

SR Manager Tool User Guide

1vv0300899 Rev.9 - 2014-05-08



Making machines talk.



APPLICABILITY TABLE

PRODUCT
ZE50/ZE60 2.4
ZE51/ZE61 2.4
TinyOne Pro (32kB)
TinyOne Lite 868MHz
ME50-169
ME70-169
ME50-868
LE50-433
LE50-868
LE70-868
LE70-915
LE51-868
LT70-868
NE50-433
NE50-868
NE70-868

SW Version SRManager Tool 2G.00.09.RC3

> SW Version GG863-SR

231.07.2003





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1. Introduction

1.1. Scope

Scope of this document is supply an user guide for the Telit SRManagerTool software.

1.2. Audience

This User Guide is intended for Short Range Module users who want to program, manage and control the short range network activities.

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.

Telit appreciates feedback from the users of our information.

1.4. Open Source Licenses

The SRManagerTool developed by Telit make use of a modified version of Wireshark.



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1.4.1. Wireshark

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

1.5. Document Organization

This document contains the following chapters:

Introduction: provides a scope for this document, target audience, contact and support information, text conventions.SRManagerTool Setup: gives instructions on how to setup SRManagerTool and the equipment needed.

SRManagerTool features: describes in details the features of SRManagerTool.

Appendix 1 – How to flash the Telit M ZE51 USB dongle: describes how to flash the Telit USB dongles MEZE51.

Appendix 2 – How to flash the Telit ME50-868 USB dongle: describes how to flash the Telit USB dongles ME50-868.

Appendix 3 – How to flash the Telit NE50-868/433 USB dongle: describes how to flash the Telit USB dongles NE50-868/433.

Appendix 4 – Technology/Platform Firmware: describes technology/platform supported by SRManagerTool.

Appendix 5 – Troubleshooting: describes a list of possible troubles and their solution.

Acronyms and Abbreviations: lists acronyms and abbreviations used in the document.

1.6. 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.





1.7. **Related Documents**

- [1] 1vv0300859 Telit ZigBee Democase Getting Started
- [2] 1vv0300845 Telit ZigBee Democase User Guide •
- [3] 1vv0300900 Telit ZigBee PRO Democase User Guide
- [4] 1vv0300901 Telit ZigBee PRO Democase Getting Started
- [5] 1vv0300819 Telit M ONE Protocol Stack User Guide
- [6] 1vv0300944 Telit Low Power Mesh Protocol Stack User Guide •
- [7] 1vv0300819 Telit Mesh Democase User Guide
- [8] 1vv0300828 Telit Wireless M-Bus User Guide_Part4+Part5_ModeR2
- [9] 1vv0300935 Telit Wireless M-Bus Part 5 Mode Q User Guide •
- [10] 1vv0300873 Telit Star Network Protocol Stack User Guide
- [11] 1vv0300949 Telit ZE51-2.4 RF USB Dongle User Guide
- [12] Wireshark documents: http://www.wireshark.org/docs/ http://wiki.wireshark.org/IEEE_802.15.4
- [13] 1vv0300995 Telit GG863-SR Firmware upgrade procedure
- [14] 1vv0300781 Telit GE863-PRO3 Linux Software User Guide
- [15] 1vv0300953 Telit Wireless M-Bus 2010 Part4 User Guide
- [16] 1VV0301059_Frequency_Hopping_Star_Network_Protocol_Stack_User_Guide
- [17] 1VV0301109_LE51868_S_SW_User_Guide_rev2





1.8. Document History

Revision	Date	Changes
0	2010-11-18	First issue
1	2011-02-04	Section 1.7 changed, Section 2.2 changed, Section 2.3 changed, Section 2.4 changed, Section 2.5 changed, Section 3.1 changed, Section 3.2 changed, Section 3.3 changed, Section 3.4.1 changed, Section 3.4.1.1 changed, 3.4.2 Section changed, Section 3.4.3 added; Section 3.4.3.1 added.
2	2011-03-31	Section 1 changed; Section 1.7 changed; Section 2 changed, Section 3 changed; Section 3.2 changed; Section 3.3 changed; Section 3.4 changed; Section 3.4.1 added; Section 4 added; Section 5 added; Appendix 1 changed; Appendix 2 changed.
3	2011-11-10	Section 3.2 changed; Section 3.32 changed; Section 3.3.1 changed; Section 3.3.1.1 changed; Section 3.3.1.2 added; Section 3.3.1.3 added; Section 3.3.3.1 changed; Section 3.3.4 changed; Section 3.3.4.1 changed Section 3.3.4.2 changed; Section 3.3.4.3 added; Section 3.4 changed; Appendix 2 added; Appendix 3 added.
4	2012-03-26	Added ME50-169 in applicability table; Added NE50-433 in the applicability table; Section 2 changed; Section 2.1 added; Section 2.2 added; Section 3.1 changed; Section 3.2 changed; Section 3.3 changed; Section 3.3.4.2 changed; Section 3.4 changed; Section 3.4.1 changed; Section 3.8.1 added; Section 3.8.2 added; Appendix 1 changed.
5	2012-04-26	Section 2.2.9.1 changed; Section 2.2.9.2 changed; Section 3.2 changed; Section 3.6 changed; Section 3.9.1 changed; Section Appendix 1 changed; Section Appendix 2 changed; Section Appendix 3 changed.
5	2012-05-18	Section 1 changed; Section 2 changed; section 3.2 changed; Section 3.3.4.2 changed; Section MB Analyzer; Section 3.8.1 changed; Section 3.9.3 changed; Section 3.9.3.1 added.
5	2012-06-11	Section 2.2.9.1 changed; section 3.2 changed;
6	2012-11-12	Section 1.7 changed ; section 2.2.1 changed ; section 3.2 changed; section 3.3.1.1 changed; section 3.3.2.1 changed; section 3.8.3 changed; section Appendix 4 changed; section 8 changed; section 3.3.3.1 changed; section 8.2.5 added.
7	2013-05-15	Section 3.3.1 changed; section 3.3.1.1 changed; section 3.3.4.1 changed; section 3.5 changed.
8	2013-08-26	Section 2.1 changed; section 2.3 changed; section 3.1



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		changed; section 3.3.1.1 changed.
9	2014-05-08	Section 2.3 changed; section 2.6 changed; section 3.2 changed; section 3.3.3.1 changed. Section 3.3.3 changed; section 3.3.2.1 changed. Section 3.3.2.1 changed; section 3.3.3 changed; section 3.8 changed.



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SRManagerTool Setup 2.

SRManagerTool setup allows using serial or GPRS/GSM connection between tool and SR module.

Via serial connection (local) the features available are:

- Flashing
- Management
- Analyzer

Via GPRS/GSM connection (remote) the features available are:

- Analyzer (ZigBee, MBus, Mesh)
- Flashing (ZigBee, MBus)
- Management (ZigBee)

SRManagerTool – SR module via Serial connection 2.1.



- 1. Connect the Board to the PC via standard USB port
- 2. Connect the power supply to the board





SRManagerTool – SR module via GPRS/GSM 2.2. connection



Next steps describe how to achieve remote connection between SRManagerTool and SR module.





2.2.1. Equipment

The minimum equipment is:

- The GG863-SR
- The module mounted in the GG863-SR should be programmed with one of the following firmware depending on device type:
 - o ZigBee ZE51/ZE61: ZEx1.XS5.11.21-B004.s28
 - o LowPowerMesh NE50-868 MHz: GC.M0S.01.01-B007.hex
 - o LowPowerMesh NE50-433: GD.M0S.01.01-B005.hex
 - o Wireless M-Bus ME50-868 MHz: GC.U0S.01.00-B004.hex
 - Wireless M-Bus ME50-169 MHz: GI.U0S.01.00-B005, GI.U0S.01.00-B006.hex
 - Wireless M-Bus ME70-169 MHz: GL.U0S.01.00-B006.hex



Flash SR module after step described in 2.2.6. For information on how to flash SR module in the GG863-SR refer to [13].

