



CROW's ULE Product's
HAN-FUN Proprietary Interfaces

Version 1.13

Revision History

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1 Scope

The present document specifies Crow's HAN-FUN (HF) proprietary interfaces that can be implemented by HF units.

2 Problem Reporting Instructions

Problems or corrections to this document must be reported using e-mail to Crow Marketing department and to the author – mailto: orenz@crow.co.il.

3 References

Referenced documents:

- [1] HF-Overview-Version 1.00.docx
- [2] HF- Protocol-Version 1.00.docx
- [3] HF- Service-Version 1.00.docx
- [4] HF- Interface-Version 1.00.docx
- [5] HF-Profile-Version 1.00.docx

4 Definitions, Symbols and Abbreviations

4.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

- *Italic* is used to indicate the name designation of attributes and commands.
- Device addresses are indicated as D'xxxx, where xxxx is a hexadecimal number up to four digits. This provides a compact notation for a HF device address. Usually appears as D'0 referring to the network main device, which has the address 0x0000.
- Group addresses are indicated as G'xxxx and have the same notation definitions as a device address.
- Unit IDs are indicated as U'xx, where xx is a hexadecimal number up to two digits. This provides a compact notation for a unit's ID. Usually appears as U'0 referring to the network management unit, with ID 0x00, that every HF device implements.
- Fully qualified HF network addresses are indicated as D'xxxx:U'xx. This compact notation is a combination of the previous two definitions.

4.2 Symbols

For the purposes of the present document, the following symbols apply:

M, (M)	Provision Mandatory
O, (O)	Provision Optional

The symbols here defined are applied to interfaces, attributes and commands and their fields in the present document if not explicitly otherwise stated. The interpretation of this status indication is as follows:

- Provision mandatory, means that the indicated interface, attributes, command or command field shall be implemented as described in the present document, and may be subject to testing.

- Provision optional, means that the indicated interface, attribute, command or command field may be implemented, and if implemented, the interface, attribute or command shall be implemented as described in the present document, and may be subject to testing.

4.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

DECT	Digital Enhanced Cordless Telecommunications
HAN	Home Area Network
HAN-FUN (HF)	Home Area Network Functional
HF-IFL	HAN-FUN Interface Library
HF-PRF	HAN-FUN Profiles
ID	Identifier
LED	Light Emitting Diode
S8	Signed Char (-128 – +127)
SUOTA	Software Update Over The Air
U8	Unsigned Char (0 – 255)
UID	Unique Identifier
ULE	Ultra Low Energy

5 Introduction

Each interface is a collection of commands and attributes usable in units as either mandatory or optional. Each interface has also one of two possible roles associated with it – server or client. As an example, figure 1 depicts two different devices each with one unit implementing the same interface: unit 1 implements the server role while unit 2 implements the client role. In this setup both units can interact in a well-defined manner according to a client-server model easily identifying the controller device (client role) and the sensor/actuator device (server role).

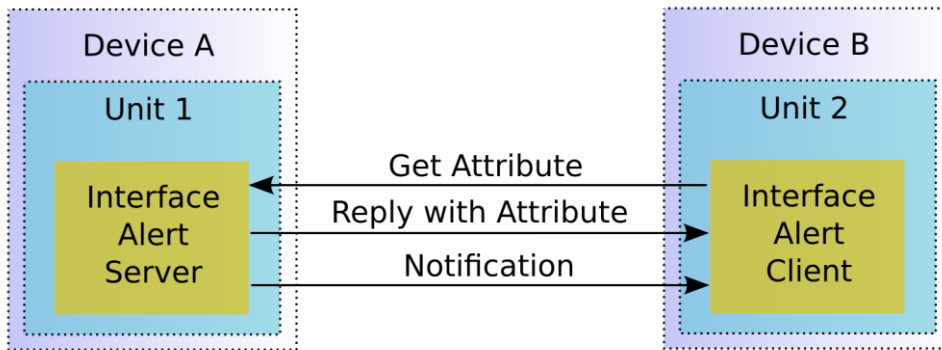


Figure 1 – Example of a Communication with Alert Interface

All Crow’s available proprietary HF interfaces are listed in

Table 1 in chapter 6.

An interface is identifiable by a unique identification number and a unique human readable name. Since the described interfaces are Crow’s proprietary collisions with other manufacturer interfaces are expected to occur.

5.1 Maintaining Crow’s Proprietary HF Interfaces

Crow’s available proprietary HF interfaces are expected to be extended to support more / new features / products. The released interfaces will not be changed in a later revision. If an existing interface needs to be extended in functionality, it will be extended without hearding the previous version functionality.

This ensures ongoing support for an interface and the continued operation, without requiring any update, of any system implementing a specific interface – allowing backward compatibility.

6 HF Interfaces

This chapter specifies HF interfaces in a user-friendly format.

For clarification, an HF interface is not required to define commands for get or set actions over its attributes, but may define such commands. This feature is already provided at the protocol level, as explained in Ref [2] – HF- Protocol-Version 1.00.docx. Therefore, commands defined in an interface serve specific needs of that interface.

The available Crow's proprietary HF interfaces with their unique identifiers (UIDs) are listed in Table 1.

UID	Name	Description
0x7F05	SUOTA	Interface for SW Upgrade Over The Air
0x7F10	Common Configurations	Enables configurations of Crow DECT ULE product's Common Attributes.
0x7F11	PIR Configurations	Enables configurations of Crow's PIR Interface Attributes.
0x7F12	Temperature Configurations	Enables configurations of Crow's Temperature Interface Attributes.
0x7F13	Crow's Smoke Interface	Enables controlling Crow's Smoke device.
0x7F14	Crow's Humidity Interface	Enables configurations of Crow's Humidity Interface Attributes.
0x7F15	Crow's Temperature High Resolution Interface	Enables configurations of Crow's Temperature High Resolution Interface Attributes.
0x7F16	AC Smart Plug Configurations	Enables configuration of Crow's AC Smart Plug Interface Attributes.
0x7F17	Crow's Air Pressure Interface	Enables configuration of Crow's Air Pressure Interface Attributes.

Table 1 – List of Crow's Available Proprietary HF Interfaces

6.1 0x7F10 – Crow’s Common Configuration

The Crow’s Common Configuration interface can be used by any device that requires changing Common attributes in Crow DECT ULE devices. This interface is implemented by all units with ID 0 on all crow devices.

6.1.1 Server Attributes

Attribute ID	Attribute Name	Attribute Type	Attribute Values	Attribute Access	M/O
0x01	LEDs State	U8	0x00 - 0x01	Read / Write	M
0x02	Battery Level Measure Interval	U32	0x0000EA60 - 0xFFFFFFFF	Read / Write	M
0x03	Message Queue Active	U8	0x00 - 0x01	Read / Write	M

Table 2 – Crow’s Common Configuration Interface Attributes

6.1.1.1 LED’s State

LED’s State attribute indicates if the LED’s operation will be inhibited or not during product operational. It can take one of two values:

- ”0x00” indicates that the LEDs operational are inhibited,
- ”0x01” indicates that the LEDs operational are visible.

