LPM Demo Case User Guide

1vv0300957 Rev.2 – 2013-11-21

Making machines talk.

APPLICABILITY TABLE

PRODUCT
NE50-868
NE50-433
NE70-868

SW Version
GC.MOA.03.17
GD.MOA.03.17
GJ.M0A.03.18

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1. Introduction

1.1. Scope

The aim of this document is to describe the DemoCase dedicated to Low Power Mesh demonstration, based on NE50 (433 or 868) and on NE70 (868) radio modules.

This user manual gives a detailed description of the DemoCase regarding the hardware parts and the software functionalities. It also gives the basic principles to build and manage a mesh network with the different elements of the DemoCase.

1.2. Audience

This document is intended for customers who are about to test or learn how Low Power Mesh works.

1.3. Contact Information, Support

For general contact, technical support, to report documentation errors and to order manuals, contact Telit Technical Support Center (TTSC) at:

TS-SRD@telit.com
TS-NORTHAMERICA@telit.com
TS-LATINAMERICA@telit.com
TS-APAC@telit.com

Alternatively, use:

http://www.telit.com/en/products/technical-support-center/contact.php

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

http://www.telit.com

To register for product news and announcements or for product questions contact Telit Technical Support Center (TTSC).

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

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1.4. Document Organization

This document contains the following chapters (sample):

"Chapter 1: Introduction" provides a scope for this document, target audience, contact and support information, and text conventions.

"Chapter 2: General Description" gives an overview of the features of the product.

"Chapter 3: Detailed equipment description" describes in details the characteristics of the provided hardware.

"Chapter 4: Tutorial" describes how to use the DemoCase and the possible uses of DemoCase

"Chapter 5: Acronyms and Abbreviations" provides a complete list of acronyms and abbreviation used in this document.

"Chapter 6: Glossary" provides some fundamental explanations about Low Power Mesh

"Chapter 7: Document History" provides a complete revision list.

1.5. Text Conventions

Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur.

Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.

Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.6. Related Documents

- [1] Low Power Mesh Protocol Stack User Guide, 1VV0300944
- [2] SR Manager Tool User Guide, 1vv0300899
- [3] xE50 -433/868 RF Module User Guide, 1VV0300905
- [4] xE70 868 RF Module User Guide, 1vv0301037

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2. General Description

2.1. DemoCase philosophy

The goal of the DemoCase is to show to customers:

- The possibilities offered by the Low Power Mesh embedded firmware.
- The know-how of Telit regarding innovating embedded network technology.

This DemoCase allows customers to create a mesh network and test the Low Power Mesh functionalities. The application available is serial link data transmission and telemetry.

2.2. Hardware Consideration

The DemoCase contains devices based on NE50 (433 or 868) and on NE70 (868) radio modules.

For the current DemoCase, modules are configured by default as stated below:

- Center Frequency: 433.6 MHz or 869.525 MHz
- RF Datarate: 38.4 kbps
- RF Output power: 10mW.

Power and ranging characteristics strongly depend on the module. For detailed information please take a look at the [3] for NE50, [4] for NE70.

2.3. Low Power Mesh Consideration

Low Power Mesh protocol is based on cluster tree network architecture. It hosts 3 device types:

- Coordinator: this is the master of the network. Most of the network parameters are set into the Coordinator, which broadcasts the configuration to the other devices. There is only one Coordinator in a network and obviously, it doesn't have any parent, only children.
- Router: this device is able to route a message from its parent to one of its child, from a child to another child or from a child to the parent. A Router has only one parent and could host up to 100 children. The parent of a Router can be the Coordinator or another Router. Depending on the configuration, the total number of Routers in a network could reach up to 100.
- EndPoint: an EndPoint is a termination of the network, i.e. it doesn't have any child. An EndPoint could either have a Router or the Coordinator as parent. It can only communicate via its parent.

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Low Power Mesh uses beacons to manage the network. It is Low Power capable and a same network can mix either powered or low power devices.

For further information, please refer to the dedicated documentation [1] available on Telit web site.

2.4. SRManagerTool Consideration

SRManagerTool is the PC software to configure and monitor a Low Power Mesh network. Three operating modules are available with some dedicate functions and interactive ones.

- *Tree view*: tree view of the mesh network with auto discovery.
- *Terminal*: customized terminal to exchange every type of frames over the mesh network.
- *Configuration Wizard*: the easiest way to configure and add a module to an existing network or to build a completely new network.

Please refer to the Telit Download zone website to get the latest software version. For installation and detailed use, please refer to the dedicated documentation [2] also available on the Telit web site.

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3. Detailed equipment description

3.1. List of N50 equipment

The DemoCase contains the following items:

- 1 module to be configured as Coordinator (DIP module named ‘COORD’),
- 1 module to be configured as Router (DIP module named ‘R1’),
- 2 EndPoints (DIP module named‘E1’ and ‘E2’),
- 4 USB EVK (for DIP modules management)
- 2 I/O management boards (with LEDs and switches),
- 4 SMA antennas (for DIP modules),
- 4 classical USB cables (for EVK),
- 4 primary +9V batteries.
- 1 Information sheet

3.2. List of N70 equipment

The DemoCase contains the following items:

- 1 module to be configured as Coordinator (DIP module named ‘COORD’),
- 1 module to be configured as Router (DIP module named ‘R1’),
- 2 EndPoints modules (DIP module named‘E1’ and ‘E2’),
- 4 USB EVK (for DIP modules management)
- 2 I/O management boards (with LEDs and switches),
- 4 SMA antennas (for DIP modules),
- 4 classical USB cables (for EVK),
- 2 power supply blocks (+6V) with jack connectors,
- 2 primary +9V batteries,
- 1 Information sheet

Please note that the 4 NE50-70 modules are configured as EndDevice in factory; two of them should manually be configured as Coordinator and Router, as described below.