- The Linux USB Ethernet/RNDIS Gadget
- A PC which will be used to configure the Gateway
- A PC which will host SRManagerTool

All required software is available in the Telit website <u>www.telit.com</u> section Download Zone:

- Software >Short Range >Software Releases Gateways > GG863 SR
- Software > Short Range > Software Releases Short/Range

2.2.2. Connections setup

Before turning on the GG863-SR be sure to follow the connections detailed below:

- connect the antennas to RF connectors of the GG863-SR
- insert the SIM card in the card holder of the GG863-SR. The SIM must have the PIN disabled.
- plug the Mini USB cable into the GG863-SR USB Device port (B-type)
- connect the power supply adapter to main power socket

Now the device is ready to be turned on.



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2.2.3. Turning On GG863-SR

To turn on the GG863-SR, simply attach the power adapter cable to the GG863-SR and wait 30 seconds for full system startup.



Note – When the power supply cable is disconnected, it is recommended to wait approximately 5 seconds before applying the power again.

224 Turning Off GG863-SR

To turn off the device you can simply unplug the power supply cable.



Warning – Please note that hardware power off should be done only after a proper GSM logoff. Any GSM device is requested to issue a "detach" request at turning off.

Normal shutdown sequence will take up to 8 seconds. An additional delay of up to 10 seconds is experienced as the GSM module logs off the network.

2.2.5. Connecting GG863-SR to the local PC

To connect the GG863-SR to the local PC follow next steps:

- Turn on the GG863-SR (see section 2.2.3)
- Wait 20 seconds for the system to startup
- Plug the USB cable into the PC (A-type):

The first time you connect the GG863-SR, you will be asked for a driver "Linux USB Ethernet/RNDIS Gadget". Follow the actions described by the screenshots:



If you have already installed the Telit Linux Development Environment, you already have the Ethernet Gadget installed and you are connecting the GG863-SR to the same USB port used for EVK-PRO3, then the USB connection is automatically established. In this case you can continue reading the present document from 2.2.6. If you are connecting the GG863-SR for the first time or to a different USB port please follow next steps.





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Found New Hardware V	Vizard
	Welcome to the Found New Hardware Wizard Windows will search for current and updated software by
	the Windows Update Web site (with your permission).
	Read our privacy policy
	Can Windows connect to Windows Update to search for software?
	○ Yes, this time only
	 Yes, now and every time I connect a device No, not this time
	Click Next to continue.
	< Back Next > Cancel







ound New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM)
Include this location in the search:
Browse
O Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back Next > Cancel

Click the **Browse** button and search for the file <u>linux.inf</u>, included in the Telit package.

Click Next.





Linux USB Ethemet/RNDIS Gadget has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.) Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.		The software conversion to define the share band server	
Linux USB Ethemet/RNDIS Gadget has not passed Windows Logo testing to verify its compatibility with Windows XP. (<u>Tell me why this testing is important.</u>) Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.		The software you are installing for this hardware:	
has not passed Windows Logo testing to verify its compatibility with Windows XP. (<u>Tell me why this testing is important.</u>) Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.		Linux USB Ethemet/RNDIS Gadget	
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.		has not passed Windows Logo testing to verify its compatibility with Windows XP. (<u>Tell me why this testing is important.</u>)	
		Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.	

Click Continue Anyway.



Click Finish.



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Go to Network Connections, right click on the device called Linux USB Ethernet/RNDIS Gadget and choose the menu voice Properties. Select the Internet Protocol (TCP/IP) and click on the button Properties; you should see the following windows:

📑 Linux USB Et	hemet/RNDIS Gadget	Configure
This connection use	es the following items:	
File and Pr	inter Sharing for Microsoft	Networks 🧧
QoS Pack	et Scheduler	1
		>
<		>
Install	Uninstall	Properties
Description		
Transmission Cor wide area networ across diverse in	ntrol Protocol/Internet Prot k protocol that provides c terconnected networks.	ocol. The default ommunication
Show icon in no	tification area when conne	cted





Internet Protocol (TCP/IP) Prope	rties 🔹 🤶 🔀	
General		
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.		
 Obtain an IP address automatically 		
─⊙ Use the following IP address: ──		
IP address:	192 . 168 . 121 . 1	
Subnet mask:	255 . 255 . 255 . 0	
Default gateway:	· · ·	
Obtain DNS server address automatically		
● Use the following DNS server addresses:		
Preferred DNS server:		
Alternate DNS server:	· · ·	
	Advanced	
	OK Cancel	

If this configuration is not available, you have to manually insert the following values:

IP address: 192.168.121.1 Subnet mask: 255.255.255.0

then click **Ok**.

At this point, Ethernet Gadget is installed on Local PC: Local PC and GG863-SR can communicate via IP with the following addresses:

- 192.168.121.1 (Local PC) .
- 192.168.121.3 (GG863-SR)





2.2.6. Reboot GG863-SR

Before rebooting the GG863-SR you have to un-plug the USB cable from the PC if it is connected, reboot the GG863-SR, wait 20 seconds and plug the USB cable into the PC to make the connection work.

2.2.7. Downloading files to GG863-SR

Default GG863-SR does not have some application and scripts needed to use remote feature of SRManagerTool.

Files to download are:

- SRTool_Agent
- Config_For_Gateway
- Config_For_SRManager
- _S04_Gateway
- _S04_SRManager

To equip the GG863-SR whit those files a tftp server shall be installed on the local PC.Once the tftp server is active and configured in the local PC the files can be copied to GG863-SR filesystem:

- Copy the files in the tftp server working directory
- Connect the GG863-SR with the USB cable and open a telnet session:

telnet 192.168.121.3

• Go to the root directory:

/

• For any file to copy type the command:

tftp –*g* –*r file_name_remote server_ip_address*

For example:

tftp –g –r SRTool_Agent 192.168.121.1

• Change file permission for any file copied:

chmod +*x SRTool_Agent*



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2.2.8. Run scripts

After copying the necessary files to GG863-SR follow next step:

• By telnet session opened in section 2.2.7 run the script Config_For_SRManager:

/Config_For_SRManager

<u>Note</u>: to come back to default GG863-SR you should run the script Config_For_Gateway:

/Config_For_Gateway

2.2.9. Create Network Connections on remote PC

2.2.9.1. GPRS

In case of GPRS connection remote PC and GG863-SR must be assigned a public IP address, check with your mobile network operator for availability of public IP addresses with GPRS connection.

Connect remote PC to GPRS network and get the public IP, for example by the command ipconfig.

Performance of the features via GPRS are affected by speed and communication latency of the GPRS connection.

The speed of the GPRS depends on: phone/terminal used, the number of connected users per cell which is split between the banda, the distance between the terminal and the antenna closer.

Check for network upgrades of features available with certain operators.



An UMTS phone/terminal is strongly suggested in order to use remote features via GPRS (section 3.2)

2.2.9.2. GSM

When GG863-SR is configured to use a dial-in connection, it waits for an incoming call and establishes a point-to-point link with the remote PC. This section describes the procedure to set up a network connection in the remote PC such that the PC dials the phone number of GG863-SR and establishes a point-to-point link. The procedure described here applies to the Windows XP operating system.



The features via Dial-in connection need not to drop the line





In order to set up a data call connection the remote PC must be equipped with a dial-up modem correctly installed in the operating system.