See Appendix A for explanation about the existing LEDs and LEDs indication in Crow’s ULE products and which LED indications can be inhibited.

See Appendix B for *LED’s State* Factory Default Value.

6.1.1.2 Battery Level Measure Interval

Battery Level Measure Interval attribute indicate the time interval in milliseconds between two consecutive battery level testing.

The *Battery Level Measure Interval* attribute minimum value is 60,000 milliseconds / 1 minute.

The *Battery Level Measure Interval* attribute maximum value is over 49 days.

As long as the measured battery voltage level is high it is recommended to keep the *Battery Level Measure Interval* attribute value high in order to save battery life. When “Low Battery” signal is received in the Base Station, the Base can reduce the *Battery Level Measure Interval* attribute value and monitor the battery level more frequently.

6.1.1.3 Message Queue Active

Message Queue Active attribute indicates if the internal message queue will be used to collect messages to be transmitted to base or not. The queue size is up to 20 messages.

- ”0x00” indicates that the Message Queue is Disabled – will not be used,
- ”0x01” indicates that the Message Queue is Enabled – will be used.

When Message Queue is Enabled the device will keep up to 20 last message that were not delivered to base during no connection event. As soon the connection between Base & Device will be resumed, all stored messages will be retransmitted to base station.

6.1.2 Client Attributes

None.

6.1.3 Server to Client Commands

None.

6.1.4 Client to Server Commands

6.1.4.1 Set Factory Default Configuration Command

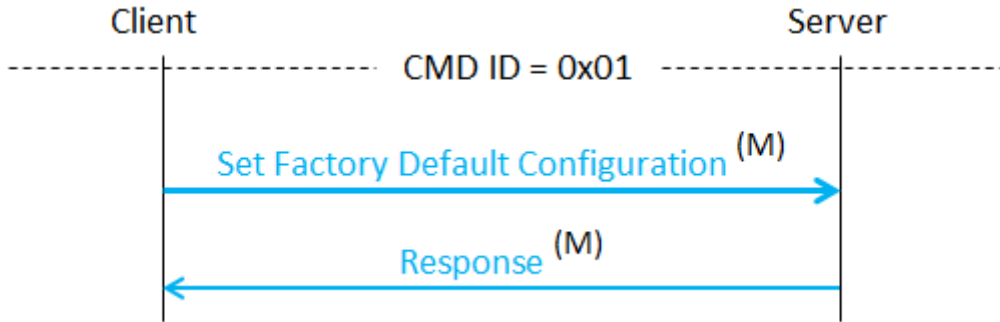


Figure 2 – Set Factory Default Configuration Command

This command resets Crow’s devices configurable attributes which means configuring the configurable attributes with their factory default values.

See Appendix B for influenced Attributes per product when this command is issued.

6.2 0x7F11 – Crow’s PIR Configurations

This interface defines the configurable attributes in Crow’s PIR Detector (server role) allowing a device implementing this interface (client role) to change and control the PIR behaviour.

6.2.1 Server Attributes

Attribute ID	Attribute Name	Attribute Type	Attribute Values	Attribute Access	M/O
0x01	Hold OFF Mode	U8	0x00 / 0x01	Read / Write	M
0x02	Hold OFF Time	U8	0x00 - 0xFF	Read / Write	M
0x03	Sensitivity	U8	'A' - 0x41 'B' - 0x42 'C' - 0x43 'D' - 0x44	Read / write	M
0x04	Pet Immunity	U8	0x00 / 0x01	Read / Write	M

Table 3 – Crow’s PIR Configurations Interface Attributes

6.2.1.1 Hold OFF Mode

Hold OFF Mode attribute indicates if the *Hold Off Time* will have a fixed value or its value could be changed. It can take one of two values:

- "0x00" (Retrigger) indicates that the implemented hold off timer will have the initial value equal to the value represented by the *Hold Off Time* attribute, but it can be dynamically stretched to a higher value.
- "0x01" (Normal) indicates that the implemented hold off timer will have a fixed value equal to the value represented by the *Hold Off Time* attribute.

See Appendix B for *Hold OFF Mode* Factory Default Value.

See Appendix C for an explanation about the *Hold Off Mode* and its influence on *Hold Off Time*.

6.2.1.2 Hold OFF Time

Hold OFF Time attribute indicates what will be the value of the implemented hold off timer.

To calculate the hold off time value in seconds the following formula should be used:

$$\text{Hold off time}_{\text{sec}} = (\text{Hold Off Time} + 1) * 10_{\text{sec}}$$

For example:

To set the hold off timer to 30seconds the *Hold Off Time* attribute should be set to the value 0x02 –

$$30_{\text{sec}} = (0x02 + 1) * 10_{\text{sec}}$$

See Appendix B for *Hold OFF Time* Factory Default Value.

6.2.1.3 Sensitivity

Sensitivity attribute indicates device sensitivity level.

The PIR sensitivity can be set to 4 different sensitivity levels marked with the letters 'A' to 'D', whereas 'A' is the lowest sensitivity and 'D' is the highest sensitivity. Sensitivity is related to the room size as follow:

Option	Room Size	Sensitivity
A	4 x 4	Lowest
B	8 x 8	
C	10 x10	
D	12 x 12	Highest

Table 4 – PIR Sensitivity level meaning

See Appendix B for *Sensitivity* Factory Default Value.

6.2.1.4 Pet Immunity

Pet Immunity attribute indicates if the device shall detect Pets or not. It can take one of two values:

- "0x00" (OFF) indicates that Pets shall be detected by the PIR.
- "0x01" (ON) indicates that Pets shall not be detected by the PIR.

6.2.2 Client Attributes

None.

6.2.3 Server to Client Commands

None.

6.2.4 Client to Server Commands

None.

6.3 0x7F12 – Crow’s Temperature Configurations

This interface defines the commands and attributes to be used by a device implementing Crow temperature interface.

6.3.1 Server Attributes

Attribute ID	Attribute Name	Attribute Type	Attribute Values	Attribute Access	M/O
0x01	Min Measurebale Temperature	S8	-40	Read	M
0x02	Max Measurebale Temperature	S8	+80	Read	M
0x03	Measured Temperature	S8	-40 - +80	Read	M
0x04	Periodic Report Interval	U8	0-255	Read / Write	M
0x05	High Temperature Threshold	S8	-40 - +80	Read / Write	M
0x06	Low Temperature Threshold	S8	-40 - +80	Read / Write	M

Table 5 – Crow’s Temperature Configurations Interface Attributes

6.3.1.1 Min Measurable Temperature

Min Measurebale Temperature attribute holds the minimum temperature that can be measured by Crow’s Temperature device. The units are in degrees Celsius (°C).

For more information please see Appendix F - Table 25.

