HVAC Controller

UC711

Payload Protocol (HEX)

Contents

Chapter 1. Preface

Readers

This guide introduces the raw HEX payload protocol used to communicate with the device. It is intended for developers or users who integrate the device without Milesight gateways or codecs.

This document does not describe physical installation, HVAC wiring, and configuration steps in detail. Please use it together with the related documents.

Related Document

Document	Description
UC711 User Guide	Provides introductions, compatibility check, wirings, installation and configuration steps.
UC711 BACnet Object List	Lists the BACnet objects exposed through a Milesight gateway with the BACnet feature enabled.

Copyright Statement

Revision History

Release Date	Version	Revision Content
July 31, 2026	V1.0	Initial version.

Chapter 2. Overveiw

All messages follow the following format (HEX), the Parameter/Data field must follow **little-endian** byte order:

Command ID	Parameter/Data	...
N Bytes	0-N Byte	...

For decoder and encoder examples, please find files on https://github.com/Milesight-IoT/SensorDecoders. For details of uplink reports and downlink commands please refer to the sections below.

Chapter 3. Uplink Data

This chapter describes the uplink packets reported by the device.

Basic Information Packet

After joining the network, the device reports a packet containing the basic device information, totaling four reports.

Packet description:

Item	Byte	Command	Description
Device Status	1+1	c8	00: Off, 01: On
TSL Version	1+2	df	Example: 01 02 = V1.2
Device Request	1	ee	Send after reset
Device Version	1+8	da	Hardware version (2B) + Software version (2B) + 00000000
OEM ID	1+2	d9	4 digits
Device Type	2+1	cf00	00: Class A, 01: Class B, 02: Class C, 03: Class C to B
Serial Number	1+8	db	16 digits

Example:

df0100 ee db6407068ec3790001 da0102010100000000 d90000 c801 cf0002	
Command	**Value**
df	TSL Version: 01 00 => V1.0
ee	Reset
db	SN: 6407068ec3790001
da	Hardware Version: 0102 => V1.2 Software Version: 0101=> V1.1
d9	OEM ID: 0000
c8	01: Device is on

df0100 ee db6407068ec3790001 da0102010100000000 d90000 c801 cf0002	
Command	**Value**
cf00	02: Class C

Json output after using Milesight default decoder:


```
{
  "all_configurations_request_by_device": 1,
  "device_status": 1,
  "lorawan_configuration_settings": {
    "mode": 2
  },
  "oem_id": "0000",
  "product_sn": "6407068ec3790001",
  "tsl_version": "v1.0",
  "version": {
    "firmware_version": "v1.1",
    "hardware_version": "v1.2"
  }
}
```


Periodic Data Packet

The device reports a data packet at a configured reporting interval.

Packet description:

Item	Byte	Command	Description
Data Source	1+1	05	03=WT401
Temperature	1+2	06	INT16/100, Unit: °C
Temperature Exception	1+1	03	03=No data
Humidity	1+2	08	INT16/10, Unit: %RH
Humidity Exception	1+1	07	03=No data
Temperature Control Mode and Status	1+1	0c	**Bit 7-4**: 0000=Heat, 0010=Cool, 0011=Auto

Item	Byte	Command	Description
			Bit 3-0: 0000=Standby, 0001=Stage-1 Heat, 0010=Stage-2 Heat, 0111=Stage-1 Cool
Fan Mode and Status	1+1	0d	**Bit 7-4**: Fan Mode, 0000=Auto, 0001=Circulate, 0010=On, 0011=Low, 0100=Medium, 0101=High **Bit 3-0**: Fan Status, 0000=Off, 0001=On, 0010=Low Speed, 0011=Medium Speed, 0100=High Speed
System Status	1+1	0f	**Bit 2-1**: 00=Vacant, 01=Occupied, 10=Night Occupied **Bit 0**: 0=System Off, 1=System On
Heating Target Temperature	1+2	10	INT16/100, Unit: °C
Cooling Target Temperature	1+2	12	INT16/100, Unit: °C

Example:

0503 069b0a 085f02 0c30 0d00 0f03 10a406 12f00a	
Command	**Value**
05	Data source: 03=WT401
06	Temperature: 9b 0a=>0a 9b =2715/100=27.15°C
08	Humidity: 5f 02 => 02 5f = 607/10=60.7%RH
0c	30=>0011 0000 Temperature Control Mode: 0011=Auto Temperature Control Status: 0000=Standby
0d	00=> 0000 00000 Fan Mode: 0000=Auto Fan Status: 0000=Off
0f	03=0011, 1=System On, 01=Occupied

0503 069b0a 085f02 0c30 0d00 0f03 10a406 12f00a	
Command	**Value**
10	Heating Target Temperature: a4 06=>06 a4=1700/100=17°C
12	Cooling Target Temperature: f0 0a => 0a f0=2800/100=28°C