Once the modem is connected to the remote PC and installed, a new network connection can be created:

- From the Windows XP Start menu, go to Control Panel Network • Connections
- Click on File New Connection... to start the New Connection Wizard •

New Connection Wizard	
	Welcome to the New Connection Wizard
	This wizard helps you:
	Connect to the Internet.
	 Connect to a private network, such as your workplace network.
	To continue, click Next.
	< <u>B</u> ack <u>N</u> ext > Cancel

Click on Next >





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New Connection Wizard
Network Connection Type What do you want to do?
 Connect to the Internet Connect to the Internet so you can browse the Web and read email. Connect to the network at my workplace Connect to a business network (using dial-up or VPN) so you can work from home, a field office, or another location. Set up an advanced connection Connect directly to another computer using your serial, parallel, or infrared port, or set up this computer so that other computers can connect to it.
< <u>B</u> ack Next > Cancel

Select **Connect to the Internet** and click on **Next** >



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1



Select Set up my connection manually and click on Next >

New Connection Wizard		
Internet Connection How do you want to connect to the Internet?		
Connect using a dial-up modem This type of connection uses a modem and a regular or ISDN phone line.		
Connect using a broadband connection that requires a <u>user name and password</u> This is a high-speed connection using either a DSL or cable modem. Your ISP may refer to this type of connection as PPPoE.		
Connect using a broadband connection that is <u>a</u> lways on This is a high-speed connection using either a cable modem, DSL or LAN connection. It is always active, and doesn't require you to sign in.		
< <u>B</u> ack <u>Next</u> > Cancel		

- Select Connect using a dial-up modem and click on Next > •
- If more than one modem device is installed, check the entry containing the • modem to be used for network access and click on Next >





New Connection Wizard	
Connection Name What is the name of the service that provides your Internet connection?	D
Type the name of your ISP in the following box. ISP N <u>a</u> me	
The name you type here will be the name of the connection you are creating.	
< <u>B</u> ack <u>Next</u> > Cancel	

Insert a name for the network connection in the ISP Name text box (in this • example, "GG863-SR" is used as connection name) and click on Next >





New Connection Wizard	
Phone Number to Dial What is your ISP's phone number?	S)
Type the phone number below. Phone number:	
]
You might need to include a "1" or the area code, or both. If you are not you need the extra numbers, dial the phone number on your telephone. If hear a modem sound, the number dialed is correct.	sure you
< <u>B</u> ack <u>N</u> ext >	Cancel

Insert the phone number of the GG863-SR device to connect to and click on • Next >





New Connection Wizard
Connection Availability You can make the new connection available to any user or only to yourself.
A connection that is created for your use only is saved in your user account and is not available unless you are logged on.
Create this connection for:
⊙ Anyone's use
O <u>M</u> y use only
< <u>B</u> ack <u>N</u> ext> Cancel

• Click on Next >





New Connection Wizard		
Internet Account Inform You will need an accou	nation Int name and password to sign in to your Internet account.	I)
Type an ISP account n safe place. (If you have	ame and password, then write down this information and store forgotten an existing account name or password, contact you	itin a ırISP.)
<u>U</u> ser name:		
Password:		
<u>C</u> onfirm password:		
Use this account in this computer	ame and password when anyone connects to the Internet fro	m
Make this the default	It Internet connection	
	< <u>B</u> ack Next > Ca	ancel

Type "ip_host" in the User name text box and "ip_gw_app" in the Password • and Confirm password text boxes and click on Next >





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New Connection Wizard	
New connection wizard	Completing the New Connection Wizard You have successfully completed the steps needed to create the following connection: GG863-SR • Share with all users of this computer • Use the same user name & password for everyone
	Connections folder.
	Add a shortcut to this connection to my desktop
	To create the connection and close this wizard, click Finish.
	< <u>B</u> ack Finish Cancel

Click on Finish to complete the New Connection Wizard; the connection is ٠ now created and added as a new icon in the Network Connections window; a new window appears which allows to activate the just created connection

2.2.10. Configuring GG863-SR

- Turn on the GG863-SR and wait 20 seconds for the system to boot
- Connect the GG863-SR to the local PC
- Wait 10 seconds
- In the local PC connected to the GG863-SR type the address:

http://192.168.121.3/cgi-bin/index.cgi

where 192.168.121.3 is one of the IP addresses of the GG863-SR. The Home Page of the Web Administration Panel is the following:





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- Set in the GG863-SR the Remote PC parameters: •
- 1. Click on *Short Range* and then on [Connection]: type of connection between GG863-SR and remote PC.
 - Connection: GPRS or DIAL-IN (DIAL-IN → GSM)







Click **Submit**, wait until the Web Panel shows the message:

Parameter configuration was successful.

2. Click on [Server]

Fill the form:

- o IP Host address: to specify only if GPRS connection is used (address qot in section 2.2.9.1)
- Port: 50000 (specify the port on which the remote PC should wait for 0 GG863-SR registration)
- Connection Type: TCP (specify only TCP) 0



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For example:



Click **Submit**, wait until the Web Panel shows the message:

Parameter configuration was successful

- 3. Click on [Mode]:
 - o Automatic: YES (GG863-SR will try automatically (YES) or not (NO) to connect to Remote PC at next reboot)

Click **Submit**, wait until the Web Panel shows the message:

Parameter configuration was successful



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4. If GPRS is used, click on *GSM* and then on GPRS Settings]:

Fill the form with APN (Access Point Name provided by the Mobile Network Operator).



Click **Submit**, wait until the Web Panel shows the message: Parameter configuration was successful





2.2.11. SRManagerTool Connection

Go to the Web Panel:

1. click on Actions and then on [Rebooting]:

Rebooting: YES (reboot (YES) or not reboot (NO) the GG863-SR immediately).



Click **Submit**, wait until the Web Panel shows the message: Action performed was successful



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- 2. Unplug the USB cable from the local PC and:
 - In case of GPRS wait at least 3 minutes before continue with step described in section 2.4.
 - In case of GSM wait at least 2 minutes before continue with step described in section GSM call2.2.12.

2.2.12. GSM call

For a GSM connection follow these steps:

1. Go to the dial-in connection created in step described by section 2.2.9.2.

Connect GG8	63-SR ? 🛛
<u>U</u> ser name:	ip_host
Password:	[To change the saved password, click here]
Save this t Me only Anyone	user name and password for the following users: , who uses this computer
Djal:	3348805024
<u>D</u> ial	Cancel Properties <u>H</u> elp

2. Click on **Dial**; if GG863-SR is under GSM coverage, the remote connection will be established



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To terminate the remote connection between the IP host and GG863-SR, right-click on the relevant icon in the Network Connections window and click on Disconnect; to reconnect, double-click on the icon and click on Dial in the Connect window.



When the remote connection is established, the remote PC and GG863-SR are assigned the IP addresses 192.168.123.1 and 192.168.123.3, respectively; in order to have a working connection, these addresses must not be used by any other host directly reachable from the IP host.

3. Wait at least 2 minutes before continue with step described in section GSM call2.4.

2.3. SR Modules

- ZE50/ZE60 1
- \checkmark ZE51/ZE61
- **TinyOnePro** √
- √ **TinyOneLite**
- ✓ ME50-868
- \checkmark ME50-169
- √ ME70-169
- \checkmark LE50-868
- LE50-433
- \checkmark LE70-868
- ✓ LE70-915
- \checkmark LE51-868
- LT70-868 \checkmark
- NE50-868 \checkmark
- NE50-433 \checkmark
- NE70-868





2.4. Downloading

Go to the Telit DownloadZone http://www.telit.com/en/products/downloadzone.php and download the file SRManagerTool-x64.msi in case of Windows 64bit version or SRManagerTool-x86.msi in case of Windows 32-bit version.

2.5. System Requirements

- Windows XP 32 or 64-bit version, Windows Vista 32 or 64-bit version, Windows Seven 32 or 64-bit version, Windows 8 32 or 64-bit version, Windows 8.1 32 or 64-bit version.
- Microsoft .NET Framework 3.5 SP1 or later.

2.6. Installation

SRManagerTool is a Windows application. It is compatible with Windows XP, Windows Vista, Windows Seven, Windows 8, Windows 8.1.