6.3.1.2 Max Measurable Temperature

Max Measurebale Temperature attribute holds the maximum temperature that can be measured by Crow’s Temperature device. The units are in degrees Celsius (°C).

For more information please see Appendix F - Table 25.

6.3.1.3 Measured Temperature

Measured Temperature attribute holds the current measured temperature. The units are in degrees Celsius (°C).

For more information please see Appendix F - Table 25.

6.3.1.4 Periodic Report Interval

Periodic Report Interval attribute indicates what will be the time period between each two consecutive reports sent by the Temperature device.

If the *Periodic Report Interval* value is set to 0x00 – no periodic reports will be initiated by the device.

To calculate the value of the Report-time-interval in seconds the following formula should be used:

$$\text{Report-time-interval}_{\text{sec}} = \text{Periodic Report Interval} * 10_{\text{sec}}$$

For example:

To set the report time interval for 30seconds the *Periodic Report Interval* attribute should be set to 0x03 –

$$30_{\text{sec}} = 0x03 * 10_{\text{sec}}$$

See Appendix B for *Periodic Report Interval* Factory Default Value.

6.3.1.5 High Temperature Threshold

High Temperature Threshold attribute indicates what the temperature level (°C) is that going above this level will cause the device to initiate an Alert message with the bit 1 set (Alert value equal to 0x0002).

To inhibit getting this alert use the Alert Interface Enable/Disable attribute.

For more information please see Appendix F - Table 25.

See Appendix B for *High Temperature Threshold* Factory Default Value.

6.3.1.6 Low Temperature Threshold

Low Temperature Threshold attribute indicates what the temperature level (°C) is that going below this level will cause the device to initiate an Alert message with the bit 0 set (Alert value equal to 0x0001).

To inhibit getting this alert use the Alert Interface Enable/Disable attribute.

For more information please see Appendix F - Table 25.

See Appendix B for *Low Temperature Threshold* Factory Default Value.

6.3.2 Client Attributes

None.

6.3.3 Server to Client Commands

6.3.3.1 Periodic Report Command

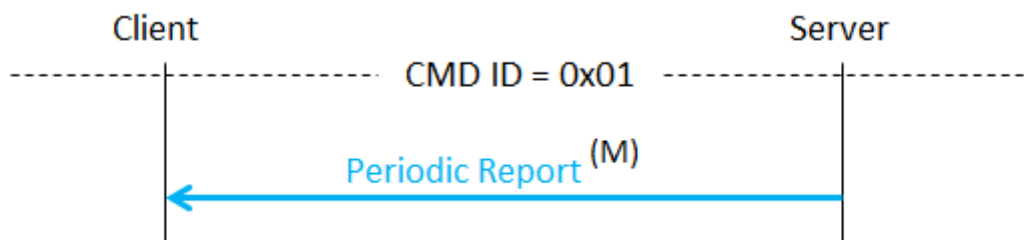


Figure 3 – Temperature Periodic Report Command

This command is being sent to a client implementing Crow’s Temperature Configurations interface in case the periodic report was enabled. This command will report to the client about the current measured temperature.

Implementation of this command is mandatory.

For more information please see Appendix F - Table 25.

This command is carrying a data payload of a single byte with the information described in Table 6.

Field Name	Field Description	Type	Value	M/O
Reported Temperature	The Measured Temperature in °C	S8	-40 - +80	M

Table 6 – Temperature Periodic Report Data Payload

6.3.4 Client to Server Commands

None.

6.4 0x7F05 – SUOTA Interface

The SUOTA Interface allows upgrading the devices SW over the air while the device is installed in its location in the End User premise.

The Base Station shall initiate the SUOTA process by sending the *New Version Available* command.

After the appropriate respond is sent, a CATiq LDS procedure is initiated (by the Device/Client) in order to upload the requested SW version (from the Base Station/Server).

The Client can use the suggested URL or any other URL. Currently the Client uses the suggested URL.

The Client can initiate the process or decide (from any reason like Battery Low) not to initiate the process.

The *Upgrade Completed* Command shall be sent by the Client to the Server announcing about the completion of the SUOTA process.

6.4.1 Server Attributes

None.

6.4.2 Client Attributes

None.

6.4.3 Server to Client Commands

6.4.3.1 New Version Available Command

The Server notifies the Client of the exiting of a new SW version. The Client should examine the request and decide if to initiate the SUOTA process. In both cases the device must return a response indicating if it is OK to start or not (due to, battery level too low or wrong version number, etc.)



Figure 4 – New Version Available Command & Response

The *New Version Available* Command must provide the information described in Table 7 organized according to Table 8.

Be noted about the content of the “New SW Version” field:

- For upgrading / downgrading the DECT Module SW the string “DECT-xxxxxx” shall be inserted into the “New SW Version” field while the “xxxxxx” represent the SW version string,
- For upgrading / downgrading the Device SW the string “HOST-xxxxxx” shall be inserted into the “New SW Version” field while the “xxxxxx” represent the SW version string.
- Crow will supply the upgraded files such that the files name will be the strings to be inserted into the “New SW Version” field.

Field Name	Field Description	Type		Value	M/O
New SW Version	The new SW version	U8	Len	0x00 - 0x20	M
		U8	Char string	0x20 - 0xFE (each U8)	
HW Version	The HW version	U8	Len	0x00 - 0x20	M
		U8	Char string	0x20 - 0xFE (each U8)	
URL	The URL to use in SUOTA	U8	Len	0x00 - 0x20	M
		U8	Char string	0x20 - 0xFE (each U8)	

Table 7 – Data in Payload of a *New Version Available* Command

8	7	6	5	4	3	2	1	Octet
new SW Version (Len=N)								1
new SW Version (char 1)								2
new SW Version (char 2)								3
...								⋮
new SW Version (char N)								N+1
HW Version (Len=M)								N+2
HW Version (char 1)								N+3
HW Version (char 2)								N+4
...								⋮
HW Version (char M)								N+M+2
URL (Len=X)								N+M+3
URL (Char 1)								N+M+4
...								⋮
URL (Char X)								N+M+X+3

Table 8 – Data Ordering of Payload of a *New Version Available* Command

6.4.3.2 New Version Available Command Respond

The *New Version Available* Command Response must provide the information described in Table 9 organized according to Table 10.

Field Name	Field Description	Type	Value	M/O
Response	Response code	U8	0x00 – OK, will start upgrade 0x01 – Wrong SW 0x02 – Wrong HW 0x03 – Battery too low 0xFF – Failure	M

Table 9 – Data in Payload of a *New Version Available* Command Response

8	7	6	5	4	3	2	1	Octet
Response								1

Table 10 – Data Ordering of Payload of a *New Version Available* Command Response

6.4.4 Client to Server Commands

6.4.4.1 Upgrade Completed Command

The Client shall inform the Server upon completion of the SUOTA process indicating success or failure. Abort is considered as a failure in this case.