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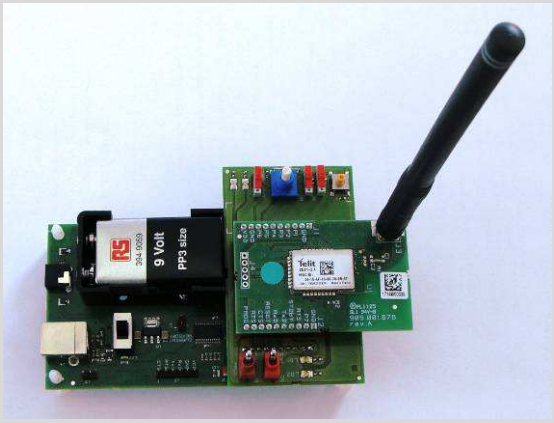
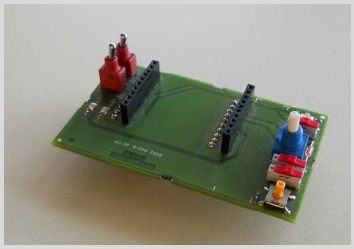
3.3. NE 50-70 Democase description

Equipment	Picture	Functionalities
DemoBoard ***COORD, R1***	EVK + DIP module + Antenna 	Supplied through USB connection or +9V battery USB Serial Link (through classical USB cable) Serial data transmission functionality
DemoBoard ***E1, E2***	EVK + DIP module + Antenna 	Supplied with +9V battery USB Serial Link (through classical USB cable) Can be plugged with I/O management board Serial data transmission and telemetry functionalities
I/O management board		To be plugged on DemoBoard with E1 and E2 only. Allow telemetry application
Classical USB cable		For EVK serial connection

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3.4. Dip module

Radio modules supplied with DemoBoards are soldered on a DIP receptacle. This DIP module can be used for a specific integration, other than DemoCase. For mechanical characteristics, please refer to [3] for NE50, [4] for NE70.

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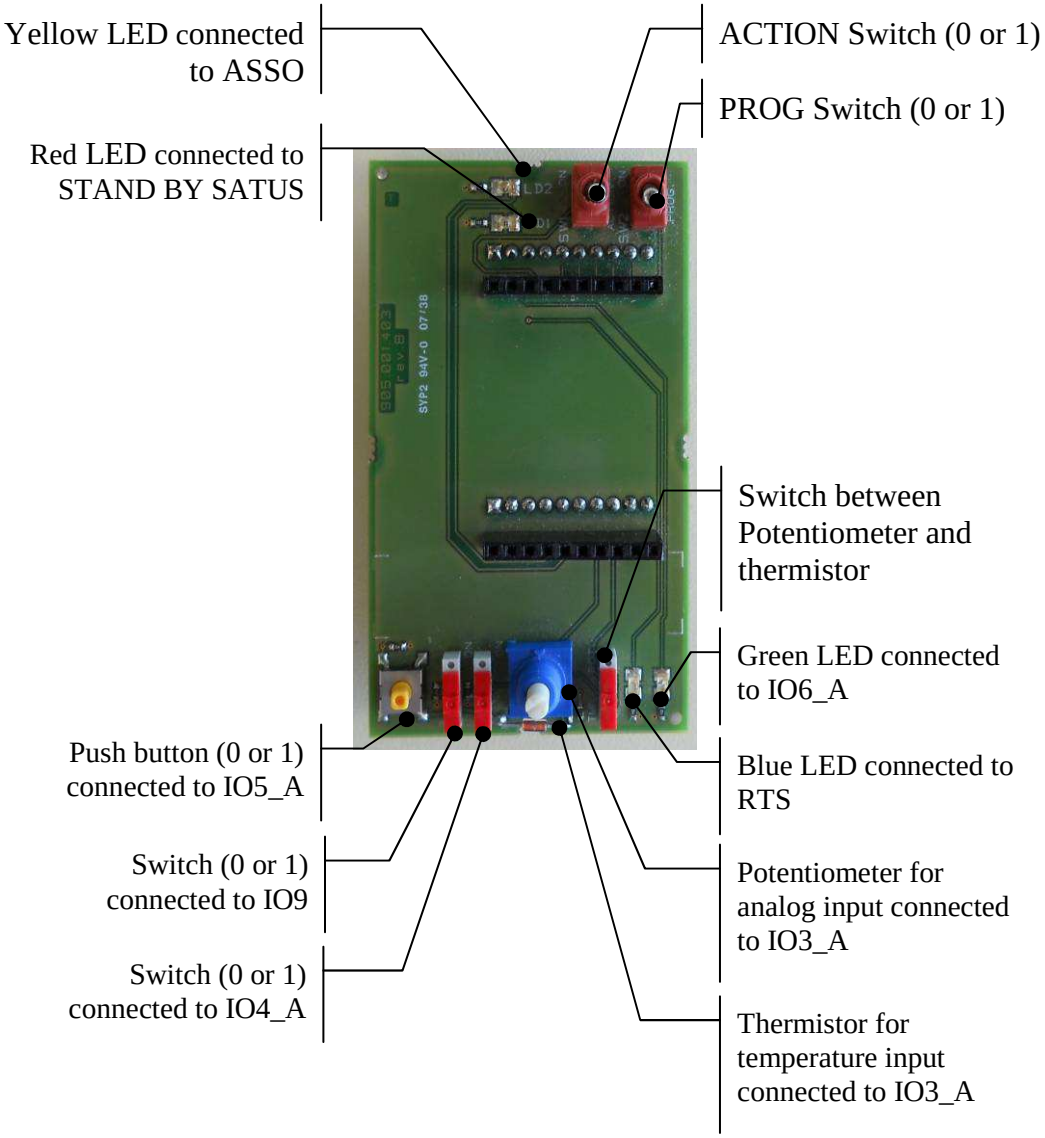
3.5. I/O Management board