In order to install SRManagerTool on your computer:

1. Run the file SRManagerTool-x64.msi or SRManagerTool-x86.msi





4	Welcome to the InstallShield Wizard for SRManagerTool-x86
	The InstallShield(R) Wizard will install SRManagerTool-x86 on your computer. To continue, click Next.
	WARNING: This program is protected by copyright law and international treaties.
	<back next=""> Cancel</back>

Next

Ready to install





Ready to Install the Program		4
The wizard is ready to begin installa	ation.	
Click Install to begin the installation		
If you want to review or change an exit the wizard.	y of your installation setting	s, dick Back. Click Cancel to

Install





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Finish

The SRManagerTool is now installed.

In the Desktop will appear the installer for the modified version of network packet analyzer Wireshark valid for 32-bit x86 as well as for 64-bit AMD64/x86-64 processors: Wireshark-win32-1.10.3.exe

In order to install run the installer: Wireshark-win32-1.10.3.exe

Information about Wireshark can be found at the link: http://www.wireshark.org/





3. SRManagerTool features

SRManagerTool is the PC software developed by Telit in order to flash and manage SR modules and to analyze SR networks.

3.1. Connection

- Telit SR Manager Tool About SR ManagerTool Version Connection Serial O GPRS/GSM Telit wireless -GPRS/GSM Info Port 50000 Connect Disconnect solutions GG863-SR IP GG863-SR IMEI Technologies Tools ZigBee Flashing O Mesh Management O Wireless M-Bus Analyzer O S-One Close
- Run SRManagerTool.exe

Select the type of Connection:

If GPRS/GSM:

- o type the port configured in GG863-SR (section 2.2.10).
- Click **Connect** and wait for the "GG863-SR Connection OK" message. 0
 - To abort connection attempt click Close. -





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Telit SR Manager Tool		
About SR ManagerTool Version		
Telit wireless	Connection Serial GPRS/GSM Info GG863-SR IP GG863-SR IMEI	GPRS/GSM Port 50000 Connect Disconnect
- Technologies		Flashing
O Mesh Wireless M-Bus		Management
O S-One	Close	Analyzer

ode sitt Hanagor room Porsion		
	Connection	
	O Serial	OPRS/GSM
Telit wireless solutions	GPRS/GSM Info-	Port 50000 Connect Disconnect
	GG863-SR IP	217.202.254.17
	GG863-SR IMEI	357251010091583
GC	863-SR Connection	n OK 🔀
echnologies	•	- Tools
echnologies ZigBee	Start Remote S	RManagerTool Flashing
echnologies 2 ZigBee) Mesh	Start Remote S	RManagerTool Flashing
echnologies 2 ZigBee Mesh Wireless M-Bus	Start Remote S	RManagerTool Flashing Management

o The window shows GG863-SR IP and IMEI





About SR ManagerTool Version				
	Connection			
1	O Serial	GPRS/GSM		
Telit wireless	GPRS/GSM Info	Port 50000	Connect	Disconnect
	GG863-SR IP	217.202.254.17		
	GG863-SR IMEI	35725101009158	33	
• Technologies • ZigBee			Tools	lashing
V Mesh			Ma	nagement
Wireless M-Bus				
				Conception and a local of the state of the second se

- To switch from GPRS/GSM to Serial connection:
- o Click on Disconnect

Between Disconnect and Connect operation wait times described in section 2.2.11 and 2.2.12

- o Click on Serial radio button
- To swicth from Serial to GPRS/GSM:
 - o Click on GPRS/GSM radio button
- Once fixed the connection select the technology to apply: ZigBee, Mesh, WM-Bus or S-One
- Then select the Tool to apply



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3.2. Flashing

The Flashing tool allows to program short range modules. The Flashing window collects the following information:

- Platforms Info: platforms supported for each technology
- Serial Info: COM Port to use in order to connect the SR module to the PC

The Flashing procedure can be performed only at serial speed of 115200 bit/s.

- Switch Prog:
 - Automatic: if checked the module connected to the SRManagerTool will be automatically switched to bootloader mode, otherwise the module must be switched manually.

Automatic Switch Prog is not supported for:

- ZE50/ZE60 \checkmark
- ✓ *MBus TinyOneLite*
- ✓ Mesh TinyOnePRO
- ✓ ME50-868, ME50-169 with Length option enabled in Serial Rx Format configuration register
- ✓ ME50-433 in case of Radio flashing
- ✓ NE50-868, NE50-433 with Stuffing Protocol enabled
- ✓ NE50-868, NE50-433 in case of module conneted to a network. For information on how to send the module in bootloader mode without moving switch prog check the related technology UserGuide



Performance of Automatic Switch Prog is affected by the module configuration, in the worst case it may take about 5 minutes. In case of long time required a popup allows to abort the Automatic Switch Prog procedure and start the manual Switch Prog.



Programming Info:



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Module:

- Local/GG863-SR: in case of serial connection to flash the module 0 connected to the serial link; in case of GPRS/GSM connection to flash the module inside the GG863-SR.
- **Remote** (except for Tiny platforms, ZE50, ZE60): to flash modules 0 over the radio link

Radio Info:

- Broadcast: to flash up to Max Number Modules (clients) through the module connected to the SRManagerTool (server) via serial or GPRS/GSM.
- o Unicast: to flash the module with Serial Number specified in the field (client) through the module connected to the SRManagerTool (server) via serial or GPRS/GSM.



An UMTS phone/terminal is strongly suggested in order to use the Flashing feature via GPRS (section 3.2)



The Remote Flashing via Dial-in connection needs not to drop the line during the flashing



The Remote Flashing via GPRS/GSM should be used in emergency situations



Max Number Modules To Flash: max 255 modules at a time can be flashed via Radio Broadcast.



In case of no Automatic Switch Prog, after Local flashing turn the power switch OFF (SW2) and then ON (SW2) before start Radio flashing and viceversa.

Radio Programming:

• LE50, ME50, NE50, LE70, ME70, NE70, LT70:

Radio Programming is managed for modules LE50, ME50, NE50, LE70, ME70, NE70, LT70. Modules XE50 should be equipped with bootloder GC.B00.01.06-B001, GD.B00.01.06-B001, GI.B00.01.09-B001, GL.B00.01.0B-B001, GJ.B00.01.0A-B001 or later versions, otherwise only Serial Flashing is allowed.

In order to know the version of the bootloader see section 3.3.1 (for Mesh Technology), 3.3.2 (for WM-Bus technology), 3.3.3 (for SOne Technology):





- Connect to the module
- Give the command: AT/V (for WM-Bus or SOne), AT/B (for Mesh). The response would be formatted for example in this way: GC.U00.01.01-B002.GC.B00.01.06 (for WM-Bus or SOne) or GC.B00.01.06 (for Mesh). The bootloader version is: GC.B00.01.06

Server and Clients modules can be equipped with any of the firmware allowed for technology/platform (see Appendix 4). Turn the programming switch ON (SW4) before power ON (SW2) or put all modules in bootloader activation (see ATBL command).

• **ZE51**, **ZE61**:

radio Programming is managed for modules ZE51, ZE61 equipped with bootloder B00.01.07 or later versions. For previous versions only Serial Flashing is allowed.

In order to know the version of the bootloader see section 3.3.4 (for ZigBee technology):

- o Connect to the module
- o Give the command: 02 14 05 The response would be formatted for example in this way: 10 15 00 05 0c 46 53 2e 42 30 30 2e 30 31 2e 30 34 The bootloader version is: 46 53 2e 42 30 30 2e 30 31 2e 30 34 That is: FS.B00.01.07





Server Module:

server module must be equipped with bootloader B00.01.07 or later versions and firmware Supervisor ZEx1 XS5.11.21-B004.s28 or later versions.

The firmware Supervisor can be flashed via Serial.

Before start Radio Programming turn the programming switch OFF (SW4) before power ON (SW2).