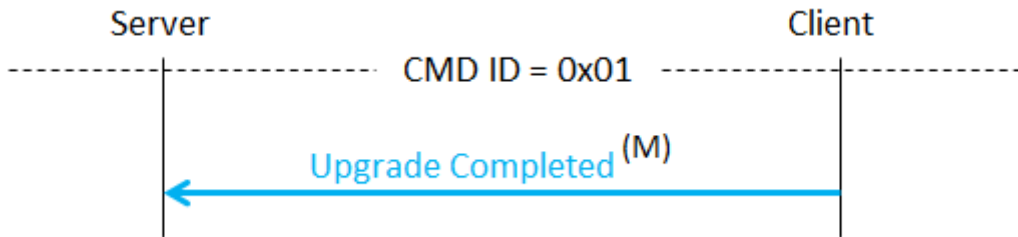


Figure 5 – Upgrade Completed Command

The command must provide the information described in Table 11 organized according to Table 12.

Field Name	Field Description	Type		Value	M/O
Result	Result of the upgrade	U8		0x00 – Success 0x01 – General Error 0x02 – Session Error 0x03 – Gmep Send Error 0x04 – Write Error 0x05 – Erase Error 0x06 – Checksum Error 0x07 – Flash Data Error 0x08 – Call Ended 0x09 – HTTP Error 0x0A –Version Number Unchanged 0x0B – Not Enough Storage 0x0C – Battery too low 0x0D – Invalid Image Type 0x0E – Upgrade not allowed	M
New SW Version	The new SW version after the successful upgrade	U8	Len	0x00 - 0x20	M only if Result=Success
		U8	Char string	0x20 - 0xFE (each U8)	

Table 11 – Data in Payload of an *Upgrade Completed* Command

8	7	6	5	4	3	2	1	Octet
Result								1
new SW Version (Len=N)								2
new SW Version (char 1)								3
new SW Version (char 2)								4
...								⋮
new SW Version (char N)								N+2

Table 12 – Data Ordering of Payload of an *Upgrade Completed* Command

6.5 0x7F13 – Crow’s Smoke Interface

This interface defines the attributes of Crow’s Smoke Detector Interface as well as the commands allowing a device implementing this interface controlling the Smoke behaviour.

6.5.1 Server Attributes

Attribute ID	Attribute Name	Attribute Type	Attribute Values	Attribute Access	M/O
0x01	Buzzer Mute Time	U32	0x0000000 / 0x0000012C – 0x00000384	Read / Write	M
0x02	Buzzer Mute State	U8	0x00 - 0x01	Read Only	M
0x03	Periodic Alert Report Interval	U8	0x02 - 0xFF	Read/Write	M

Table 13 – Smoke Interface Attributes

6.5.1.1 Buzzer Mute Time

Buzzer Mute Time attribute indicates if the device can be muted and if it can be muted it holds the Mute Time period after which the device will return to Unmute state (silent or alerting depending on the smoke existence state).

In case the *Buzzer Mute Time* attribute value is set to 0x00000000 the Mute operation is Disabled.

The Minimum mute time is 300 seconds – 0x0000012C.

The Maximum mute time is 900 seconds – 0x00000384.

See Appendix B for *Buzzer Mute Time* Factory Default Value.

6.5.1.2 Buzzer Mute State

Buzzer Mute State attribute indicates if the device buzzer state is Muted or Unmute state.

- "0x00" indicates that the Buzzer State is UnMuted.
- "0x01" indicates that the Buzzer State is Muted.

6.5.1.3 Periodic Alert Report Interval

Periodic Alert Report Interval attribute indicates the time interval between every two consecutive *Smoke Periodic Alert Commands* in seconds. This attribute resolution is 2 seconds (meaning values can be anything but in reality the interval time will be 2,4,6 ...seconds).

For more information on *Smoke Periodic Alert Command* see section 6.5.3.3.

See Appendix B for *Periodic Alert Report Interval* Factory Default Value.

6.5.2 Client Attributes

None

6.5.3 Server to Client Commands List

6.5.3.1 Buzzer Mute Indication Command

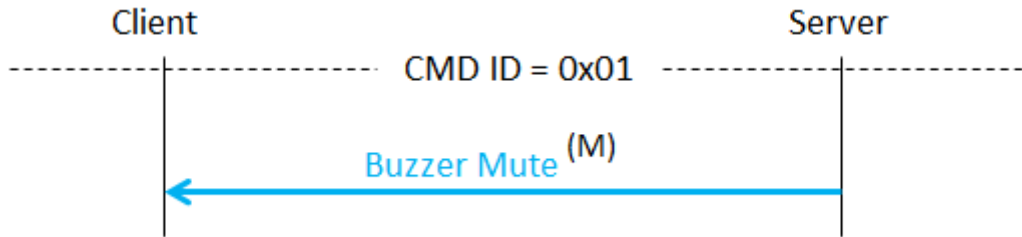


Figure 6 – Buzzer Mute Indication Command

This command when sent to a Base implementing the Client side of this interface indicates that the Device’s Buzzer is currently in Mute state.

This command has no payload.

6.5.3.2 Buzzer Unmute Indication Command

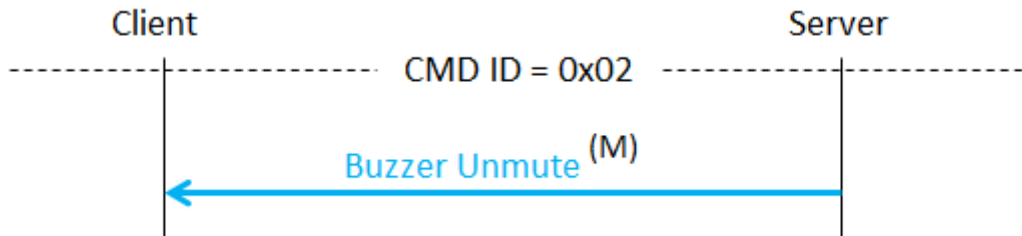


Figure 7 – Buzzer Unmute Indication Command

This command when sent to a Base implementing the Client side of this interface indicates that the Device’s Buzzer is currently in Unmute state.

This command has no payload.

6.5.3.3 Smoke Periodic Alert Command

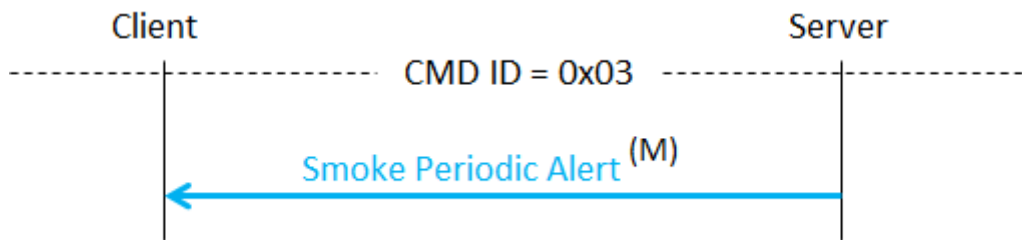


Figure 8 – Smoke Periodic Alert Command

This command will periodically be sent to the Base currently in indicates that the Device identified Smoke. These messages will be transmitted only after the Device will send the standard Alert message. This message will be sent to Base – every 10 seconds till the Device will report about the Alert Restore.