Json output after using Milesight default decoder:


```
{
   "celsius_target_temperature1": 17,
   "celsius_target_temperature2": 28,
   "celsius_temperature": 27.15,
   "fahrenheit_target_temperature1": 62.6,
   "fahrenheit_target_temperature2": 82.4,
   "fahrenheit_temperature": 80.87,
   "fan_control_info": {
      "mode": 0,
      "status": 0
   },
   "humidity": 60.7,
   "system_status": {
      "occupy_status": 1,
      "reserved": 0,
      "system_switch": 1
   },
   "temperature_control_info": {
      "mode": 3,
      "status": 0
   },
   "temperature_humi_data_source": 3
}
```


Alarm Packet

The device reports the following types of alarm packets.

Item	Byte	Command	Description
Temperature Alarm	1+3	02	**Byte 1**: Alarm type, 10= Freeze Protection Alarm Release, 11=Freeze Protection Alarm **Byte 2-3**: Temperature, INT16/100, Unit: °C

Example:

02116400	
Command	**Value**
02	11=Freeze Protection Alarm 64 00 => 00 64=100/100=1°C

Json output after using Milesight default decoder:

```
{
  "anti_freeze_protection_status": 1,
  "celsius_temperature": 1,
  "fahrenheit_temperature": 33.8,
  "temperature_alarm": {
    "anti_freeze_protection_trigger": {
      "celsius_temperature": 1,
      "fahrenheit_temperature": 33.8
    },
    "type": 17
  }
}
```

Status Change Packet

The device reports a packet when a parameter or status is changed.

1. Configuration Change Report

   A configuration change report is sent when system status, target temperature, temperature control mode or fan mode changes. The change report format is the same as the periodic data report.

2. Relay status change report

When Relay Change Report is enabled, the device will send this report whenever the relay status changes.

Byte	Command	Description
1+1	01	For per bit 0=disconnected, 1=connected Bit 0: Y1 Bit 1: W1 Bit 2: O/B Bit 3: GL Bit 4: GM Bit 5: GH

Example:

0103	
Command	**Value**
01	03 => 0000 0011 =Y1&W1 connected, others disconnected

3. Bluetooth Status Packet.

A Bluetooth status packet will be reported once after the device joins the network or when Bluetooth pairing status changes.

Byte	Command	Description
1+10	ba	**Byte 1**: 00 **Byte 2**: 00=Not paired, 01=Paired, 02=Disconnected **Byte 3-10**: Paired device EUI

Example:

ba000224e124826068b876	
Command	**Value**
ba	02=Disconnected Paired device EUI: 24e124826068b876

Json output after using Milesight default decoder:


```
{
  "ble_new_event": [
    {
      "index": 0,
      "mac": "24e124826068b876",
      "status": 2
    }
  ]
}
```


Thermostat Data Packet

When UC711 controller is paired with or connected to the wireless thermostat (WT401) and the communication mode of the thermostat does not include LoRa, the thermostat status will be reported via UC711 controller. The UC711 can forward the following information from the WT401 thermostat:

- Battery Level: transfer when the thermostat turns on or the battery level changes;
- Battery Alarm: transfer when a low battery alarm is triggered or cleared;
- Button Event Report: transfer when the corresponding button is pressed;
- Device Status: transfer when the thermostat turns off.

Byte	Command	Description
1+3	30	**Byte 1**: 00 **Byte 2**: Data type, 00=Battery Level, 0f=Battery Alarm, 0d=Button Event Report, c8=Device Status **Byte 3**: • Battery Level: UINT8, Unit: % • Battery Alarm: 00=Normal, 01=Low battery voltage • Button Event Report: 00=Button 1, 01=Button 2, 02=Button 3 • Device Status: 00=Off

Example:

30000062	
Command	**Value**
30	00=Battery Level, 62=>98%

Json output after using Milesight default decoder:


```
{
   "data_transparent": {
      "res_cmd": 0,
      "res_cmd1": {
         "battery": 98,
         "command": 0
      }
   }
}
```

Chapter 4. Downlink Commands

Downlink commands can be used for remote control of device through a network server. The downlink port (application port) is 85 by default and can be configured through ToolBox.

If you need to query the configurations first, please send a query command in the following format:

Command (1B)	Command ID Length (1B)	Command ID (1-N Byte)
ef	Query command ID length in bytes	Query command ID

If the device receives a downlink command requiring confirmation, it will send a reply packet in the following format:

Command (1B)	Result & Length (1B)	Command ID (1-N Byte)	...
ef	Bit 7-4: result code, 0=success, 5=parameter error, 7=execute error, 10=association error Bit 3-0: command length	Same as downlink command	...

For details of downlink commands please refer to the sections below.

Downlink Commands for Network Parameters

This section describes the downlink commands for network settings.