Client Modules:

clients modules must be equipped with bootloader B00.01.07 or later versions and any of the firmware allowed for right technology/platform (see Appendix 4). Turn the programming switch ON (SW4) before power ON (SW2) or put all modules in bootloader activation (see [2]).





🕇 Flashing Manager to	ol	
Platforms Info Tiny WM-Bus ME50-868 WM-Bus ME50-169 WM-Bus ME70-169 WM-Bus	COM Port COM1 Automatic	Results
Local/GG863-SR Remote Modules Responding	Broadcast Max Number Modules to Flash Unicast Serial Number Left 11	Responding Success
Firmware		Browse

• Firmware: the firmware file to flash in the SR module

- Select the right **Platform**
- Select the COM port
- Select the Via and Radio Info if needed
- Browse and select the firmware file related to the technology:





Technology/Platform firmware:

Mesh:

- platform NE50-868, Stack Low Power Mesh
- platform NE50-433, Stack Low Power Mesh
- platform NE70-868, Stack Low Power Mesh
- Platform TinyOne Pro, Stack M_ONE

ZigBee:

- platform ZE50/ZE60, Stack ZB2007
- platform ZE51/ZE61- IA/WA, Stack ZBPRO

MBUS:

- platform TinyOneLite, Protocol EN13757-4:2005
- platform ME50-868, Protocol:EN13757-4:2005 + EN13757-5 Mode R2
- platform ME50-868, Protocol:EN13757-4:2013
- platform ME50-169, Protocol:EN13757-4:2013
- platform ME70-169, Protocol:EN13757-4:2013
- platform ME50-868, Protocol EN13757-5 Mode Q

SOne:

- platform LE50-868, Stack StarNetwork
- platform LE50-433, Stack StarNetwork
- platform LE70-868, Stack StarNetwork
- platform LE70-915, Stack Frequency Hopping Star Network
- platform LE51-868, Stack SigFox plus S-One
- platform LT70-868, Stack StarNetwork



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- Power the SR board OFF (SW2) (see section 2.3)
- Connect the SR board to the serial COM Port
- Turn the programming switch ON (SW4) for LE50, LE70, ME50, ME70, NE50
- Turn the programming switch ON (SW4) for ZE50, ZE60, ZE51, ZE61 in case of serial flashing
- Turn the programming switch OFF (SW4) for ZE51, ZE61 that acts as Supervisor in case of radio flashing
- Power the SR board ON (SW2) (see section 2.3)
- Click the Flashing button



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🕇 Flashing Manager tool	
Platforms Info Serial Info Switch Prog ME50-868 WM-Bus COM Port COM1 Automatic	
Programming Info Module Radio Info Local/GG863-SR Broadcast Max Number Modules to Flash Remote Unicast Serial Number Modules Responding Image: Comparison of the second seco	Results Max Responding Success Error
Firmware C:\FW-SR\FW-WMB\ME50_WM-Bus\ME50-868_WM-Bus\EN13757-4_2010\GC.U03.01.00-B004.tlt	Browse





🕇 Flashing Manager tool	
Platforms Info ME50-868 WM-Bus COM Port COM1 Automatic	Douth
Programming Info Module Image: Construction of the second	Hesults Max Responding Success Error
Firmware [:\FW-SR\FW-WMB\ME50_WM-Bus\ME50-868_WM-Bus\EN13757-4_2010\GC.U03.01.00-B004.tt	Browse
Flashing	Close





T Flashing Manager tool	
Platforms Info Serial Info COM Port COM	1 Switch Prog
Programming Info Module Local/GG863-SR Remote Unicast Max Number Unicast Serial Number GCBK0000711: SUCCESS Firmware CNFW-SRNFW-WMBNME50_WM-BusV/IE51-868_WM-Bus Flashing Flashing	Modules to Flash Max er Success Success 1 (100 %) Error 0 (0 %) KEN13757-4_2010\GC.U03.01.00-B004.tt Browse Close Close
 Modules Responding: Serial ID and flashing result of the modules responding: available for LE50, LE70, LT70, LE51, ME50, ME70, NE50, ZE51, ZE61.not available for: ✓ Tiny, ZE50, ZE60 ✓ ZE51 and ZE61 equipped with bootloader that does not support Radio Programming 	 Results: available for LE50, LE70, LT70, LE51, ME50, ME70, NE50, ZE51, ZE61 not available for: ✓ Tiny, ZE50, ZE60 ✓ ZE51 and ZE61 equipped with bootloader that does not support Radio Programming



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A Pop up will show when flashing is finished: click OK



Click Close button in order to return to the Main Window •



Flashing is a critical feature that may lead to unexpected behaviour if wrong firmware is flashed.



In case of connection GPRS/Dial-in the Flashing operation may take a long time





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- Warning × W Radio Programming is managed only for modules with bootloader GC.800.01.06-8001.hex, GD.800.01.06-8001.hex or later versions. 1 OTA flashing for modules equipped with previous bootloader versions leads to data flashing corruption OK 🕇 Flashing Manager tool Serial Info Switch Prog-Platforms Info-COM Port COM1 ME50-868 WM-Bus Automatic Programming Info-Results -Module: Radio Info Max Local/GG863-SR Broadcast Max Number Modules to Flash Responding Remote 🔘 Unicast Serial Number Success Modules Responding Error ¥ Firmware C:\FW-SR\FW-WMB\ME50_WM-Bus\ME50-868_WM-Bus\EN13757-4_2010\GC.U03.01.00-B004.tt Browse Flashing Close
- Example of Radio Flashing Broadcast:





Flashing Manager t	ool			
Platforms Info ME50-868 WM-Bus		iial Info	Switch Prog	
Programming Info Module Local/GG863-SR Remote Modules Responding GCBK0000443: SUCC GCBK0000443: SUCC	Radio Info Broadcast Unicast ESS ESS	Max Number Modules to F	lash 2	Max 2 Max 2 Responding 2 Success 2 (100 %) Error 0 (0 %)
Firmware C:\FW-SR\FW-WMB\M Flashing	IE50_WM-Bus\ME50	-868_WM-Bus\EN13757-4_	2010\GC.U03.01.00-B004.tlt	Browse
dules Respond	ling Alarms:			
1% <= SUC 26% <= SUC 51% <= SUC 76% <= SUC SUCCESS	CESS <= 25% CCESS <= 50% CCESS <= 75% CCESS <= 99% = 100%	6 6 6		





Example of Radio Flashing Unicast: •

🕇 Flashing Manager tool	
Platforms Info Serial Info ME50-868 WM-Bus COM Port COM Port COM1	
Programming Info	Results
Module Radio Info	Max
Local/GG863-SR Broadcast Max Number Modules to Flash	Responding
Remote Oricast Serial Number GCBK0000443	Success
Modules Responding	Error
Firmware]
C:\FW-SR\FW-WMB\ME50_WM-Bus\ME50-868_WM-Bus\EN13757-4_2010\GC.U03.01.00-B004.tk	Browse
Flashing	Close





🕇 Flashing Manager to	ol				
Platforms Info ME50-868 WM-Bus	СОМ	Info Port COM1 🗸	Switch Prog		
Programming Info Module Local/GG863-SR Remote Modules Responding GCBK0000443: SUCCE	Radio Info Broadcast Unicast SS	Max Number Modules to F Serial Number	Iash GCBK0000443	Results Max Responding Success 1 Error 0 (0 %)	
	E50_WM-Bus\ME50-88	68_WM-Bus\EN13757-4_	2010\GC.U03.01.00-8004.tk	Brow	NSE
Flashing				Cic	JSE





3.2.1. Multiple Flashing Sessions

The SRManagerTool allows multiple flashing sessions.

You can use the Flashing Tool until you have COM Ports available.

