

# WiFi Temperature/Humidity 3008-04-V3

## FEATURES



- NIST Traceable Digital Temperature/Humidity Sensor
- 16 mw 2.4 GHz 802.11b wireless radio
- Communicates with Industry Standard Access Points
- Configurable Alarm Utility with Audible and Visual Alarm Indication
- Transmission and alarm acknowledgement
- Up to 3 year battery life
- Supports WEP 128 and WPA2-PSK (AES)
- Small data packets (~75 bytes)
- Temperature/Humidity input values sampled every 15 seconds
- Supports DHCP or Static IP
- Channel agility
- FCC, CE, and IC Class B compliant

## DESCRIPTION

The Point Sensor WiFi Room Sensor is a battery operated digital temperature/humidity sensor with a microprocessor controlled IEEE 802.11b radio transceiver. The sensor has an on board clock that allows it to spend most of the time in a low power quiescent state. Onboard calibration tables provide a linear temperature output using a Sensirion SHT71 "single chip" digital temperature/humidity sensor. This information is combined with a CRC-16 error check and transmitted in a very short data packet that results in a very short transmitter on-time. This architecture allows the Point Sensor WiFi Room Sensor to consume very low energy.

Upon power up the sensor scans all available WiFi network channels (typically 1, 6, and 11) and associates with the Access Point exhibiting the strongest signal, provided the correct security and encryption setting agree. This feature can also be disabled to allow the user to operate the sensor on a fixed channel.

Alarm limits for temperature, humidity, and time span are user selectable through an easy to use utility. An LED is included on the sensor to indicate an alarm condition. In addition to the LED for visual alarm indication, an audible alert is included to alert the user to an alarm condition when the sensor is not in the line of sight. The audible alarm can be silenced by depressing the reset button on the side of the enclosure. The alarm utility includes a "Return-to-Normal" transmission state so the user can tell the exact duration of the alarm. The alarm can be acknowledged by sending a radio packet back to the sensor or by a user selectable time-out. Upon acknowledgement, the LED displays a different flash sequence.

Dimensions (enclosure)	4.5 H X 2.75 W X 1.0 D (inches)
Operating Temperature	-40° to 60° C
Temperature Accuracy (@25° C)	+/- .4° C
Humidity Accuracy (20% to 80% RH)	+/- 3%
Sample Rate	15 seconds
Battery Life	87,600 Transmissions
Battery	(2) 1.5 vdc Lithium L91
Weight	5.0 oz.
Storage Temperature	-40° to 60° C

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# UDP Packet Specification

## OVERVIEW

Point Six Wireless Wifi sensors send a standard sensor packet contained in a UDP wrapper. This UDP wrapper contains information about the sender. See the document "**Point Six Wireless Transmitter Packet Data Specification**" for information about the standard sensor packet.

Wifi sensors normally send UDP packets with a command of 2. The Wifi Sensor Utility has a mode where it will send UDP packets on behalf of a sensor using command 5. The host application (like Point Managers, OneSix OPC Server or other applications) will respond with the UDP Host Acknowledgment packet. The acknowledgement packet allows the Wifi Sensor Utility to confirm that a host is receiving the UDP packets. Host applications should respond with an acknowledgement if a command 5 packet is received. The Wifi Sensor Utility provides a bogus sensor packet with type 0 and sensor serial number of all zeros. This bogus sensor packet should not be processed by the host application but the UDP Host Acknowledgement packet should be sent.

Phase 1 Wifi sensors sent a UDP Packet just once for every transmit interval. Phase 1 sensors expect no host acknowledgement.

Phase 2 Wifi sensors will send a UDP Packet with a programmable number of tries (with 15 seconds between tries) until an UDP Host Acknowledgement packet was received for every transmit interval or when an alarm is fired. If an alarm is fired, the sensor will populate the "Alarm" field with the alarm state.

## UDP SENSOR PACKET

Identifier		Cmd		Data1						Data2					
0	1	2	3	4	6	24	32	33	34	63	64	67	70	72	73
C3	3C	00	<i>Cmd</i> (1)	<i>PktCnt</i> (2)	<i>MAC</i> (18)	<i>Reserved</i> (8)	<i>Locator1</i> (1)	<i>Locator2</i> (1)	<i>Sensor Pkt</i> (29)	<i>Org</i> (1)	<i>Transmissions</i> (3)	<i>Max Transmissions</i> (3)	<i>Period</i> (2)	<i>Alarm</i> (1)	<i>Reserved</i> (2)

Where

C3 3C - 2 byte identifier

*Cmd* – (1 byte) Command: 2 – UDP Sensor Data; 5 – UDP Simulated Sensor Data (Wifi Sensor Utility).

*PktCnt*<sup>†</sup> – (2 bytes) packet count. The device will increment this count every time it transmits a UDP PassThru packet.

*MAC* – (18 bytes – null terminated string) device MAC address. If the MAC address does not apply this field will contain a unique identifier for the device. If not used, this field will be set to all zeros. (ex: "00:23:b4:39:03:47") (NULL terminated)

*reserved* – (8 bytes) set all bytes to 0.

*Locator1* – character that represents where a sensor packet entered the repeater network. (" ", "a"- "z" and "A"- "Z"). Normally set to NULL(0) for Wifi sensors.