A Base implementing the Client side of this interface will receive these messages and will be able to instruct the Device (Server side) to keep the Link and then to send the Buzzer Mute / Unmute commands – as described in sections 6.5.4.1 and 6.5.4.2.

This command has no payload.

6.5.4 Client to Server Commands List

6.5.4.1 Buzzer Mute

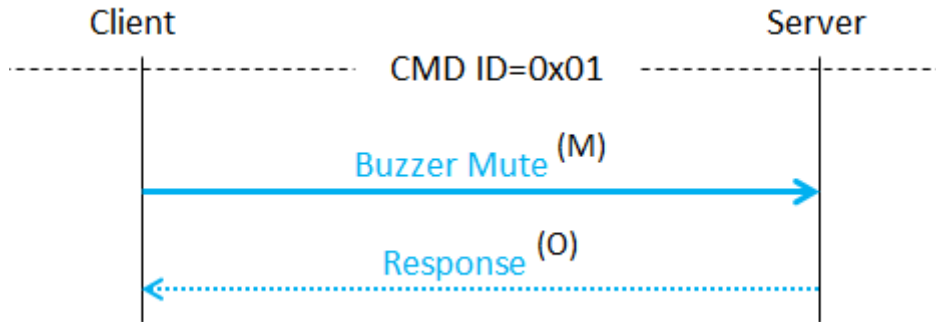


Figure 9 – Buzzer Mute Command

This command when sent to a device implementing the Server side of this interface will mute the Buzzer for a time period defined in the command payload. If the time period defined in the command payload is set to zero (0x00000000) the actual mute time will be equal to the value stored in the “Buzzer Mute Time” attribute of this Interface.

The command must provide the information described in Table 14.

Field Name	Field Description	Type	Value	M/O
Mute Time	Time to mute the Siren in seconds	U32	0x00000000 / 0x0000012C – 0x00000384	M

Table 14 – Data in Payload of *Buzzer Mute* Command

The *Mute Time* payload value can be set for minimum of 300 seconds up to 900 seconds.

6.5.4.2 Buzzer Unmute

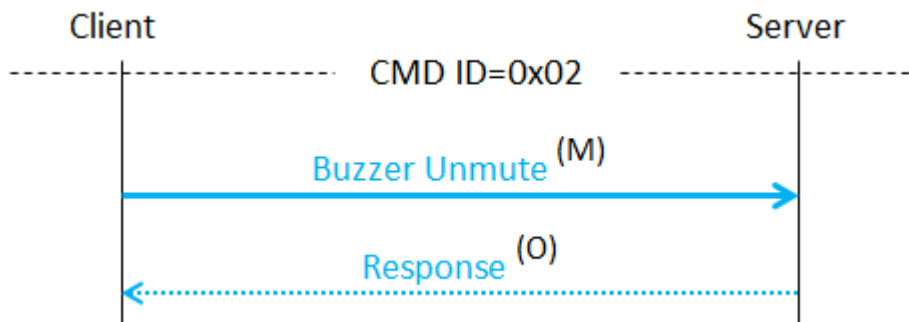


Figure 10 – Siren On Command

This command when sent to a device implementing the Server side of this interface will unmute the buzzer in case it was previously muted using the *Buzzer Mute* command. This command has no payload.

In case the Buzzer is in OFF state, sending this command to the device will have no effect.

6.6 0x7F14 – Crow’s Humidity Interface

This interface defines the attributes of Crow’s Humidity Interface as well as the commands allowing a device implementing this interface controlling the Humidity device.

6.6.1 Server Attributes

Attribute ID	Attribute Name	Attribute Type	Attribute Values	Attribute Access	M/O
0x01	Periodic Report Interval	U32	0x0000000-0xFFFFFFFF	Read / Write	M
0x02	High Humidity Threshold	U16	0x0000-0x2710	Read / Write	M
0x03	Low Humidity Threshold	U16	0x0000-0x2710	Read / Write	M

Table 15 – Humidity Interface Attributes

6.6.1.1 Periodic Report Interval

Periodic Report Interval attribute indicates what will be the time period between each two consecutive reports sent by the device.

The periodic report time can be set from a minimum of 2 seconds up to 0xFFFFFFFF seconds, with 2 seconds resolution.

If the Periodic Report Interval value is set to 0x00 – no periodic reports will be initiated by the device.

See Appendix B for Periodic Report Interval Factory Default Value.

6.6.1.2 High Humidity Threshold

High Humidity Threshold attribute indicates what the humidity level (RH%) is that going above this level will cause the device to initiate an Alert message with the bit 1 set (Alert value equal to 0x0002). The units are one hundredth (1/100) of Relative Humidity percentage.

Since the Humidity units are defined in percentage (RH%), the Minimum Measureable Humidity is equal to zero (0) and the Maximum Measureable Humidity is equal to one hundred (100), and the *High Humidity Threshold* attribute value shall be in between these values.

To inhibit getting this alert use the Alert Interface Enable/Disable attribute.

See Appendix B for *High Humidity Threshold* Factory Default Value.

6.6.1.3 Low Humidity Threshold

Low Humidity Threshold attribute indicates what the humidity level (RH%) is that going below this level will cause the device to initiate an Alert message with the bit 0 set (Alert value equal to 0x0001). The units are one hundredth (1/100) of Relative Humidity percentage.

Since the Humidity units are defined in percentage (RH%), the Minimum Measureable Humidity is equal to zero (0) and the Maximum Measureable Humidity is equal to one hundred (100), and the *High Humidity Threshold* attribute value shall be in between these values.

To inhibit getting this alert use the Alert Interface Enable/Disable attribute.

See Appendix B for *Low Humidity Threshold* Factory Default Value.

6.6.2 Client Attributes

None.

6.6.3 Server to Client Commands

6.6.3.1 Periodic Report Command

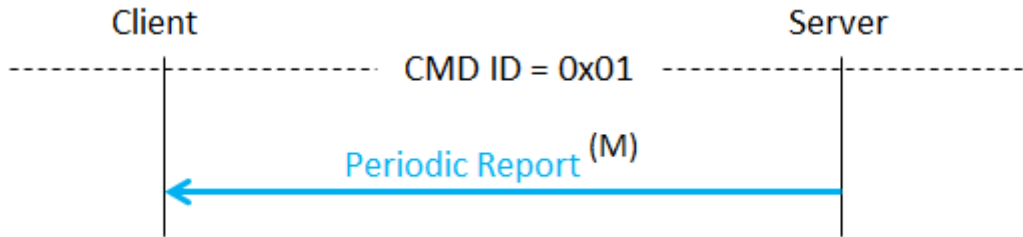


Figure 11 – Periodic Report Command

This command is being sent to a client implementing Crow’s Humidity interface in case the periodic report was enabled. This command will report to the client about the current measured humidity. The units are one hundredth (1/100) of Relative Humidity percentage.