This board is used for an easy access to the Inputs/Outputs of the DIP module. It is dedicated to EndPoints only (E1 & E2). It is very useful to test the telemetry functionality available on the Low Power Mesh.



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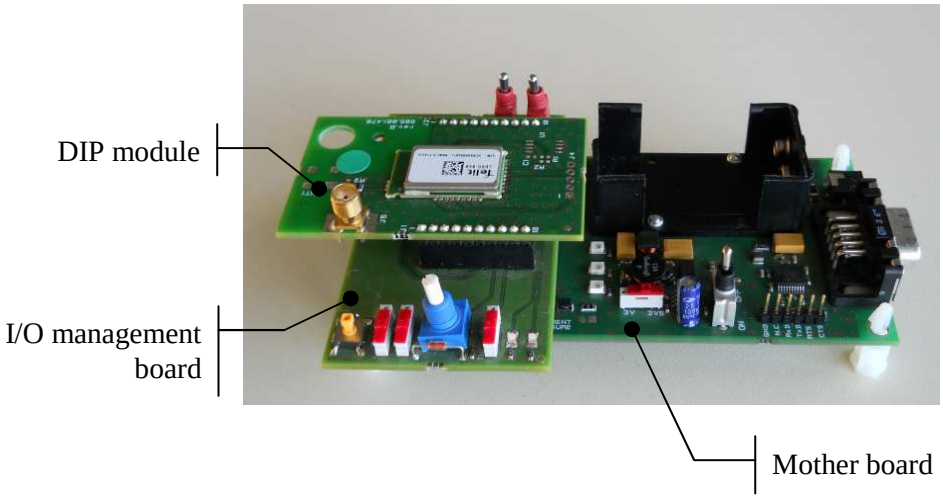
They are positioned between the mother board and the DIP module, as shown on the following picture:



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4. Tutorial

4.1. General description

The DemoCase allows very quick start to enjoy the functionalities of Telit Low Power Mesh associated to the SRManagerTool software.

The following tutorial allows discovering both the Low Power Mesh and the SRManagerTool. Each step is dedicated to learn a particular functionality. An example is shown for 868MHz Democase version (either NE50 or NE70), but it could be easily applied also for NE50 - 433MHz.

4.2. Device configuration (mandatory)

Since the devices are configured as EndPoints in factory, before any other operation they should be set to the proper status (if different). There are two ways to perform it: by Hayes commands or by SRManagerTool. The easiest way is by SRManagerTool. In paragraphs 4.2.1and 4.2.2 the description.

4.2.1. Coordinator configuration

- Open SRManagerTool to make an interactive window appear. Select Mesh technology and then click Management button. Select the correct COM port (the one where its USB cable is mapped) and click ‘Connect’ to start the communication with this module.
- Just after (within 1 second), put the PROG switch on the I/O management board to ‘ON’ position, the Asso Led should blink fast; if not: reset PROG switch to OFF, switch off the device and retry.
- Click “Configuration Wizard”. A configuration window appears as depicted in the following picture.

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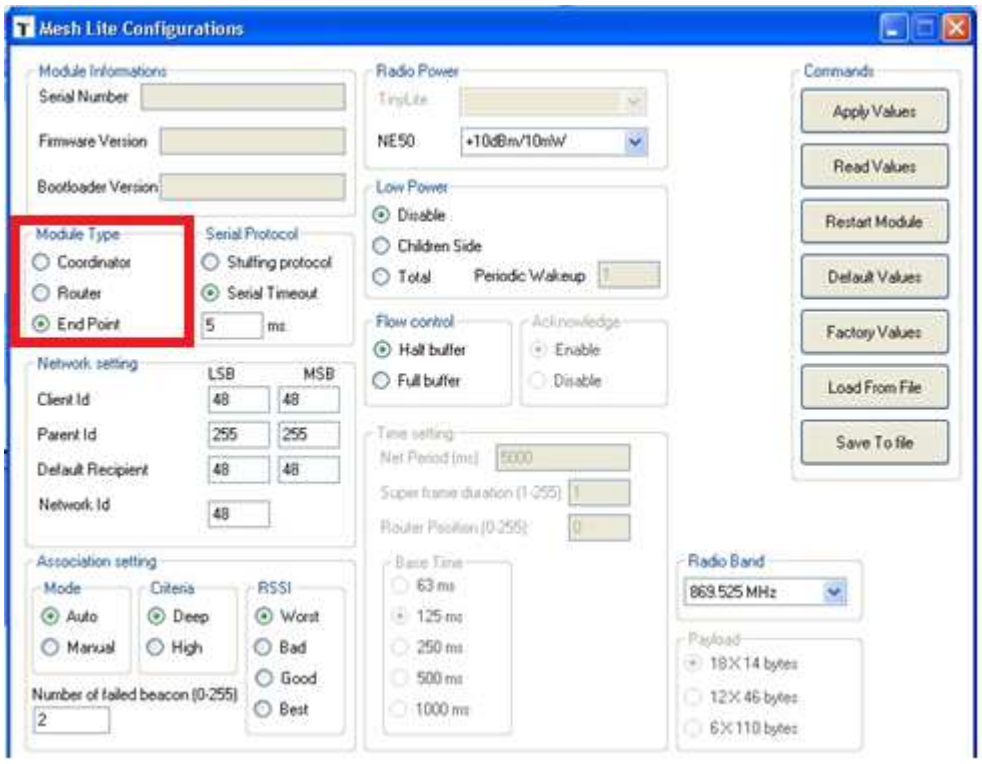

