title	Function/Responses	Format	Value Ranges	CATID	Message Class sub-item index
Command	Join Device to Zone	Zone ID		0-100	0x55	0x01
Event	Device Present in Zone	Device ID		0-100	0x95	0x02
Event	Device Associated/D isassociated with Zone	Device ID		0-100	0x95	0x03
Event	Remote Managed Devices	TBD		-	0x95	0x04
Status	Device Present	True False	Boolean	- -	0x15	0x05
Status	Device Associated/D isassociated	True False	Boolean	- -	0x15	0x06
Status	Device Battery Level	Integer		0-100	0x15	0x07
Status	Monitor Managed Devices	TBD			0x15	0x08

6 Appendix

6.1 ICI Zone Architecture