Implementation of this command is mandatory.

This command is carrying a data payload with the information described in Table 16.

Field Name	Field Description	Type	Value	M/O
Reported Humidity	The Measured Humidity	U16	0x0000-0x2710	M

Table 16 – Humidity Periodic Report Data Payload

6.6.4 Client to Server Commands List

None.

6.7 0x7F15 – Crow’s Temperature High Resolution Interface

This interface defines the attributes of Crow’s Temperature High Resolution Interface as well as the commands allowing a device implementing this interface controlling the device.

6.7.1 Server Attributes

Attribute ID	Attribute Name	Attribute Type	Attribute Values	Attribute Access	M/O
0x01	Periodic Report Interval	U32	0x0000000-0xFFFFFFFF	Read / Write	M
0x02	High Temperature Threshold	S16	0xFFFF – 0x7FFF	Read / Write	M
0x03	Low Temperature Threshold	S16	0xFFFF – 0x7FFF	Read / Write	M

Table 17 – Temperature High Resolution Interface Attributes

6.7.1.1 Periodic Report Interval

Periodic Report Interval attribute indicates what will be the time period between each two consecutive reports sent by the device.

The periodic report time can be set from a minimum of 2 seconds up to 0xFFFFFFFF seconds, with 2 seconds resolution.

If the Periodic Report Interval value is set to 0x00 – no periodic reports will be initiated by the device.

See Appendix B for Periodic Report Interval Factory Default Value.

6.7.1.2 High Temperature Threshold

High Temperature Threshold attribute indicates what the Temperature level is that going above this level will cause the device to initiate an Alert message with the bit 1 set (Alert value equal to 0x0002). The units are one hundredth (1/100) of degrees Celsius (°C).

To get the device supporting Temperature range the HUN-FUN *Simple Temperature Interface – Minimum Measureable Temperature & Maximum Measureable Temperature* attributes shall be read.

To inhibit getting this alert use the Alert Interface Enable/Disable attribute.

See Appendix B for *High Temperature Threshold* Factory Default Value.

6.7.1.3 Low Temperature Threshold

Low Temperature Threshold attribute indicates what the Temperature level is that going below this level will cause the device to initiate an Alert message with the bit 0 set (Alert value equal to 0x0001). The units are one hundredth (1/100) of degrees Celsius (°C).

To get the device supporting Temperature range the HUN-FUN *Simple Temperature Interface – Minimum Measureable Temperature & Maximum Measureable Temperature* attributes shall be read.

To inhibit getting this alert use the Alert Interface Enable/Disable attribute.

See Appendix B for *Low Temperature Threshold* Factory Default Value.

6.7.2 Client Attributes

None.

6.7.3 Server to Client Commands

6.7.3.1 Periodic Report Command

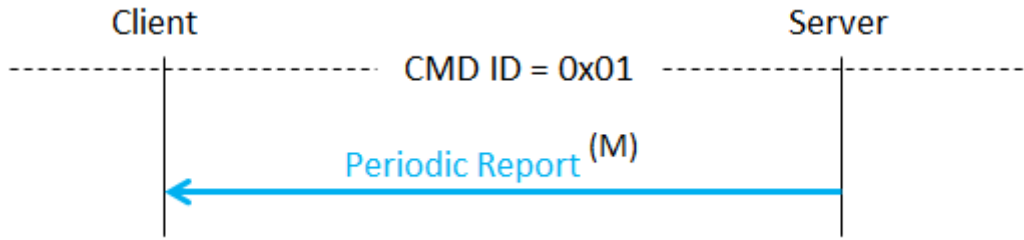


Figure 12 – Periodic Report Command

This command is being sent to a client implementing Crow’s Temperature interface in case the periodic report was enabled. This command will report to the client about the current measured temperature. The units are 1/100 of degrees Celsius (°C).

Implementation of this command is mandatory.

This command is carrying a data payload with the information described in Table 18.

Field Name	Field Description	Type	Value	M/O
Reported Temperature	The Measured Temperature in °C	S16	0xFFFF – 0x7FFF	M

Table 18 – Temperature Periodic Report Data Payload

6.7.4 Client to Server Commands List

None

6.8 0x7F16 – Crow’s AC Smart Plug Configurations

This interface defines the commands and attributes to be used by a device implementing Crow AC Smart Plug interface.

6.8.1 Server Attributes

Attribute ID	Attribute Name	Attribute Type	Attribute Values	Attribute Access	M/O
0x01	Power Up Relay State	U8	0x00 – 0x02	Read / Write	M

Table 19 – Crow’s AC Smart Plug Interface Attributes

6.8.1.1 Power Up Relay State

Power Up Relay State attribute value defines how the AC Smart Plug will behave after returning from power outage. There are three possible behaviours according to this attribute value:

- The value 0x00 indicates that after power outage the relay state is always OFF,
- The value 0x01 indicates that after power outage the relay state is always ON,
- The value 0x02 indicates that after power outage the relay state will be the same as its value before the power outage – LAST.

6.8.2 Client Attributes

None.

6.8.3 Server to Client Commands

None.

6.8.4 Client to Server Commands

None.

6.9 0x7F17 – Crow’s Air Pressure Interface

This interface defines the commands and attributes to be used by a device implementing Crow’s Air Pressure interface.

Air pressure readings are given in hectopascals (hPa), a multiple of pascal (Pa) (1hPa = 100Pa) which is an International System (SI) unit of measurement. The average pressure at sea-level is approximately 101325 Pa or 1013.25 hPa.

6.9.1 Server Attributes

Attribute ID	Attribute Name	Attribute Type	Attribute Values	Attribute Access	M/O
0x01	Periodic Report Interval	U32	0x00000000 – 0xFFFFFFFF	Read / Write	M
0x02	High Air Pressure Threshold	U16	0x0000 - 0xFFFF	Read / Write	M
0x03	Low Air Pressure Threshold	U16	0x0000 - 0xFFFF	Read / Write	M

Table 20 – Air Pressure Interface Attributes

6.9.2 Periodic Report Time

Periodic Report Interval attribute indicates what will be the time period between each two consecutive reports sent by the device.

The periodic report time can be set from a minimum of 2 seconds up to 0xFFFFFFFF seconds, with 2 seconds resolution.

If the Periodic Report Interval value is set to 0x00 – no periodic reports will be initiated by the device.

See Appendix B for Periodic Report Interval Factory Default Value.

6.9.3 Pressure Alert High Threshold

High Air Pressure Threshold attribute indicates what the Air Pressure level is that going above this level will cause the device to initiate an Alert message with the bit 1 set (Alert value equal to 0x0002). The units are in hectopascals (hPa).

To get the device supporting Air Pressure range the HUN-FUN *Air Pressure Interface – Minimum Measureable Air Pressure & Maximum Measureable Air Pressure* attributes shall be read.