🕇 Flashing Manager tool	
Platforms Info ME50-868 WM-Bus Serial Info COM Port COM1 Automatic	
C Module C Radio Info	Hesults
Local/GG863-SR Broadcast Max Number Modules to Flash	Responding
C Remote Unicast Serial Number	Success
Modules Responding	Error
Firmware C:\FW-SR\FW-WMB\ME50_WM-Bus\ME50-868_WM-Bus\EN13757-4_2010\GC.U03.01.00-B004.tlt	Browse
Flashing	Close





Platforms Info Serial Info Switch Prog ME50-868 WM-Bus COM Port COM5 Automatic Programming Info Output Output Output	Results
Module Radio Info Local/GG863-SR Broadcast Max Number Modules to Flash Remote Unicast Serial Number Modules Responding Image: Construction of the second seco	Max Association Action
Firmware C:\FW-SR\FW-WMB\ME50_WM-Bus\ME50-868_WM-Bus\EN13757-4_2010\GC.U03.01.00-B004.ttt IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Browse

For any flashing session a pop up will show when the flashing is finished









The main Window will have the Close button not enabled until there is a Window alive

🕇 Telit SR Manager Tool		
About SR ManagerTool Version		
	Connection Serial	O GPRS/GSM
Ieir solutions		Port 50000 Connect Disconnect
	GG863-SR IP	
	GG863-SR IMEI	
- Technologies	L	Tools
⊖ ZigBee		Flashing
O Mesh		Management
O S-One	Close	Analyzer





3.3. Management

The window Management is specific for the technology chosen.



The Management feature may lead to change critical parameters for normal behaviour.

Management of Mesh Technology 3.3.1.

In order to use the Management features select Serial Protocol information:

- Serial Port: serial port where is connected the SR Module •
- Stuffing or Timeout protocol
- **Enable Flow Control**





T Mesh Management		
Serial Protocol	Control	Configuration Wizard
		Connect
Free command		
- HEX command Baw Data		
-ASCII command		
Type Recipient Data		
Command Type ASCII Hexadecimal	Network Discovery	Send Command
Clear Log		Savelog
Citodi Log	Load Log	Jave Lug

- In order to perform a commissioning session, connect the Mesh module to • the selected serial port and put the module in configuration mode as follow:
 - o Switch the SR board OFF (SW2).
 - o Turn the programming switch OFF (SW4) on the SR board.
 - Switch the SR board ON (SW2) 0
 - o Turn the programming switch ON (SW4) on the SR board.







Be care to select the Serial Port where the Mesh module is really connected, SRManagerTool can not check it and it leads to no communication.

Once fixed the Serial Protocol Information and connected the module click the button **Connect** in order to connect to the Module.





🕇 Mesh Management 📃 🗖 🔀
Serial Protocol Stuffing protocol COM1 Wizard Timeout protocol Enable Flow Control Disconnect
Free command
HEX command Raw Data
ASCII command Type Recipient Data DATA V
Command Type ⊙ ASCII ○ Hexadecimal Network Discovery Send Command
17/11/2011 15.21.25
Clear Log Save Log Save Log

The previous window allows to send/receive Hex or ASCII commands to/from the Mesh module.



In order to use correctly the Window, the right protocol must be selected.

The Stuffing Protocol waits for 0xAB at the start of the command and 0xCD at the end of the command.





- Select the Command Type
- If the Command Type selected is HEX:
 - o fill the Raw command field to send.
- If the Command Type selected is ASCII:
 - o select the Type
 - o fill the Recipient (if the module is in configuration mode put Recipient = 00, if the module is in operative mode put the actual ASCII ClientID of the module) and Data fields to send



For example: Client Id LSB = 69 (ASCII = E), Client Id MSB = 49 (ASCII = 1) \rightarrow ASCII Client Id = $E1 \rightarrow Recipient = E1$

- Click the button Send Command .
- The Text Box shows the responses from the module





Examples:

<u>Type DATA:</u>		
🕇 Mesh Management		
Serial Protocol Stuffing protocol COM1	Control	Configuration Wizard Disconnect
Free command		
HEX command Raw Data		
ASCII command Type Recipient Data DATA V 00 HELLO]	
Command Type ASCII Hexadecimal	Network Discovery	Send Command
OUT: e00HELLO OUT: 65 30 30 48	45 4c 4c 4f Od	
Clear Log	Load Log	Save Log



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Type <u>HAYES</u>

🕇 Mesh Management		
Serial Protocol Stuffing protocol COM1 Timeout protocol Enable Flo	w Control	Configuration Wizard Disconnect
Free command HEX command Raw Data ASCII command Type Recipient Data		
HAYES ♥ 00 AT∧ Command Type ● ASCII ● Hexadecimal	Network Discovery	Send Command
OUT: e00HELLO OUT: 65 30 30 48 OUT: m00AT/V OUT: 6d 30 30 41	45 4c 4c 4f Od 54 2f 56 Od	
Clear Log	Load Log	Save Log





Туре **IO**

🕇 Mesh Management		
Serial Protocol Stuffing protocol COM2	Flow Control	Configuration Wizard Disconnect
Free command HEX command Raw Data		
ASCII command Type Recipient IO / IO V 00 Wr	Access ite Dig. V Off X O O	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Command Type ASCII Hexadecimal 17/11/2011 15.28	Network Discovery	Send Command
Clear Log	Load Log	Save Log





Type **PING:**

🕇 Mesh Management	
Serial Protocol Stuffing protocol COM2 Timeout protocol Enable Flow Control	Configuration Wizard Disconnect
Free command	
- HEX command Raw Data	
ASCII command Type Recipient PING V 00	
Setwork Discovery	Send Command
ОUT: јОО ОUT: 6а 30 30 0d	
IN: kÿÿ IN: 6b ff ff 0d	
Clear Log Load Log	Save Log

- The responses log can be saved, cleared or loaded. •
- Starting from this window the user can open the configuration wizard clicking the button **Configuration Wizard** or disconnect from the Mesh module clicking the button **Disconnect** (for example to select another Serial Protocol)




3.3.1.1. Mesh Configuration Wizard

The Configuration wizard allows configuring and reading registers of modules TinyOne Pro (modules/terminals 32 kB), NE50-868 MHz and NE50-433 MHz equipped with firmware AllInOne.

The selection of one of the three module behaviours (end point, router, and coordinator) is possible at configuration time. It is not necessary to flash the module to switch from a behaviour to another since it's all integrated in a unique firmware.



In order to configure correctly the AllInOne module it has to be in Configuration Mode (Prog switch ON). Once in Configuration Mode the module will be operative after about 5 seconds.

In order to verify the accuracy of data written by the user in every textbox the tool needs a specific XML file. This file is closely linked together with the Mesh firmware version. The files are provided by Telit and are stored in the folder ./ConfigTool/Mesh and the name of each file is composed in this way: Info_ML_<Maj>_<Min>.xml, where Maj and Min are the major and minor number of Mesh firmware version.

i.e.: if the firmware version is DV.M0A.03.112 the xml file name will be Info ML 03 11.xml.

The user shall not modify the xml files; if the file is not present or corrupted the SRManagerTool returns a caution popup. In the future, when a new firmware version will be available. Telit will make available a new XML file for the SR Tool and the user will take care to put it in the correct folder. If the module is not connected to the selected serial port or it is not responding, the configuration wizard won't start and it will show an error popup.