- Click on the “Read Values” key to charge the pre-loaded settings;
- In the field “Module Type” (marked in red) change the value to Coordinator for this module.
- Click on the “Apply Values” key, and then close the window.
- Switch the device off, and then put the PROG switch to OFF state, and then switch the device on; from now on, this device is configured as Coordinator.

4.2.2. Router configuration

- From the SRManagerTool interactive window, keep ‘Mesh technology’ selected and click on Management button. Select the correct COM port of a second device (the port where its USB cable is mapped) and click ‘Connect’ to start the communication with this device.
- Just after (within 1 second), put the PROG switch on the I/O management board to ‘ON’ position, the Asso Led should blink fast; if not: reset PROG switch to OFF, switch off this device and retry.
- Click “Configuration Wizard”.
- Click on the “Read Values” key to charge the pre-loaded settings;
- In the field “Module Type” change the value to Router.
- Click on the “Apply Values” key, and then close the window.
- Switch the device off, and then put the PROG switch to OFF state, and then switch the device on; from now on, this device is configured as Router.

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4.3. Step 1 – Start Coordinator and first EndPoint

4.3.1. Requirement

The Coordinator sends a beacon every 5 seconds. This frame contains network information used by any module who wants to join the network. Each module that is capable to have children has to send periodical beacon to synchronize and keep alive its children.

The beacon is very useful for low power device because it allows quickly synchronizing a module after a sleep period.

The beacon contains also the number of pending messages for each child. Thus, a module does not need to poll its parent to know if any messages are to be expected. This allows very low power and fast operations.

Finally, beacon can be considered as a precious newsletter used to broadcast periodically the network information to all the modules.

4.3.2. Application

Switch on the Coordinator. Then, connect S1 EndPoint to a USB port of your computer. The Coordinator does not need to be connected to a serial port.

Open SRManagerTool and an interactive window appear. Select Mesh technology and then click Management button. Select the correct COM port (the one where its USB cable has mapped) and click 'Connect' to start the communication with S1.

Now send the hayes command 'AT/V' to the Coordinator as shown below:

Wait for the answer; it looks like "nÿÿGC.M0A.03.162". It means S1 is correctly connected to the Coordinator.

4.4. Step 2 - Add Routers to the network

4.4.1. Requirement

When a new module joins the network, it is necessary to make an association to establish a virtual link between the new module and its parent. As soon as the association is complete, a route is opened and available to exchange information between the parent and its child.

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For Routers, the association process also includes the book of a time slot to send beacons to its potential future children.

4.4.2. Application

Now, switch on R1 Router; it is not necessary to connect it to the computer. At start-up, it will immediately search for a valid parent to associate to. The status of the association procedure can be monitored by the yellow led flashing on the device:

- Fast blink (2 per second) indicates that no network has been found at this time.
- Slow blink (1 per second) indicates that a valid network is found and the module is looking for the best parent in this network.
- LED ON (fixed) indicates that association has succeeded and that the module is ready to transmit data over the network.

After LED ON it could be repeated the network discovery hayes command; as a result, it should be seen R1 connected to the Coordinator.

4.5. Step 3 – Extend the Low Power Mesh network

4.5.1. Requirement

Thanks to the association process, all Routers can build a list of all their children. This table is first used to route frames through the network but it is also very useful to reconstitute the complete network architecture. When a module moves from a parent to another, a new association is started to update both the old and new parent lists.

4.5.2. Application

SRManagerTool includes a network tree view with automatic discovery. Click on the “Network Discovery” button to launch the discovery tool.

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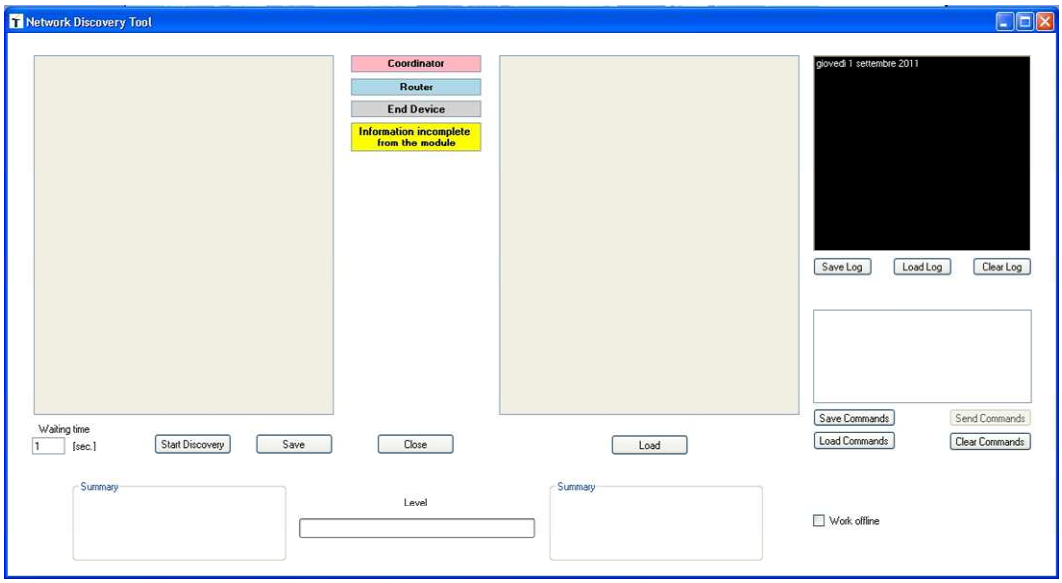

