



EMN

RF

BROADCAST AND SAMPLING INTERVAL

REPROGRAMMING

PROCEDURE

SITUATION DESCRIPTION

The Broadcast interval is the minimal time between two data streams be sent from the sensor. By default, EMN module sends a packet every **20 seconds** (this is EMN broadcast interval value by default). As 3 packets are required to update all Modbus registers, you then get information refreshed every minute.

Now, in case of large network or network with bottleneck, if this interval time is too short, wireless network will get flooded and some data packets won't get to the gateway, especially when information from EMN must be often repeated by Mesh nodes.

Correct broadcast interval, in seconds, can be calculated using following formula, **available in worst case situation**:

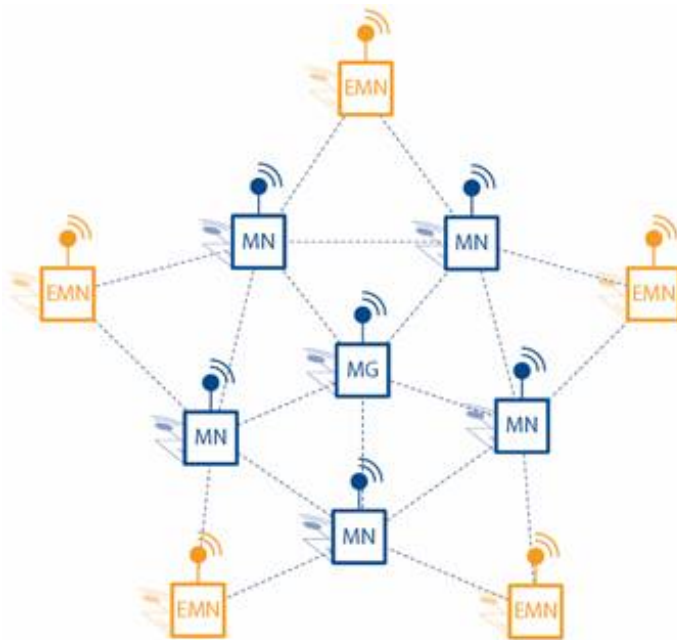
$$\text{Min Interval (sec)} = 2 \times \text{MN} + \text{EN}$$

MN : Amount of Mesh Nodes modules

EMN: Amount of End Nodes modules (EMN, Wi-Pulse, ...)

This parameter, Broadcast interval, is saved in EEPROM.

In a suitable environment, as a Star Mesh Network Topology as shown below, with MeshGate in the center, this result can be divided by two.





Examples:

1) Dense (32 EMN, 10 MN) with a single path between MG and one MeshNode (some part of the network is linear): we do have a bottleneck on the unique MeshNode in direct access to the MeshGate !

Min interval = $2 \times 10 + 32 = 52$ so we fix to 60 seconds.

2) Dense (40 EMN, 16 MN) but with best topology: Mesh Gate in the center with different Mesh nodes in direct access, no bottleneck.

SI = $(2 \times 16 + 40) / 2 = 36$ so we can fix to 40 seconds

The End Node sub-module from Millennial has its own interval time, called Sampling interval, which is the maximum period for heartbeat to be sent, if no data streams, in order to declare the device is still online.

This value must be higher than the Broadcast Interval.

By default, for EMN device, it is set to 30 seconds. This is the value reported in Interval row by MeshScape Network Monitor.

If this value must also be increased, take care it is written in RAM only, so needs to be written again in case of shutdown. The best solution is to have the application periodically overwriting the value, as it is also accessible through a Modbus register.

REPROGRAMMING PROCEDURE

The calculated minimum broadcast interval value, specific to each EMN is part of the internal firmware and can be modified by a Modbus register (#297): take care this is protected by password (register #298) for EMN firmware version up to V1.2. Such protection has been removed in release V1.2. The software version is written on each EMN module (front label) and can be read back in register #50.

Remind:

Available Modbus commands are:

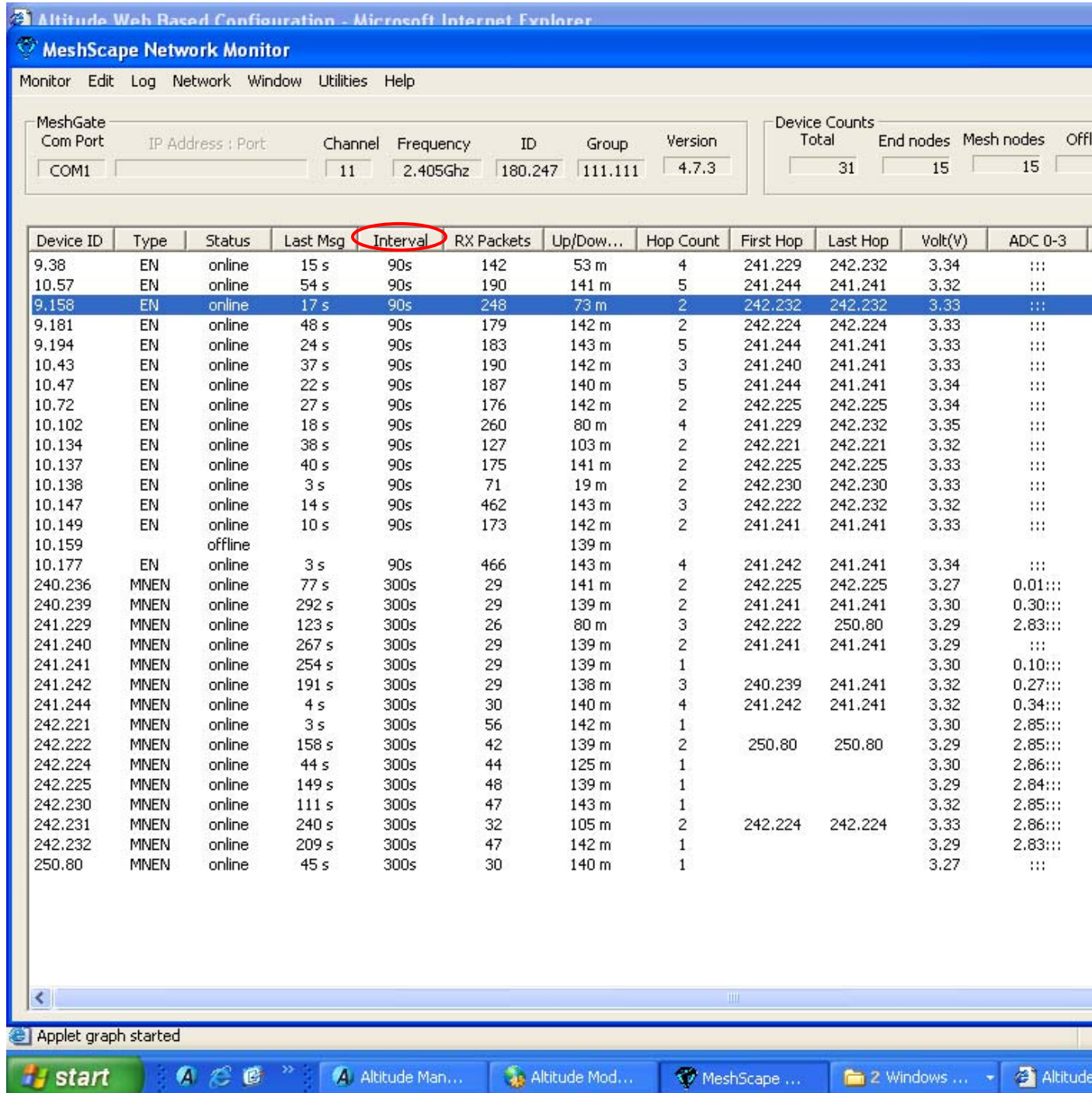
- Write Multiple registers (function code 0x10)
- Read Holding registers (function code 0x3).

They must be sent with Modbus Slave addresses corresponding to the EMN ID.

You must modify this setting for each EMN installed in the Mesh network.

- 1) If required, set password to '0x1234' (decimal value 4660) in register #298.
Wait until this value has been updated (read same register)
- 2) Set Broadcast interval time value in register #297 (0x3c = 60 sec).
Wait until this value has been updated (same register).
- 3) Set Sampling Interval value in tenth of seconds (900 or 0x384 for 90s) in register #349.
Read back this value in register #222.

This last parameter is also reported in Interval row by MeshScope Network Monitor and can be updated by double-clicking on it, but don't forget it is saved in RAM so no permanent in case of power down !



The screenshot shows the MeshScope Network Monitor interface. At the top, there is a menu bar with 'Monitor', 'Edit', 'Log', 'Network', 'Window', 'Utilities', and 'Help'. Below the menu bar, there are two summary sections: 'MeshGate' and 'Device Counts'.

MeshGate Summary:

Com Port	IP Address : Port	Channel	Frequency	ID	Group	Version
COM1		11	2.405Ghz	180.247	111.111	4.7.3

Device Counts Summary:

Total	End nodes	Mesh nodes	Offl...
31	15	15	

The main part of the interface is a table with the following columns: Device ID, Type, Status, Last Msg, Interval, RX Packets, Up/Dow..., Hop Count, First Hop, Last Hop, Volt(V), and ADC 0-3. The 'Interval' column is circled in red. The table contains 31 rows of data, including various device IDs and their associated metrics.

At the bottom of the screenshot, there is a Windows taskbar with the Start button and several open applications: 'Altitude Man...', 'Altitude Mod...', 'MeshScope ...', and '2 Windows ...'.