When the Configuration Wizard is started it shows the factory values



The values in the window have not been read from the module

Module Information	ns		Radio Power		Association se	tting	Commands	
Serial Number			TinyLite	2	Mode Auto	Criteria	Apply Values	
Firmware Version			NEx0 +10dB	n/10mW 👻	O Manual	O High	Read Values	
Bootloader Version	N2507107124		Disable		RSSI		Restart Module	
Module Type	Serial F	'rotocol ffing protocol	Children Side	dic Wake up 1	Bad		DefaultValues	
Router End Point	Series	ial Timeout	Elow control		Good			
Network Settings (Dec)		Half buffer	 Enable 	Nuclear (C.)	46	Factory Values	
Client Id	LSB ASCII	MSB ASCII	O Full buffer	O Disable	2	Deacon (U-255)	Load From File	
Parent Id	255 jj	255 jj	 Time setting Net Period (ms) 5 	000	Disable OTA	Config Disabled	Save To file	
Default Recipient Network Id	48 0 48	48 0	Super frame duration	(1-255) 1				
Radio Band 869.525 MHz	*		Base Time 63 ms 125 ms					
Payload 18×14 bytes 12×46 bytes			250 ms 500 ms 1000 ms					
Telemetry								
Automatic Telem	otry Digital Only 🤇) Analog Only	O Digital and Analog	Enable/Disab	le			
💿 Disable 🔘		104250	NEx0					
Disable Disable Tiny Tiny		-1/04		Δ				
Disable Disable Tiny I/01 OIn Out		0 In 0 Out		n 💿 Out 🗌 IRQ	O In ⊙ Out			
Disable D		-1/04 O In O Out -1/05 O In O Out]_A ∩ ③ Out □ IRQ _A 1 ③ Out □ IRD	0 In 0ut			
Disable D		- 1/04 - 1/05 - 1/05 - 1/06		LA ∩ ③ Out ☐ IRQ _A ∩ ③ Out ☐ IRQ _A	//07_AD_DA ○ In ⊙ Out //08_AD_DA ○ In ⊙ Out //09			
Disable D	IRQ	-1/04 -1/05 -1/05 -1/06 -1/06 -1/06		LA 1 ③ Out ☐ IRQ LA 1 ④ Out ☐ IRQ LA 1 ④ Out ☐ IRQ	1/07_AD_DA ○ In ③ Out 1/08_AD_DA ○ In ③ Out 1/09 ○ In ④ Out	IRQ		





• The button **Apply Values** allows configuring registers with desired values, after filling the different fields and selecting the radio buttons, click on the button Apply Values to configure the module:



If the Serial Protocol applied with Configuration Wizard is different from the previous selected in the Window Management (for example in Configuration Wizard is selected Stuffing protocol and in the Window Management was selected Timeout protocol or vice versa) after Apply Values it is strongly recommended Restart Module before giving ATO commands by Management Window, then Connect again to the module with the Serial protocol just applied.

In the LSB and MSB Client Id you can set the identifier for each device in the network. Note that in the Topology Network the ASCII representation of the bytes is shown for each device.



Table values:

- from 0 to 31, 127: non-printable values;
- from 32-126: printable values;
- 32: is the space character.

For example:

Client Id LSB = 69 ('E'), Client Id MSB = 49 ('1') \rightarrow Client Id = "E1"







Module Information	ns				- Radio Pow	er		- Association se	ettina	Commands
Serial Number	17				TinyLite		12	- Mode	Criteria	
E	-			-	NE O	10.00	H0.V/	Auto	O Deep	Apply Values
Firmware Version	-			1	NEXU	+1UdBm	N/IUMW	🔘 Manual	🔘 High	Bead Values
Bootloader Version					Low Powe	-		RSSI		- Hode Falado
Module Type	- 17	Serial I	Protocol		O Disable	. C. J.		Worst		Restart Module
🔵 Coordinator		🔿 Stu	uffing pro	otocol	C Unildren	n Side Devied	lia Malua un 🗍	🔵 🔘 Bad		Determitelese
Router		💿 Sei	rial Time	out		Fenod		🕘 🔘 Good		Default Values
End Point		5	ms		Flow contro	ol	Acknowledge	🔘 Best		Factory Values
Network Settinas (Decl		and the second s	_	💿 Half bu	ffer	Enable		1	
and a state of the second state of the	LSB	ASCI	I MSB	ASCII	🔘 Full buf	fer	O Disable	Number of faile	d beacon (U-255)	Load From File
Client Id	69	E	49	1	c Time settin	d:		- Disable OTA	Config	
Parent Id	2515	ÿ	255	ÿ	Net Period	9 1 (ms) 50	000	Enabled/	Disabled	Save To file
Default Recipient	48	0	48	0	Super fram	ne duration	(1-255)			
Network Id	48	- 6			Bouter Po	sition (0-25	5) 0			
Radio Rand					Base Ti	me				
869 525 MHz					○ 63 m	15				
003.323 MITZ	×.				125	ms				
Payload					0 250	ms				
18×14 bytes					0 500	ms				
12 X 46 bytes					0 1000) ms				
6 X 110 bytes					N	8				
Telemetry Automatic Teleme	ster						-IPO Source Info			
Disable	Digital	Only (🔿 Anal	loa Nolv	🔿 Digital an	id Analog				
- Tiny			-1/04			NEx0	A			
O In O Out		RQ	O In	() Ou	IRQ	0 In	- Out 🗌 IRQ	O In ⊙ Ou	IRQ	
c1/02-		=	-1/05-			-1/04	A	- 1/08 AD DA-		
🔿 In 🔿 Out		RQ	O In	🔿 Ou	🖂 IRQ	O In	💿 Out 🔲 IRQ	🔘 In 💿 Ou	IRQ	
		=7	1/06			-1/05_	_A	1/09		
-1/03		RQ	O In	() Du	🔲 IRQ	O In	💿 Out 🔲 IRQ	🔘 In 💿 Oul	IRQ	
0 In 0 Out						A Maria	10	J.L	2	
0 In 0 Out						- I/OB	Δ .			



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The button **Read Values** allows reading registers value from the module •





Module Information	10				- Badio Pou	ier			etting	Commande	
Serial Number G	JCM000	00025		-	Tinul ite	Tinul ite		- Mode	- Criteria	Commandas	
			1992-199			Auto	O Deep	Apply Values			
Firmware Version	GJ.MO	A.03.1	74		NEx0	+10dBm	n/10mW	🔘 Manual	O High	PandValues	
Bootloader Version	GJ.BO	0.01.04	4		- Low Powe	r -				Read Values	
	Carriero			_	💿 Disable			RSSI		Bestart Module	
Module Type	71	Serial F	Protocol		O Childre	n Side		Worst			
Coordinator		🔿 Stu	itting pro	otocol	🔘 Total	Period	lic Wake up 🚺			Default Values	
Houter		🥑 Ser	ial l'ime	out	Theory of the	27	Nature Martin	Good		6	
End Point		5	ms		Flow contr	01 Ifer	Acknowledge	💛 Best), i i	Factory Values	
Network Settings (Dec)			Alexandre		for		Number of faile	d beacon (0-255)		
er alla	LSB	ASCI	MSB	ASCI		iel		2		Load From File	
Ulient Id	69	E	49	1	r Time settin	g		Disable OTA	Config	Cause Ta Gla	
Parent Id	255	y	255	у	Net Period	d (ms) 50	000	🔽 Enabled/	Disabled	Save To file	
Manual II	48	0	48	U	Super fran	ne duration	(1-255)				
Network 1a	48	3			Router Pc	sition (0-25	5) 0				
Radio Rand					C Base T	me					
969 525 MU-	-				◯ 63 n	ns					
000,020 MITZ					125	ms					
Payload					0 250	ms					
18×14 bytes					0 500	ms					
12 X 46 bytes					0 1000) ms					
○ 6×110 bytes											
Telemetry							2000 KEV 1878				
-Automatic Telem	etry	-	.		0.011		-IRQ Source Info				
	Digital (Jnly 🤇) Anal	log Unly	 Digital ar 	nd Analog	Enable/Disa	ble			
Tiny			100000			NEx0	02	100	7,		
C1/01			1/04-	ac 124	-	-1/03_	_A	1/07_AD_DA-			
	IF	RQ	O In	🔾 Ou	t 🔄 IRQ	⊖ In	i 💿 Out 📋 IRQ	🛛 🔘 🔘 🛈 🔘			
r1/02-		-	-1/05-			-1/04	_A	1/08_AD_DA			
🔘 In 🔘 Oùt	III. JF	1Q	🔘 İn	🔿 Ou	t 🖂 IRQ	O In	i 💿 Out 🗌 IRQ	🔵 In 💿 Out	🗌 IRQ		
-1/03			1/06-			-1/05	Δ.	J L			
	L IF	1Q	O In	O Ou	t 🗌 IRQ	O In	n 💿 Out 🥅 IBD	🔿 In 💿 Out			
111 1111					- metricial	- Marcala					
						1/06	A				





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The button Restart Module leads sending ATO command to the module



After the ATO command the user shall reconnect to the module in order to continue the configuration, otherwise the module is in operating mode.