Push the "Start Discovery" button and the discovery starts.

Beginning with the Coordinator, the discovery tool asks to each module the list of its children. The architecture of discovered network will be displayed in the left panel. This procedure asks only a few seconds to complete for a network like the demo one.

When discovery is finished you can see the network architecture at this step.

It is possible now to extend the network and then discover the new modules added.

Now plug an I/O management board on E1 DemoBoard. Switch on EndPoint E1. This module has no preconfigured parent, so it will look for the best parent to make association. Connect E1 to PC serial cable. Open SRManagerTool and an interactive window appear. Select Mesh Lite technology and click Management button. Select the correct COM port and click 'Connect' to start the communication with E1.

Now the EndPoint E1 is associated to the Coordinator; we can change its parent sending some Hayes command (for the correct syntax refer to [1] and [2]) using the MeshLite Management of SRManagerTool (you can return to that window closing the Network Discovery window).

Now we have to send 3 commands to the module E1:

- ATS313=82 (ParentId LSB)
- ATS314=49 (ParentId MSB)
- ATO (Module Reboot)

Now we wait for some seconds and then we can perform a new Network Discovery. Now the new parent of E1 will be R1. In order to restore the previous network configuration, please send the following commands to E1:

- ATS313=255 (ParentId LSB)
- ATS314=255 (ParentId MSB)
- ATO (Module Reboot)

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4.6. Step 4 - Exchange information through the network

4.6.1. Requirement

Low Power Mesh protocol is able to route a message from one side of the network to the other by consecutive jumps. This allows increasing range compared to point to point architecture.

Each frame uses the tree way to join the recipient from the sender. Even tough, it isn't necessary to route systematically by the Coordinator. The route is made by the tree but it is as short as possible using the minimum number of jumps.

4.6.2. Application

It's time to use the built network to exchange any type of data from/to each network element. Thanks to the Mesh Management Terminal, just select the command type, then the recipient and, if needed, the data payload; then click "Send" button to send the composed frame. Mesh Management Terminal automatically does the correct encapsulation. On the other side, received frame are un-encapsulated to be displayed in a convivial appearance including receive time, frame type and sender.

For example:

- You can send a 'PING' frame to R1 and wait for the 'PONG' frame confirming the presence of R1.
- In the same way you can send 'HAYES' order like AT/V to check the firmware version of a module.
- You can send a 'TELEMETRY' frame to E1 to verify the value of its analogical input or to light on its blue or green LED.

WARNING:

Before sending telemetry frames to E1, it is important to set its I/O registers to define inputs & outputs regarding the I/O management board.

Example: I/O3_A, I/O4_A, I/O5_A and I/O6_A must be set as inputs, IO7_AD_DA, IO8_AD_DA and I/O9 must be set as outputs. Send a 'HAYES' order to E1 with ATS345=15 payload.

Please refer to the Low Power Mesh protocol stack & SRManagerTool manuals (see [1], [2]) for more information about data exchange.

A very simple application: switch on the green led. Set the register 345 equal to 0 on EndPoint E1 (ATS345=0). Then select "IO" type on MeshLite Management Terminal, write digital, and select radio button "6 – On" as shown below:

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When E1 receives this command, the green led will be switched on. In order to switch off the green led, send the same command but selecting the radio button "6 – Off".

4.7. Step 4 - Increase your expertise by adding manually the last module of the DemoCase

4.7.1. Requirement

Many parameters could be set in Low Power Mesh to perfectly match your application. To join a network, a module needs at least to know the network number and to have a module identifier (not already used in the network). Other optional parameters can be set like Low Power configuration, Association Criteria or Auto Repair functionality.

Depending of the module type, more or less parameters have to be set. The Coordinator is the module which needs the more attention because it has to know critical network information like Network Period, Base Time, Payload Size…

Routers and EndPoints need less information than the Coordinator, especially if Low Power is not requested. If Low Power is needed, Super Frame Duration, and Low Power registers must be configured.

4.7.2. Application

In the DemoCase, most of parameters are already set for a quick start; all modules have been configured except E2. It is proposed to configure E2 as a low power EndPoint which sends automatically a message to the computer (via E1) when a front edge occurs on IO5_A.

- Plug an I/O management board on E2 DemoBoard do not switch ON E2 for the moment.
- Plug the module to a serial link (change the port number in SRManagerTool and click "Connect")
- Switch ON E2.
- Just after (within 1 second), put the PROG switch on the I/O management board to 'ON' position, the Asso Led should blink fast; if not: reset PROG switch to OFF, switch off E2 and retry.
- Click "Configuration Wizard". In just a few steps, you can configure the new device.

