

ZigBee Temp/Humidity Transmitter 3009-06-V6



FEATURES

- Digital Temperature/Humidity Sensor with logging
- 50 mw 2.4 GHz ZigBee radio module
- Wireless Configuration
- Configurable Alarm Utility with Audible and Visual Alarm Indication
- Onboard calibration table provides linear output
- Up to 3-4 year battery life
- Small data packets (~75 bytes)
- Temperature and Humidity sampled every 15 seconds
- Programmable log rates (2 minutes to 1 hour)
- Models available that support external power (5-24vAC or DC)
- FCC, CE, and IC Class B compliant

DESCRIPTION

The Point Sensor ZigBee Room Sensor is a battery operated digital temperature/humidity sensor with a microprocessor controlled 2.4GHz ZigBee 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 "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 ZigBee Room Sensor to consume very low energy.

The Point Sensor ZigBee Room sensor also has onboard memory allowing it to function as a data logger. The sensor has programmable log rates ranging from 2 to 60 minutes. The sensor can store up to 3,072 data and/or event records.

Alarm limits for temperature, humidity, and time span are user selectable through an easy to use utility and can be configured wirelessly. 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 face 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.



Installation and Operation Instructions

Specifications

Transmission rate	User Programmable
Log rate	User Programmable
Dimensions (enclosure)	5.5 H X 3.44 W X 1.0 D (inches)
Operating Temperature	-40° to 85° C
Temperature Accuracy (@25° C)	±0.2° C
Humidity Accuracy (20% to 80% RH)	±2%
Sample Rate	15 seconds
Battery Life	Up to 157,680 Transmissions
Battery	3.6 vdc Lithium Thionyl Chloride (2)
Weight	5.0 oz.
Storage Temperature	-40° to 85° C

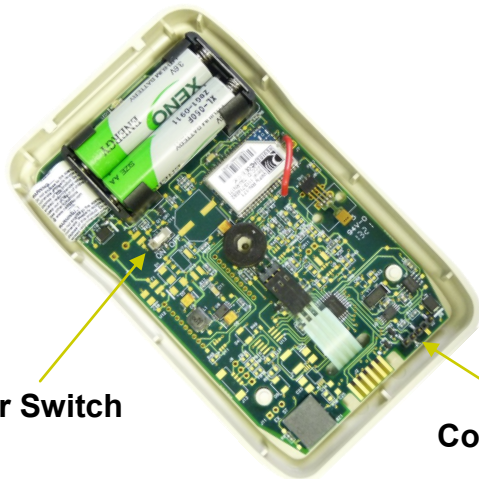
ZigBee Temperature/Humidity Transmitter

The Point Sensor ZigBee Temp/Humidity sensor transmits a temperature, humidity, and a unique serial number to a ZigBee Receiver. The Point Sensor ZigBee Temp/Humidity sensor is enclosed in a high impact ABS enclosure for direct surface mounting in the environment to be measured. The Point Sensor ZigBee Temp/Humidity sensor is battery operated and transmission times are user programmable.

Application: Apply the sensor to the surface to be monitored with double-sided adhesive tape.

Start/Stop Function: The sensor is started when the On/Off switch is moved to the ON position. The Sensor has surface pushbutton (Service Switch) that can be activated to send "service" packets. Momentarily activating this button will cause the device to transmit a special installation status mark in the data packet immediately after the button is released. The immediate transmission of temperature, ID, and installation status mark will occur anytime the service switch is activated. The Point Sensor ZigBee Temp/Humidity sensor may be placed in a quiescent state (no transmission) by sliding the On/Off switch off.

Battery: Two 3.6 Volt lithium Thionyl chloride batteries power the wireless temperature sensor. The device will transmit data for as long as 4 years.



This device contains transmitter module
 FCC ID: MCQ-XBEEPRO2
 IC: 1846A-XBEEPRO2
 US Patent: 6721546 B1

Power Switch

Configuration Port

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES, OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESERED OPERATION

OVERVIEW

Point Six ZigBee Counter/Temperature transmitter will send a standard sensor packet contained in a extended packet wrapper. See page 5 for information about the standard sensor packet.

EXTENDED 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+ – (2 bytes) packet count. The device will increment this count every time it transmits a 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 page 5 for more information.

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

Transmissions+ – (3 bytes) number of transmissions since last battery reset. 0 if no battery support

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

Period+ – (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.

* 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 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

Where

C3 3C - 2 byte identifier

00 06 – (2 bytes) UDP Host Acknowledgement

Identifier		Cmd	
0	1	2	3
C3	3C	00	06

Wireless Transmitter Packet-Data Specification

“Humidity2” (51/52)

IDSSSSSSSSnnrrhhhttttCCCCCKK<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.

“hhhh”

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 %R and 4095 is 100 %RH

“tttt”

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