Configure Communication Parameters

Command description:

Item	Byte	Command	Value	Example
Reporting Interval	2+3	6600	**Byte 1**: 01 **Byte 2-3**: Interval time, range: 1-1440, unit: minute, default: 10	Reporting interval is 15 minutes: **6600010f00**
Reset Blue tooth Name	2	b400	-	-
	2	b401	-	-

Item	Byte	Command	Value	Example
Cancel Bluetooth Pairing				

Rejoin the Network

Command description:

Item	Byte	Command	Value
Rejoin the Network	1	b6	-

Downlink Commands for Temperature Control Parameters

This section describes the downlink commands for temperature control related parameters.

Configure Installation Parameters

Command description:

<table>
<tr><th>Item</th><th>Byte</th><th>Command</th><th>Value</th><th>Example</th></tr>
<tr><td>Wiring Settings</td><td>2+3</td><td>8e00</td><td>Byte 1:
<table><tr><th>Bit</th><th>Wire</th><th>Value</th></tr><tr><td>7-6</td><td>W1</td><td rowspan="4">00=Disable,
01=Enable</td></tr><tr><td>5-4</td><td>O/B</td></tr><tr><td>3-2</td><td>G/GH</td></tr><tr><td>1-0</td><td>Y1</td></tr></table>Byte 2: 00
Byte 3:
<table><tr><th>Bit</th><th>Wire</th><th>Value</th></tr><tr><td>3-2</td><td>GM</td><td rowspan="2">00=Disable,
01=Enable</td></tr><tr><td>1-0</td><td>GL</td></tr></table></td><td>Enable Y1, W1 and GL: 8e00410001</td></tr>
</table>

Item	Byte	Command	Value	Example
Reversing Valve	2+1	8e01	00=Energize on Heat, 01=Energize on Cool (default)	Set energize on Heat: **8e0100**
Compressor and Auxiliary Heat Linkage	2+1	8e02	00=Disable (default), 01=Enable	Enable: **8e0201**
Fan Control during Heating	2+1	8e03	00=Thermostat (default), 01=HVAC System	Set HVAC system: **8e0301**
System Protection	2+1	7400	00=Disable (default), 01=Enable	Enable: **740001**
Minimum Running Duration	2+1	7401	Range: 1-60, Unit: min, Default: 5	Set 60 minutes: **74013c**
Freeze Protection	2+1	7100	00=Disable (default), 01=Enable	Enable: **710001**
Freeze Protection Temperature	2+2	7101	INT16/100, Unit: °C, Range: 1~5, default: 3	Set 1°C: **71016400**

Configure Temperature Control Basic Parameters

Command description:

Item	Byte	Command	Value	Example
System Status + Temperature Control Mode + Target Temperature	1+6	59	**Byte 1**: 00=System Off, 01=System On **Byte 2**: 00=Heat, 02=Cool, 03=Auto, ff=No parameter **Byte 3-4**: Heating Target Temperature, INT16/100, Unit: °C, Range: 5~35, ffff=No parameter **Byte 5-6**: Cooling Target Temperature, INT16/100, Unit: °C, Range: 5~35, ffff=No parameter	System On and Heat mode: **590100ffffffff**
System On/Off	1+1	6f	00=Off (default), 01=On	System on: **6f01**

Item	Byte	Command	Value	Example
Temperature Control Mode	2+1	6000	00=Heat (default), 02=Cool, 03=Auto	Temperature control mode is Cool: **600002**
Target Temperature Resolution	1+1	65	00=0.5 (default), 01=1	Target temperature resolution is 1: **6501**
Target Temperature	1+3	61	**Byte 1**: 00=Heat, 02=Cool **Byte 2-3**: target temperature, INT16/100, Unit: °C, Range: 5~35	Cooling target temperature is 26°C: **6102280a**
Target Temperature Tolerance	1+3	62	**Byte 1**: 00=Heat, 02=Cool **Byte 2-3**: tolerance, INT16/100, Unit: °C, Range: 0.1~5	Cooling target temperature tolerance is 1°C: **62026400**
Target Temperature Regulation Range	1+5	63	**Byte 1**: 00=Heat, 02=Cool **Byte 2-3**: Min. Range, INT16/100, Unit: °C, Range: 5~35 **Byte 4-5**: Max. Range, INT16/100, Unit: °C, Range: 5~35	Cooling target temperature regulation range is 22 to 35 °C: **63029808ac0d**
Target Humidity Range Min	2+2	7202	UINT16/10, Range: 0-100, Unit: %RH, Default: 40	Min. range is 50%RH: **7202f401**
Target Humidity Range Max	2+2	7203	UINT16/10, Range: 0-100, Unit: %RH, Default: 80	Max. range is 70%RH: **7203bc02**
Fan Mode	2+1	7000	00=Auto (default), 01=Circulate, 02=On, 03=Low Speed, 04=Medium Speed, 05=High Speed	Fan mode is circulate: **700001**
Fan Circulate Operation Time	2+1	7003	Range: 5-55, Unit: min/h, Default: 30	Set 55 min/h: **700337**
Fan Regulate Humidity	2+1	7001	00=Disable (default), 01=Enable	Enable: **700101**