*Locator2* - character that represents where a sensor packet entered the repeater network. (" ", "a"- "z" and "A"- "Z"). Will be identical to *Locator1*. Normally set to NULL(0) for Wifi sensors.

*Sensor Pkt* – (29 bytes) sensor packet. (includes the CR terminator) See the document "**Point Six Wireless Transmitter Packet-Data Specification**" for more information about specific sensors.

*Org* – originator type that generated the packet. 0 – Wifi Sensor; 1 – Point Manager; 2 – Ethernet Point Repeater; 3 - Application

*Transmissions*<sup>†</sup> – (3 bytes) number of transmissions since last battery reset. 0 if no battery support

# UDP Packet Specification

*Max Transmissions*<sup>+</sup> – (3 bytes) maximum number of transmissions for the power source (0 to 16777216 where 0 is unlimited)

*Period*<sup>+</sup> – (2 bytes) transmit interval in seconds.

*Alarm* – (1 byte) sensor is in alarm state: 0 – no alarm

Bit 0: I/O 1 – low alarm

Bit 1: I/O 1 – high alarm

Bit 2: I/O 2 – low alarm

Bit 3: I/O 2 – high alarm

Bit 4: I/O 1 – low alarm reset: 0 - reset

Bit 5: I/O 1 – high alarm reset: 0 - reset

Bit 6: I/O 2 – low alarm reset: 0 - reset

Bit 7: I/O 2 – high alarm reset: 0 - reset

*Reserved* – (2 bytes) set all bytes to 0.

<sup>+</sup> Most significant byte is first.

Note: UDP Sensor Packets that include only Data1 are 63 bytes. UDP Sensor Packets that include Data1 and Data2 are 75 bytes. Older sensors contained Data1 but not Data2. Newer sensors include Data1 and Data2.

Example:

```
0000 c3 3c 00 02 41 f7 30 30 3a 30 36 3a 36 36 3a 37
0010 37 3a 30 33 3a 32 41 00 00 00 00 00 00 00 00
0020 00 00 35 33 37 31 31 36 31 30 30 38 30 30 30 30
0030 30 30 30 30 46 33 38 31 34 38 36 38 31 36 0d 00
0040 00 15 5a 01 56 30 01 00 00 00 00
```

## Battery Usage Indicator

Estimated Battery Life Percentage =  $100 - \text{Transmissions} / \text{Max Transmissions} * 100$

Estimated Battery Expiration =  $\text{CurrentTime} + (\text{Max Transmissions} - \text{Transmissions}) * \text{Period}$

If battery usage information is not supported by the sensor or device, then *Transmissions*, *Max Transmissions* and *Period* will all be zero.

Battery Usage Indicator is reset by pressing “Service” button while turning the sensor On.

## UDP Host Acknowledgement

Identifier		Cmd	
0	1	2	3
C3	3C	00	06

Where

C3 3C - 2 byte identifier

00 06 – (2 bytes) UDP Host Acknowledgement

# UDP Packet Specification

## FUTURE EXPANSION

The UDP Sensor Packet may be expanded in one of two ways: 1) Append additional data fields to the original 75 bytes. An application should accept packets of 75 bytes or greater. When it receives the packet it should process the 75 bytes and if the packet is longer, optionally process the additional bytes. 2) Additional "Cmd" parameters will be created with unique packet formats for the new commands.

## CURRENT WIFI SENSORS

The following is list of the current types of sensors with their corresponding standard sensor packet types. See the document "**Point Six Wireless Transmitter Packet Data Specification**" for information about the standard sensor packet.

Description	Point Six Wireless Packet Device ID Name	Point Six Wireless Packet Device ID/Service ID
RTD	TEMP	54/53
Dual RTD	DUALANALOG	76/75
Humidity/Temperature	HUMIDITY2	52/51
Vibration	DUALANALOG	76/75

# Wireless Transmitter Packet-Data Specification

## “Humidity2” (51/52)

**IDSSSSSSSSnnrrhhhttttCCCCKK<CR>**

*Note: All fields are in ASCII Hex*

“ID”

The device type field: Humidity2 has device type **52** hex. A **51** hex when in service mode.

“SSSSSSSS”

The MS-30 bits of these 4-bytes are the serial number of the Humidity2 device. The LS-2 bits are set to zero.

“nn”

Always “00”.

“rr”

This 1 byte field is not used and contains generic 00 data.

“hhh”

This is the humidity data field. This field is 16 bits stored MSB first (bits 15-8) and LSB last (bits 7-0) from left to right. This field has a possible range of 0 to 4095 where 0 is 0 %RH and 4095 is 100 %RH

“ttt”

This is the temperature data field. This field is 16 bits stored MSB first (bits 15-8) and LSB last (bits 7-0) from left to right. This field has a possible range of 0 to 4095 where 0 is -40 degC and 4095 is 85 degC.

“CCCC”

This field is the CRC-16 error check as was originally received and checked. This CRC is over the first 11 bytes of the packet starting with the device type and ending with but not including CRC-16.

“KK”

This field is the mod 256 sum of all the binary data values as represented by the ASCII hex values in the response but does not include the <CR>.

Example:

526035700402000625085249D1FC

SN = 60357004H ; Humidity = 0625H = 38.4%RH ; Temp = 0852H – 25.0 degC; CRC16 =49D1H; FC - Checksum

51603570040200060A084CF7540B