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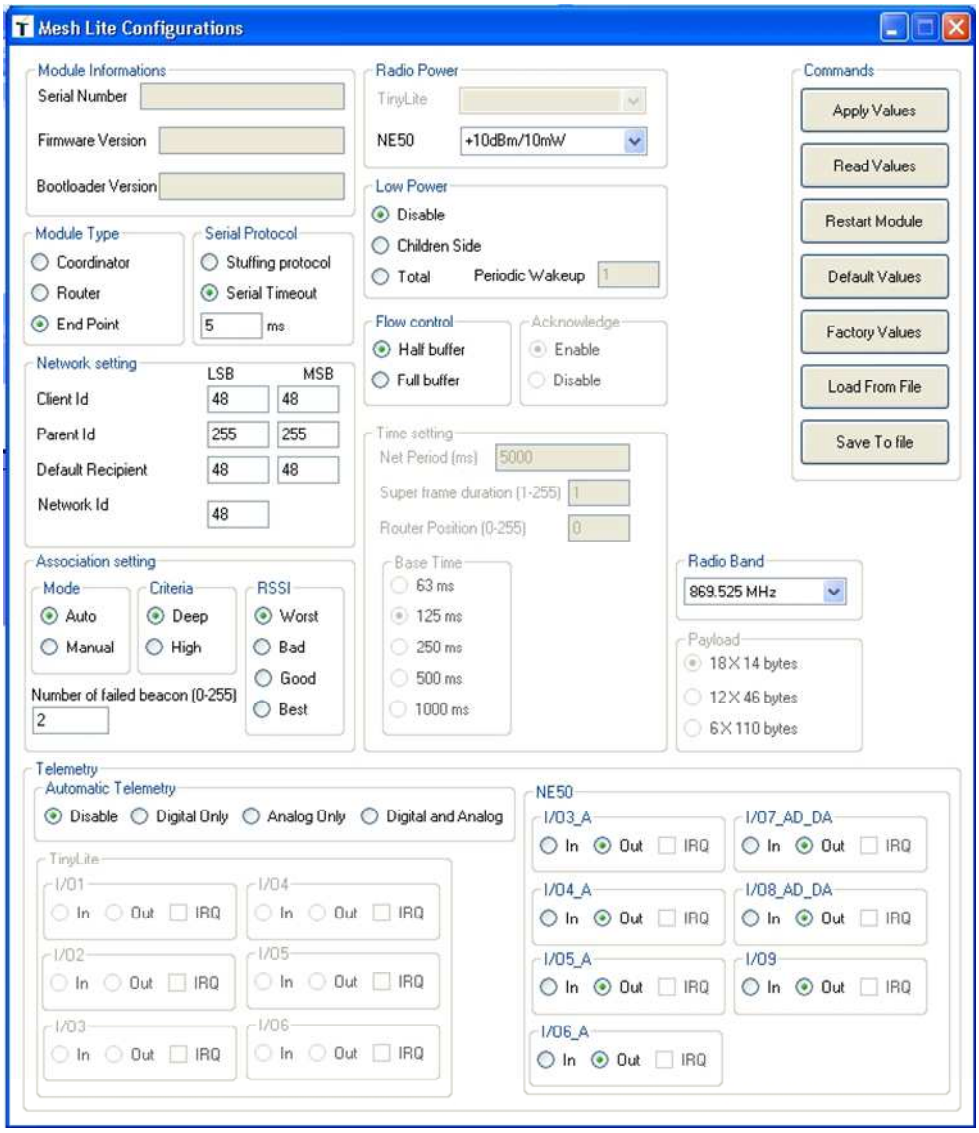

- First of all you have to choose the module type, here an EndPoint is desired.
- ‘Network Id’ of the demo case is 49. E2 is the ID desired for the last EndPoint, so fill ‘Client Id LSB’ as 69 (ASCII code of ‘E’) and ‘Client Id MSB’ at 50 (ASCII code of ‘2’). ‘Default Recipient’ is the destination module in case of non encapsulated frames. It is a binding association. Here, we want E2 to transmit to E1. So set ‘Default Recipient LSB’ as 69 (ASCII code of ‘E’) and ‘Default Recipient MSB’ as 49 (ASCII code of ‘1’).
- Here are the parameters to select the way the new module will associate to the network. In this tutorial, we want to define manually R1 as a parent for E2. Choose ‘Manual’ for ‘Association setting – Mode’. ‘Association setting – Criteria’ is used by the module to select the best parent if not defined. Let the default value. ‘Number of failed beacon’ defines the number of consecutive non received beacons before

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considering loss of the link, 2 is the default and correct value here. Define R1 as parent of E2, set ‘Parent Id LSB’ as 82 (ASCII code of ‘R’) and ‘Parent Id MSB’ as 49 (ASCII code of ‘1’).

- We want E2 to be Low Power and to wake up only for receiving its parent beacon. Choose ‘Total’ low power and ‘Periodic Wake up’ every 1 beacon.
- Click the ‘Apply Values’ button of Configuration Wizard: it sends the full setting in the memory of E2, you can also save this configuration in a file for future reference (‘Save To file’ button).
- Power OFF the device and put back the PROG switch.

When completed, switch on E2. After the association process, you can refresh the Tree View to see E2 as a new child of R1.

