WiFi RTD Transmitter 3008-02-V3

FEATURES

- **Universal Temperature Transmitter compatible with all Point Six RJ11 remote RTD probes**
- **Single (p/n 3008-02-V3) or Dual Channel (p/n 3008-02-V3-2)**
- **16 mw 2.4 GHz 802.11b wireless radio**
- **Communicates with Industry Standard Access Points**
- **Configurable Alarm Utility with Return to Normal**
- **LED Status Indicator**
- **Up to 3 year battery life**
- **Supports WEP 128 and WPA2-PSK (AES)**
- **Supports DHCP or Static IP**
- **Small data packets (~75 bytes)**
- **Temperature Channels sampled every 15 seconds**
- **Channel agility**
- **FCC, CE, and IC Class B compliant**

DESCRIPTION

The Point Sensor WiFi RTD Transmitter is a battery operated 2.4GHz IEE 802.11b radio transmitter compatible with all Point Six RJ11 Temperature probes. The sensor has an on board clock that allows it to spend most of the time in a low power quiescent state. At predetermined time intervals the clock will wake up the onboard microprocessor. User defined, programmable transmission intervals allow the user to obtain data based on the application needs. Onboard calibration tables provide a linear temperature output and 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 Transmitter 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 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 and time span are user selectable through an easy to use utility. An LED is included on the sensor to indicate the following conditions: Alarm, Alarm Acknowledgment, and Return to Normal. The Alarm Acknowledgement is indicated by a different LED flash sequence and can be reset via a return radio transmission. The Return to Normal (RTN) is used to allow the user to determine the exact duration of the alarm.

Parameter	Standard RTD	Extended Range RTD
Measuring Current	300 micro Amp. @ 2% duty cycle	300 micro Amp. @ 2% duty cycle
RTD Power on Duty Cycle	2%	2%
Resolution	.1° C	.1° C
Accuracy 60-125 ° C	+/-.5° C	+/-1.3° C
Accuracy 30-60 ° C	+/-.3° C	+/-1.1° C
Accuracy 0-30 ° C	+/-.1° C	+/-.9° C
Accuracy (-50)-0 ° C	+/-.3° C	+/-1.1° C
Accuracy(-200)-(-50) ° C	N/A	+/-1.3° C
Transmission rate	Selectable	Selectable
Battery Life	87,600 Transmissions	87,600 Transmissions
Dimensions (enclosure)	4.625”x2.85”x1.0”	4.625”x2.85”x1.0”
Weight	5.0 oz.	5.0 oz.
Storage Temperature	-40° to 60° C	-40° to 60° C
Probe Operating Temperature	-50° to 125° C	-200° to 125° C
Battery	1.5 v Lithium L91 (2)	1.5 v Lithium L91 (2)

Point Six Wireless

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161 Prosperous Place, Suite 200 - Lexington, KY - 40509 - http://www.pointsix.com - 859-266-3606 - Fax 859-266-0542

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	*Cmd (1)*	*PktCnt* (2)	*MAC* (18)	*Reserved* (8)	*Locator1* (1)	*Locator2* (1)	*Sensor Pkt* (29)	*Org (1)*	*Transmissions (3)*	*Max Transmissions (3)*	*Period (2)*	*Alarm (1)*	*Reserved (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 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[+] – (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 – *Transmissions*/ *Max Transmissions**100
Estimated Battery Expiration = CurrentTime + (*Max Transmissions* – *Transmissions*)* *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

Dual Analog Data Format

"DualAnalog" (75/76)

IDSSSSSSSSnneeaaaaAAAACCCCKK<CR>

Note: All fields are in ASCII Hex

"ID"
The device type field: DualAnalog has device type 76 hex. A 75 hex when in service mode.

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

"nn"
Bits 0 and 1: The number of I/O points (1 byte field: 1 or 2). Bits 2 –7: enumerated Engineering units for 2nd Analog.

"ee"
Bits 0-5: enumerated Engineering units for 1st Analog. Bits 6 and 7: reserved (always 0).

"aaaa"
This is the second analog data field and is populated when the number of I/O points is 2. This field is signed 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 –32768 to 32767. This is a general purpose field and may contain 8 bit or 12 bit data.

"AAAA"
This is the first analog data field and always exists. This field is signed 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 –32768 to 32767. This is a general purpose field and may contain 8 bit or 12 bit data.

"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>.

1 Channel Example:
766035501C0100052708104CBEC6
SN = 6035501CH ; No of I/O = 01H; EEU1 = 0; EEU2 = 0; Channel1 = 0810H = 6.3%; CRC16 =4CBEH; C6 - Checksum

Enumerated Engineering Units

"DualAnalog" and "CounterAnalog" have attributes as part of their packets that are an enumerated value that describes the scale/offset and engineering units of an analog I/O point. These attributes are 6 bits and therefore can describe up to 64 enumerations. Point Six reserves enumerated values 0 and 33 through 63. Enumerated values 1 through 32 are user defined. If a host application does not recognize an enumeration, then it should default to the scale/offset/engineering units as defined by enumeration 0. The follow table defines the Point Six enumerations.

Enum	*Bin1*	Engr1	Bin2	Engr2	Scale	Offset	Units	Description
0	0	0	4095	100	0.0244	0	%	Generic
63	0	-40	4095	85	0.030525	-40	degC	Temperature
62	0	-40	4095	185	0.0549	-40	degF	Temperature
61	0	0	4095	100	0.0244	0	%RH	Humidity
60	0	-200	4095	200	0.0977	-200	DegC	Temperature (+/- 200 C)
59	0	0	4095	2000	0.488	0	ppm	CO2
58	0	0	4095	25	0.00610	0	%	O2

Wireless Transmitter Packet-Data Specification

Temperature Sensor Data Format
(Legacy Packet—Not Available for Dual Channel)

"Temp" (54/53)

IDSSSSSSSSSSSSSSSTTTTCCCCKK<CR>

Note: All fields are in ASCII Hex

"ID"
This field is the device ID; 54 indicates normal mode, 53 indicates service mode; (service mode button has been pushed).

"SSSSSSSSSSSSSSS"
This field is the 64 bit unique serial number of the 1-Wire temperature sensor.

"TTTT"
This is the temperature data field; two's compliment 16-bit data stored MSB first in 1/16 deg. C units.

"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:

53282764080000003F0160716483
SN=282764080000003F; Temp=0160 – 22.0 degC; CRC16 =7164; Checksum=83