To inhibit getting this alert use the Alert Interface Enable/Disable attribute.

See Appendix B for *High Air Pressure Threshold* Factory Default Value.

6.9.4 Pressure Alert Low Threshold

Low Air Pressure Threshold attribute indicates what the Air Pressure level is that going below this level will cause the device to initiate an Alert message with the bit 0 set (Alert value equal to 0x0001). The units are in hectopascals (hPa).

To get the device supporting Air Pressure range the HUN-FUN *Air Pressure Interface – Minimum Measureable Air Pressure & Maximum Measureable Air Pressure* attributes shall be read.

To inhibit getting this alert use the Alert Interface Enable/Disable attribute.

See Appendix B for *High Air Pressure Threshold* Factory Default Value.

6.9.5 Client Attributes

None.

6.9.6 Server to Client Commands

6.9.6.1 Periodic Report Command

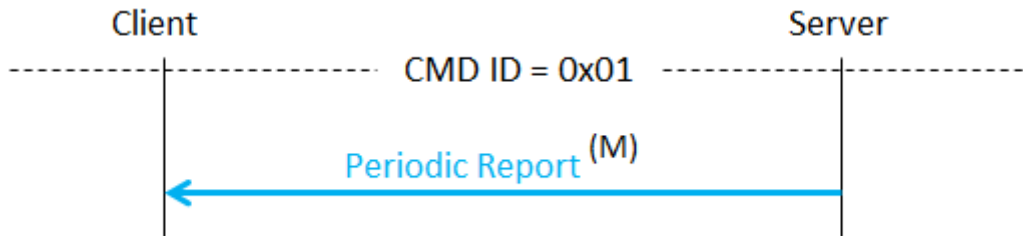


Figure 13 – Periodic Report Command

This command is being sent to a client implementing Crow’s Temperature interface in case the periodic report was enabled. This command will report to the client about the current measured air pressure. The units are in hectopascals (hPa).

Implementation of this command is mandatory.

This command is carrying a data payload with the information described in Table 21.

Field Name	Field Description	Type	Value	M/O
Reported Air Pressure	The Measured Air Pressure in hPa	U16	0x0000 - 0xFFFF	M

Table 21 – Air Pressure Periodic Report Data Payload

6.9.7 Client to Server Commands

None.

Appendix A – Crow’s ULE Devices LEDs

Crow’s ULE devices include two LEDs – Red & Green. The below table summarize the available LEDs indications, and which one can be inhibited or not using this interface. Inhibiting the LED’s operation will help to reduce the current consumption and by that extend the battery life time.

Product’s State / Indication	Green LED	Red LED	Can it be Inhibited?
Initialization Succeed / Idle	OFF	OFF	No
In Initialization Process	OFF	Blinking 500ms ON 250ms OFF	No
Initialization Failed - Detector Trouble	OFF	Blinking 250ms ON 250ms OFF forever	No
Registration Button Pressed	Constant ON	OFF	No
Registration Process	Blinking 250ms On 250ms OFF during all registration process	OFF	No
Registration Process completed and device is registered	Constant on for 3 seconds	OFF	No
Registration Process completed and device is NOT registered	OFF	Blinking 200ms On 800ms OFF for 20 Sec	No
Alarm Detection	OFF	250ms ON (one pulse)	Yes
Battery CUT OFF state	OFF	Constant ON	No
Identification Request	Alternately blinking 250ms ON and 750ms OFF for 10 seconds starting with the Green LED		No

Table 22 – The existed LEDs and their indications

Appendix B – Crow’s Devices Attributes Factory Default Values

The collection of configurable attributes and their factory default values shall be described in the product’s User Manuals and appear here as a reference only.

Product	Attribute Name	Factory Default Value	Value Means
PIR	<i>Interval (Keep Alive)</i>	0x000668A0	7 Minutes
	<i>LED’s State</i>	0x01	ON
	<i>Battery Level Measure Interval</i>	0x02255100	10 Hours
	<i>Hold Off Mode</i>	0x01	Retrigger
	<i>Hold Off Time</i>	0x0B	120 seconds
	<i>Sensitivity</i>	0x44 ('D')	High Sensitivity
	<i>Pet Immunity</i>	0x01	ON
Magnet	<i>Interval (Keep Alive)</i>	0x000668A0	7 Minutes
	<i>LED’s State</i>	0x01	ON
	<i>Battery Level Measure Interval</i>	0x02255100	10 Hours
Flood	<i>Interval (Keep Alive)</i>	0x000668A0	7 Minutes
	<i>LED’s State</i>	0x01	ON
	<i>Battery Level Measure Interval</i>	0x02255100	10 Hours
Temperature	<i>Interval (Keep Alive)</i>	0x000668A0	7 Minutes
	<i>LED’s State</i>	0x01	ON
	<i>Battery Level Measure Interval</i>	0x02255100	10 Hours
	<i>Periodic Report Interval</i>	0x2A	7 Minutes
	<i>High Temperature Threshold</i>	0x19	25°C
	<i>Low Temperature Threshold</i>	0x0F	15°C
Humidity	<i>Interval (Keep Alive)</i>	0x000668A0	7 Minutes
	<i>LED’s State</i>	0x01	ON
	<i>Battery Level Measure Interval</i>	0x02255100	10 Hours
	<i>Temp. Periodic Report Interval</i>	0x1A4	7 Minutes
	<i>High Temperature Threshold</i>	0x2D	45°C
	<i>Low Temperature Threshold</i>	0x0F	15°C
	<i>Hum. Periodic Report Interval</i>	0x1A4	7 Minutes
	<i>High Humidity Threshold</i>	0x1F40	80
	<i>Low Humidity Threshold</i>	0x07D0	20
	<i>Air Pressure Periodic Report Interval</i>	0x1A4	7 Minutes
	<i>High Air Pressure Threshold</i>	0x044C	1100
<i>Low Air Pressure Threshold</i>	0x01F4	500	
AC Smart Plug	<i>Power Up Relay State</i>	0x02	LAST
Smoke	<i>Buzzer Mute Time</i>	0x0000012C	300 Seconds
	<i>Periodic Alert Report Interval</i>	0x02	2 Seconds

Table 23 – Crow’s Products Factory Default Values

Appendix C – Hold Off Time & Hold Off Mode

The PIR’s definition for *Hold Off Time* is as follow:

The minimum time period elapsed from a Motion detection that initiated a transmission till the PIR will resume its full functionality and will be ready to detect and alert on the next Motion detection.

The below figure illustrate the different behaviours of the PIR device depending on the *Hold OFF Mode* attributet value – Normal or Retrigger.

Using the Retrigger mode will cause fewer transmissions from Server to Client and those help reducing the current consumption and by that extend the Device battery life time.