We have configured E2 as Low Power, so that it is necessary to configure R1 in ‘Low Power children Side’. In this configuration, R1 will send message to E2 only when E2 is awake. All downward messages for E2 are buffered by R1 to be sent only during awake slot. To do this, you have to send a Hayes frame to R1 with Mesh Terminal. Send ‘HAYES’ to ‘R1’ with *ATS340=1* as data payload (this is the Hayes order to switch R1 in ‘Low Power Child Side’).

Your low power EndPoint E2 is now ready to use. As previously for E1, it is important to set I/O registers of E2: IO5_A must be set as input and interrupt input. For that, send a ‘HAYES’ order to E2 with ATS345=4 payload then with ATS346=4 payload.

You can now work with E2 EndPoint. Push the button connected to IO5_A and leave it: it will wake up the module and send automatically its inputs status to the default recipient, which is S1: as S1 is connected to the PC, you will have the status displayed on the MeshLite Management Terminal.

It is also possible to send a message to E2. Try for example to send ‘PING’ frame to E2 and wait for the ‘PONG’ response. You observe that response could take a few seconds to arrive due to the low power setting. However the response time of all other devices (including R1) is kept very short.

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4.8. Network Monitoring

An accurate network monitoring could be performed using the SR Manager Tool and an external tool, Wireshark.

Wireshark is a network packet analyzer, widely used for troubleshooting and analysis of communication protocols. It is an open source application and is released under the GNU General Public License version 2.

To perform a network packet analysis, a device in the set should be completely dedicated to this aim. A typical configuration, using the Demo Case, could be the following:

- 1 Coordinator
- 1 Router
- 1 End device
- 1 Monitoring device (i.e. the 2nd End Device).

Use the SRManagerTool in order to flash a Telit module NE70 module with the firmware GC.M0S.01.01-B007.hex or a more recent version (the firmware is distributed along with the SRManagerTool packet, in the path:

~\W_ZB_ML-MB_Sniffer\MeshLite\NE50\NE50-Gx.M0S\868MHz_13_Bands).

When the module is flashed:

- Switch the SR board OFF (SW2);
- Turn the programming switch OFF (SW4) on the SR board;
- Switch the SR board ON (SW2).

Now the device is monitoring the network.

The following step is to set the software analyzer (Wireshark). The option “Analyzer” should be selected in the SRManagerTool main panel.

As depicted below, the proper parameters concerning the serial SR sniffer node address, the radio band and the Wireshark path should be inserted into the proper fields. For a more detailed configuration, please take a look at [2], ch. 3.5.

Note that the “NE50-868-GC.M0S 13 Band” Source should be selected also for NE70 network monitoring.

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The button 'Wireshark' starts the analyzer to capture and save packets during a monitoring session.

It is required to enter the name of a folder where save PCAP file with captured packets.

The PCAP file will have the following format name: Date_Time_Captured.PCAP.

Example: 2012-3-2_15.3.0_Captured.PCAP

The captured packets are shown with the timestamp and their payload just as shown in the following picture, as example.

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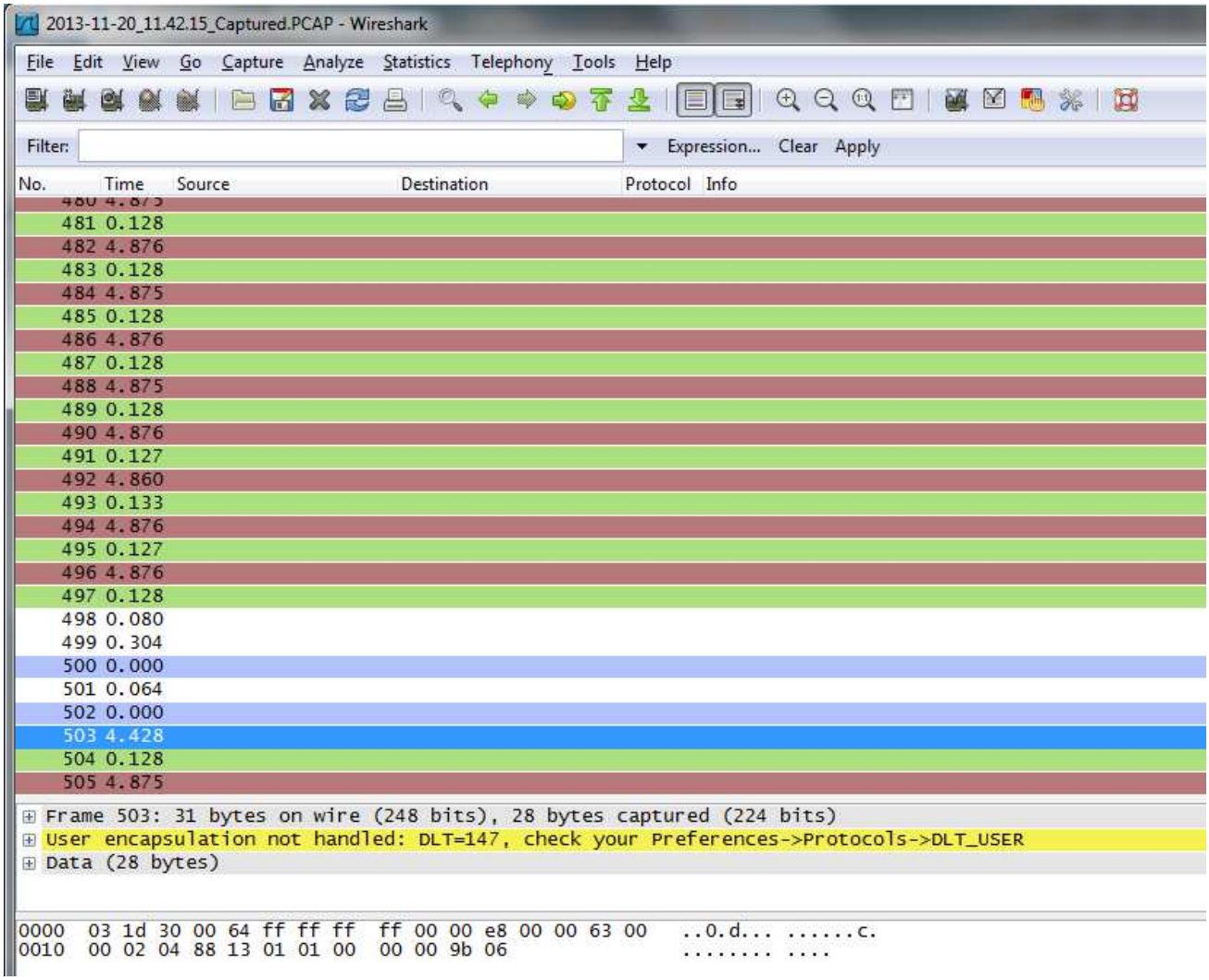
2013-11-20_11.42.15_Captured.PCAP - Wireshark
File Edit View Go Capture Analyze Statistics Telephony Tools Help
Filter: Expression... Clear Apply
No. Time Source Destination Protocol Info
481 0.128
482 4.876
483 0.128
484 4.875
485 0.128
486 4.876
487 0.128
488 4.875
489 0.128
490 4.876
491 0.127
492 4.860
493 0.133
494 4.876
495 0.127
496 4.876
497 0.128
498 0.080
499 0.304
500 0.000
501 0.064
502 0.000
503 4.428
504 0.128
505 4.875
Frame 503: 31 bytes on wire (248 bits), 28 bytes captured (224 bits)
User encapsulation not handled: DLT=147, check your Preferences->Protocols->DLT_USER
Data (28 bytes)
0000 03 1d 30 00 64 ff ff ff ff 00 00 e8 00 00 63 00 ..0.d... ......c.
0010 00 02 04 88 13 01 01 00 00 00 9b 06 ....