Item	Byte	Command	Value	Example
Fan Regulate Interval	2+1	7002	Range: 5-55, Unit: min/h, Default: 30	Set 55 min/h: **700237**
Fan Delay	2+1	8200	00=Disable, 01=Enable (default)	Disable: **820000**
Fan Delay Duration	2+2	8201	Range: 30-3600, Unit: s, Default: 60	Set 30 seconds: **82013c00**

Configure Energy Saving Parameters

Command description:

Item	Byte	Command	Value	Example
Energy Saving Settings	1+1	84	00=Disable (default), 01=Enable	Enable: **8401**
Level 1 Energy Saving	3+1	850000	00=Disable (default), 01=Enable	Enable level 1 energy-saving: **85000001**
Level 2 Energy Saving	3+1	850100	00=Disable (default), 01=Enable	
Level 1 Vacant Duration	3+2	850001	UINT16, Range: 1-1440, Unit: min, Default: 480	Level 1 Vacant Duration is 60 minutes: **8500013c00**
Level 2 Vacant Duration	3+2	850101	UINT16, Range: 1-1440, Unit: min, Default: 720	
Level 1 Energy Saving Target Temperature Tolerance	3+2	850002	UINT16/100, Range: 0.1-5, Unit: °C, Default: 2	Level 1 Energy Saving Target Temperature Tolerance is 1°C: **8500026400**
Level 2 Energy Saving Target Temperature Tolerance	3+2	850102	UINT16/100, Range: 0.1-5, Unit: °C, Default: 4	

Configure Unilateral Tolerance

Command description:

Item	Byte	Command	Value	Example
Unilateral Tolerance	1+1	77	00=Disable (default), 01=Enable	Enable: **7701**

Control Stage Switch

Command description:

Item	Byte	Command	Value	Example
Setforward	2+1	8300	00=Disable, 01=Enable (default)	Disable setback: **830100**
Setback	2+1	8301	00=Disable, 01=Enable (default)	
Heat Stage-up Switch Change Time	2+1	8302	Range: 1-30, Unit: min, Default: 5	Heat stage-up change time is 30 minutes, change value is 1°C: **83020583036400**
Heat Stage-up Switch Change Value	2+2	8303	UINT16/100, Unit: °C, range: 0.5-5, default: 1	
Cool Stage-up Switch Change Time	2+1	8304	Range: 1-30, Unit: min, Default: 5	
Cool Stage-up Switch Change Value	2+2	8305	UINT16/100, Unit: °C, range: 0.5-5, default: 1	
Temperature Delta 1 (ΔT1)	2+2	8306	UINT16/100, Unit: °C, range: 0-10, default: 3	ΔT1 is 2°C: **8306c800**
Temperature Delta 2 (ΔT2)	2+2	8307	UINT16/100, Unit: °C, range: 0-10, default: 5 **Note:** ΔT2 > ΔT1	

Downlink Commands for Auxiliary Features

This section describes the downlink commands for the auxiliary features.

Configure General Parameters

Command description:

Item	Byte	Command	Value	Example
Reboot	1	be	-	-
Temperature Unit	1+1	64	00=°C (default), 01=°F	Set unit as °F: **6401**
Enquiry Periodic Report	1	b9	-	-
Relay Change Report	1+1	80	00=Disable (default), 01=Enable	Enable: **8001**

Configure Time Parameters

Command description:

Item	Byte	Command	Value	Example
UTC Time Zone	1+2	c7	INT16/60	UTC-4: **c710ff**
Daylight Saving Time	1+10	c6	**Byte 1**: 00=Disable (default), 01=Enable **Byte 2**: DST bias, unit: min, range: 1-120 **Byte 3-6**: Start time, Month (1B)+Week&Day (1B) + Minute Time (2B) **Byte 7-10**: End time, Month (1B)+Week&Day (1B) + Minute Time (2B) Week&Day:	Enable DST, start time is October 1st Sunday 2:00, end time is April 1st Sunday 2:00, bias is 60 minutes: **c6013c0a17780004177800**

Item	Byte	Command	Value		Example
			Bit7-4	Bit3-0	
			Week number, range: 1-5	Weekday, range: 1-7	
Sync time from LNS	1	b8	-		-

Chapter 5. Services

Milesight provides customers with timely and comprehensive technical support services. End-users can contact their local dealer to obtain technical support. Distributors and resellers can contact Milesight directly for technical support.

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