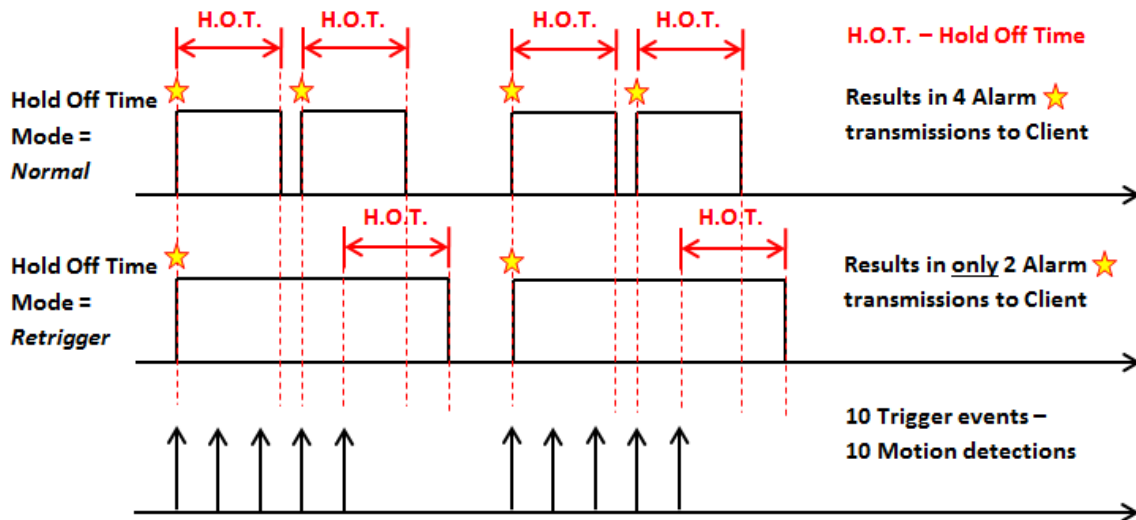


Figure 14 – Hold Off Mode – explanation figure

Appendix D – SUOTA

The SUOTA – SW Update Over The Air, allows upgrading the devices SW without returning the devices for any service activity in Crow or in any other repair center.

Crow is committed to continue develop and improve its products to the full satisfaction of its customers. The, SUOTA feature can be used to upgrade devices with a new SW version due to added features or BUGs fixed.

The new SW version distribution process will be varying from one customer to another. Crow will allow its customer to download new SW versions (as well as Release Notes) directly from Crow's WEB site. These SW versions shall be generic one. In case a customised SW version will be created for a customer, Crow will forward that SW version on a different way.

It is the Customer responsibility to get the new version from Crow and locate it in a suitable location, such that will be accessible by the Customer's Base Stations.

The trigger for upgrading the units is also under the customer responsibility.

Additional notes:

1. The read version string from the device has the following structure "<DECT SW VER><DELIMITER CHARACTER><HOST SW VERSION>" where the <DELIMITER CHARACTER> is equal to the character "#".
2. At the moment and if there is no other notification, there is no defined order for the updated SW versions, meaning that the "HOST" and/or the "DECT" SW version can be upgraded/downgraded regardless the other one. Consider the following two scenarios were both are started from the same state in which the Current read SW version field includes the following string:

1.1.J 26.24.8#0.1.0.13

DECT current SW version is - 1.1.J 26.24.8

HOST SW Version is: 0.1.0.13

Scenario 1 - updating the "DECT" and afterwards the "HOST" -

Performing successfully the SUOTA process to the DECT with new SW Version 1.1.J 27.17

Reading the SW version field from the device will yield the following string -

1.1.J 27.17#0.1.0.13

Performing successfully the SUOTA process to the HOST with new SW Version 0.1.0.15

Reading the SW version field from the device will yield the following string -

1.1.J 27.17#0.1.0.15

Scenario 2 - updating the "HOST" and afterwards the "DECT" -

Performing successfully the SUOTA process to the HOST with new SW Version 0.1.0.15

Reading the SW version field from the device will yield the following string -

1.1.J 26.24.8#0.1.0.15

Performing successfully the SUOTA process to the DECT with new SW Version 1.1.J 27.17

Reading the SW version field from the device will yield the following string -

1.1.J 27.17#0.1.0.15

Appendix E – Response Codes

The following table contains the respond code associated with crow propriety Interfaces:

Response Code	Textual Meaning	Description
0x00	OK	The request/command was correctly received/processed.
0x01	Fail: Not authorized	The requesting device needs to authenticate itself or it is simply not authorized to perform that request.
0x02	Fail: Invalid argument	One or more request/command arguments are invalid.
0x03	Fail: Not supported	Some requested feature, command or attribute is not implemented on the destination device. The operation will permanently fail.
0x04	Fail: Read Only attribute	The attribute you are trying to set is a read only attribute. The operation will permanently fail.
0x05	Fail: Invalid mode	Operation failed since device is in invalid mode
T.B.D.	T.B.D.	T.B.D.
0xFF	Fail: General Error	An unspecified error has occurred, the operation failed.

Table 24 – Crow’s propriety interfaces response codes

Appendix F – Temperature Device

Crow’s Temperature device includes two independent temperature sensors – Internal to the device and External at the edge of the wire probe. See below picture.

Since the two temperature sensors in included in one device, there are two Units implementing the Temperature Interface 0x7F12:

- Unit 1 – the Internal sensor,
- Unit 2 – the External sensor.

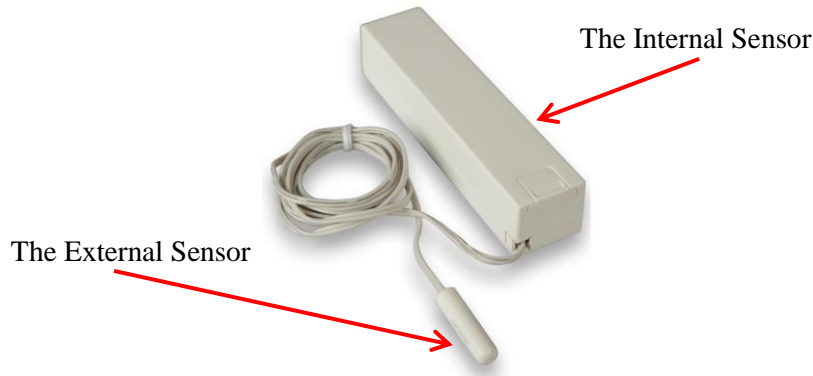


Figure 15 – Temperature device with two sensors

The Internal and External sensor are both temperature sensors but each of them has its own sensing temperature range and other characteristics as can be seen in the below table:

Feature	Internal Sensor	External Sensor
Operating Temperature	-10°C - +55°C 0xF6 – 0x37	-40 – +80°C 0xD8 – 0x50
Tolerance in -10°C to 55°C	±1°C	±1°C
Tolerance in -40°C to -10°C	NA	±1°C
Tolerance in +55°C to 80°C	NA	±2°C

Table 25 – HW Characteristics of the used Temperature Sensors