5. Acronyms and abbreviations

ACP	Adjacent Channel Power
BER	Bit Error Rate
Bits/s	Bits per second (1000 bits/s = 1Kbps)
CER	Character Error Rate
dBm	Power level in decibel milliwatt (10 log (P/1mW))
EMC	Electro Magnetic Compatibility
EPROM	Electrical Programmable Read Only Memory
ETR	ETSI Technical Report
ETSI	European Telecommunication Standard Institute
FM	Frequency Modulation
FSK	Audio Frequency Shift Keying
GFSK	Gaussian Frequency Shift Keying
GMSK	Gaussian Minimum Shift Keying
IF	Intermediary Frequency
ISM	Industrial, Scientific and Medical
kbps	kilobits/s
LBT	Listen Before Talk
LNA	Low Noise Amplifier
LPM	Low Power Mesh
MHz	Mega Hertz (1 MHz = 1000 kHz)
PLL	Phase Lock Loop
PROM	Programmable Read Only Memory
NRZ	Non return to Zero
RF	Radio Frequency
RoHS	Restriction of Hazardous Substances
RSSI	Receive Strength Signal Indicator
Rx	Reception
SRD	Short Range Device
Tx	Transmission
SMD	Surface Mounted Device
VCO	Voltage Controlled Oscillator
VCTCXO	Voltage Controlled and Temperature Compensated Crystal Oscillator

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6. Glossary

Beacon: beacon is a frame periodically sent by the Coordinator and each Router to their children. This frame contains network information to synchronize and keep alive the children. The beacon information is also used by any module who wants to join the network. The beacon is very useful for low power device because it allows to quickly synchronizing a module after a sleep period. The beacon contains also the number of pending messages for each child. So a module doesn't need to pool its parent to know if any message is waiting. This allows very low power and fast operations. Finally, beacon can be considered as a precious newsletter used to broadcast periodically the network information to all the modules.

"Direct" and "Indirect" child: in the detailed module card, accessible from the tree view, you can read the number of direct and indirect child of a Router. The direct children are the children that are directly associated to the Router. Only one jump is necessary for a frame to go to, or to come back, from a direct child. Indirect children are all the other modules lower in the network. There are the children of the direct children. A frame needs at least two jumps to go from a Router to an indirect child.

Data Payload: Depending of the frame type, you should complete the data payload field in the MeshLite Management Terminal module. The reason is that all Mesh network messages are encapsulated, i.e. all frames contain a header and a data payload. The header contains information about the frame type, the recipient and the sender of the message while the data payload contains the message. As a mail comparison, the header is the envelope with the recipient address while the data payload is the letter inside the envelope.

Binding: In the Configuration Wizard, you are prompted to choose a default recipient, this allows to make binding. A binding is a virtual link between 2 modules. Each frame of the module will be automatically sent to the default recipient what ever the network architecture between the 2 bound modules. This is very useful to associate, for example, a switch remote to a light. In this case, the remote module can move in the network (change of parent) and the binding option insure that the remote still control the same light.

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7. Document History

Revision	Date	Changes
0	2011-11-11	First issue
1	2012-10-18	• Add 433MHz version • New EVK and Democase content
2	2013-11-21	Document title change to make it generic to LPM; Added NE70 (868) device; Added Network Monitoring section; General revision.

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