Real Time TCP Implementation Guide

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Version 1.5

Contents

Overview

The gateway has a listener that will accept communication over a simple TCP socket. When enabled this listener default port is 3500 if needed this port can be configured to something else. Once the TCP socket is set up the gateway it can accept a small simple command set, it will also report any data messages received by the gateway allowing you to process messages as they are received directly from the sensors.

To implement software that communicates with the gateway to receive data messages you will need to implement at minimum the Network Status command. The gateway has a default socket timeout of 65 seconds. In order to continue to receive message from the gateway you will need to send a network status request within that timeout period or about once a minute. If at any point you detect that the socket has been closed or timed out you will need to instantiate a new connection with the gateway.

This binary API can be implemented in any code language. Monnit does have a Microsoft .Net Library that can simplify implementation if your implementation is using a compatible language. The same library is also available in source code to assist porting it to another language.

Gateway Commands

There are a few simple commands that can be sent to the gateway. Each command has the command type defined in the first byte of the command array that will be sent to the gateway.

Command types and buffer lengths

```
0 = Network Status
        Length = 5
1 = Send Data
        Length = 1
2 = Download New Sensors
        Length = 1
3 = Reform Network
        Length = 1
4 = Reset Defaults
        Length = 1
```

Constructing Commands

Construction of each command type.

Network Status (buffer[0] = 0)

This command informs the gateway that it should report the status of the sensor network.

Start Position	0	1
Field Name	Command Type	Date
Field Length	1 byte	4 byte
Field Type	Uint8	Uint32

Command Type is the type of command being sent to gateway.

Date is the number of seconds since 1/1/2010 00:00:00 UTC time. Example: 189,302,400 represents the date 1/1/2016 00:00:00.

Send Data (buffer[0] = 1)

This command informs the gateway to send any data in the message queue to the server without waiting for the standard gateway heartbeat to elapse.

Start Position	0
Field Name	Command Type
Field Length	1 byte
Field Type	Uint8

Command Type is the type of command being sent to gateway.

Download New Sensors (buffer[0] = 2)

This command informs the gateway to request a new sensor list from the server without waiting for the standard network list heartbeat to elapse.

Start Position	0
Field Name	Command Type
Field Length	1 byte
Field Type	Uint8

Command Type is the type of command being sent to gateway.

Reform Network (buffer[0] = 3)

This command informs the gateway to reform the sensor network by choosing a new operating channel, clearing all sensors from the device list and requesting a new sensor list from the server.

Start Position	0
Field Name	Command Type
Field Length	1 byte
Field Type	Uint8

Command Type is the type of command being sent to gateway.

Reset Defaults (buffer[0] = 4)

This command informs the gateway to reset its configurations to factory default. This does not affect the sensor network settings. In some gateways the Real Time Interface is not enabled by default and you may have to access the gateway configurations to turn this interface back on.

Start Position	0
Field Name	Command Type
Field Length	1 byte
Field Type	Uint8

Command Type is the type of command being sent to gateway.

Command Responses and Data Parsing

Byte Array received is made of one or more messages. The composition of each message is defined by its message type, the first byte of the message indicates the type of message. (buffer[0] = messageType)

Message types and buffer lengths

```
0 = Command Acknowledgement Message
        Length = 2
1 = Data Message
        Length = variable
        The length of the message is calculated by adding 11 bytes of static
        information along with the dynamic length of the payload sent by the
        sensor.  The dynamic length of the payload is found in index 10 of the
        message byte array.
        (Length = 11 + buffer[10])
2 = Network Status Message
        Length = 9
3 = Sensor Config Updated Message
        Length = 6
4 = Sensor Command Response Message
        Length = 7
5 = Sensor Joined Message
        Length = 6
```

After we know the length of the first message stored in the received buffer we can process it then if needed repeat for the next message(s) in the buffer.

Message Type Parsing

Definitions for parsing each message type.

Command Acknowledgement Message (buffer[0] == 0)

Start Position	0	1
Field Name	Message Type	Command Type
Field Length	1 byte	1 byte
Field Type	Uint8	Uint8

Message Type is the type of message received from gateway

Command Type is the type of message that was sent to the gateway that the gateway is now acknowledging

Data Message (buffer[0] == 1)

Start Position	0	1	5	9	10	11
Field Name	Message Type	Sensor ID	Date	Status	Data Length	Data
Field Length	1 byte	4 bytes	4 bytes	1 byte	1 byte	Variable
Field Type	Uint8	Uint32	Uint32	Uint8	Uint8	Variable

Message Type is the type of message received from gateway

Sensor ID is the unique numeric identifier of the sensor that sent the message.

Date is the number of seconds since 1/1/2010 00:00:00 UTC time.

Status holds flags indicating information about the sensor and is defined by the type of sensor reporting.

Data Length is the size of the data sent by the sensor and defines how much longer the message is.

Data holds the values sent from the sensor. Parsing of this field must be done based on the type of sensor that is sending the data.

Network Status Message (buffer[0] == 2)

Start Position	0	1	5	9	10
Field Name	Message Type	Gateway ID	Channel	Is Active	Device Count
Field Length	1 byte	4 bytes	1 byte	1 byte	2 byte
Field Type	Uint8	Uint32	Uint8	Boolean	Uint16

Message Type is the type of message received from gateway

Gateway ID is the unique numeric identifier of the gateway that sent the message.

Channel indicates which channel the gateway is operating on.

Is Active indicates if the gateway is ready to receive messages from the sensors.

Device Count indicates the number of devices assigned to the gateway.

Sensor Config Updated Message (buffer[0] == 3)

Start Position	0	1	5
Field Name	Message Type	Sensor ID	Success
Field Length	1 byte	4 bytes	1 byte
Field Type	Uint8	Uint32	Boolean

Message Type is the type of message received from gateway

Sensor ID is the unique numeric identifier of the sensor that sent the message.

Success indicates if the configuration write was successful or not.

Sensor Command Response Message (buffer[0] == 4)

Start Position	0	1	5	9
Field Name	Message Type	Sensor ID	Command	Success
Field Length	1 byte	4 bytes	1 byte	1 byte
Field Type	Uint8	Uint32	Uint8	Boolean

Message Type is the type of message received from gateway

Sensor ID is the unique numeric identifier of the sensor that sent the message.

Command the type of command the sensor is acknowledging

Success indicates if the command was successful or not.

Sensor Joined Message (buffer[0] == 5)

Start Position	0	1	5
Field Name	Message Type	Sensor ID	Success
Field Length	1 byte	4 bytes	1 byte
Field Type	Uint8	Uint32	Boolean

Message Type is the type of message received from gateway

Sensor ID is the unique numeric identifier of the sensor that sent the message.

Success indicates if the sensor was sent an acknowledgement that it was allowed to join.