- The button **Default Values** leads sending **ATR** command:
- using this command it is possible to restore a great part of register default values; the difference with ATF command is that the module type will be not changed and the default values depend on the module type. If a module used as Coordinator receives the command ATR, restores all the default values but module type continues to have the value equals to 2 and the Client ID will be not changed (0xFF,0xFF). For the other module types the module type (register 306) does not change but the Client ID becomes 0x30, 0x30.



After sending this command it is mandatory to perform a module reboot clicking the button Restart Module.

- The button Factory Values leads sending the Hayes command ATF.
- The Hayes command ATF allows user restoring the "Factory" settings. It • means that module type becomes 0x00, Network ID is 0x30, Client ID is 0x30, 0x30, and so on.



After sending this command it is mandatory to perform a module reboot clicking the button Restart Module.

- The button Load From File allows configuring registers with values stored in a configuration file (see for example Mesh Coordinator Config Default.txt, Mesh_Router_Config_Default.txt, Mesh_EndDevice_Config_Default.txt, Mesh_AllType_Config_Factory.txt). After loaded the file click the button Apply All in order to set effectively the values.
- The button Save To File allows saving the values present in the window in a • file (for example in order to save a specific configuration).

3.3.1.2. Mesh Network Discovery

The feature **Network Discovery** shows the topology of the network and some useful information such as:

- Network ID of the network discovered
- Radio Band used for network operations



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- Network Period of the network discovered
- How many devices have been discovered in the network
- How many devices are not responding during discovery
- For each device (right click): Client ID, Serial Number (if detected), Parent ID, Module Type (if detected), Low Power Mode (if detected), Periodic Wake up (if detected and applicable), firmware version and a list of commands that can be sent to remote device (see 3.3.1.3)

The topology can be get using one of the Telit modules of the network in field:

by the tool Management of the SRManagerTool Connect to the module of the network (see section 3.3.1)



For discovering the topology it is recommended to use a device that does not receive data with high rate, otherwise the performances can be very slow and the topology can be detected with incomplete information or not detected at all.





- In the Management window Click button Network Discovery
- Appears the following window:

1 Network Discovery Tool			
	Coordinator Router End Device Information Incomplete		07/10/2011 15:52:45
			SaveLog LoadLog ClearLog
Waiting time 1 (sec.) Start Discovery Save	Close	Load	Save Commands Send Commands Load Commands Clear Commands
	Status Bar		Vork offline

The field Waiting time is the time to wait for each command sent during the network discovering.



If in the network there are sleeping devices it is recommended to type a time compliant to the registers 320, 321, 322, 340, 341 and network depth, anyway some devices can be detected with information incomplete or not detected at all.





T Network Discovery Tool			
© COORD	Coordinator Router End Device Information Incomplete		04/11/2011 16.18.47 SaveLog LoadLog ClearLog
Wailing time 3 [sec.] Start Discovery Save Summary Network ID: 100 Radio Band: 868.300 MHz Network Period: 1000 Devices discovered: 7 Devices not responding: 0	Close Status Bar	Load	Save Commands Send Commands Load Commands Clear Commands

click the button Start Discovery:

- The button Save allows saving the topology shown in the left window to XML • file.
- The button Load allows loading in the right window the topology saved (XML • file), for example for comparing two networks or the same network in two different times.





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1vv0300899 Rev9 - 2014-05-08

Network Discovery Tool			
 □ COORD □ R0 □ E0 □ E2 □ R2 □ E1 □ R1 	Coordinator Router End Device	□ COORD 1 R0 2 E0 2 E0	04/11/2011 16.18.47
			SaveLog LoadLog ClearLog
Waiting time 3 [sec.] Start Discovery Save	Close	Load	Save Commands Send Commands Load Commands Clear Commands
Summary Network (D: 100 Radio Band: 868.300 MHz Network Period: 1000 Devices discovered: 7 Devices not responding: 0	Level	Summary Network (ID: 100 Radio Band: 868.300 MHz Network Period: 1000 Devices discovered: 3 Devices not responding: 0	Vork offline

An **Abort Discovery** button allows aborting the Network Discovering process: •

Abort

A progress bar shows the network **Level** discovered.

Level: 3	









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3.3.1.3. Mesh Remote Commands

Right click on the node of the topology in order to list all remote commands available.



The performance of the commands are not guaranteed in case of node marked in the topology as "Information Incomplete".

COORD		Coordinator		04/11/2011 16.26.49
EO	NODE INFORMATION	Router		
E2 R2	Client ID: R0	End Device		
E1 	Serial Number: GCBK0000740	Information Incomplete		
	Parent ID: COORD	Sector Contractor Contractor Sec		
	Module Type: Router			
	Low Power Mode: LP Disable			
	Periodic Wake up: Not Present, it's a router!			
	Firmware version: GC.M0A.03.151			Save Log Load Log Clea
	COMMANDS			
	Ping-Standard to R0			
	Ping-Statistic to R0			
	Telemetry to R0			
	Move R0			Save Commands Send Comr
ing time [sec.]	Start Discovery Save	Close	Load	Load Commands Clear Comm
Sun	mary work ID: 100	Status Bar	Summary	
Rac	io Band: 868.300 MHz			Work offline
Net	vork Period: 1000			

Ping-Standard: pings the remote device sending the PING command







Ping-Statistic: pings the remote device sending the PING and shows statics •

giovedì 6 ottobre 2011
TIME: 14.37.38 Ping-Statistic to E0:
1° attempt: result = SUCCESS, delay = 343 ms 2° attempt: result = SUCCESS, delay = 203 ms 3° attempt: result = SUCCESS, delay = 171 ms 4° attempt: result = SUCCESS, delay = 140 ms
Packets trasmitted = 4 Packets received = 4 Packets lost = 0 Average delay = 214 ms
Save Log Load Log Clear Log





Telemetry: sends the Telemetry command to the remote device

🕇 Telemet	ryML		
Recipient E0	IO Access Write Dig. 💊	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Send
		Close	

giovedì 6 ottobre	2011	
TIME: 14.39 Digital write requ).21 est to E0:	
ок		
Save Log	Load Log	Clear Log

- Move: change the parent of the remote device
 - o Go to the topology and select the device you want change parent

🕇 MoveML		
Client Id E1	NEW Parent Id	Send
	Close	

o Go to the Topology and double click on the new parent





T MoveML		
Client Id E1	NEW Parent Id R0	Send
	Close	
giovedì 6 ott	obre 2011	
TIME: 1 Move E1 (ne	4.41.43 ew parent = R0):	
Result = SUI	CCESS	



Because the Move is a critical command the module can not be switched off during it. In case of Error response the module can be associated to a parent different from "NEW parent ID" or out of the network.

Clear Log

Load Log

 $\mathbf{0}$

Information about the time needed to apply the new topology after the Move operation can be retrieved in the relating technology documentation.

Start Discovery in order to see the new topology of the network.

Save Log





3.3.2. Management of WM-Bus Technology

In order to use the Management features you have to select Serial Protocol information:

- Serial Port: serial port where is connected the SR Module
- Baudrate: the speed of the serial port (19200 bits/s default)
- Enable Flow Control
- Serial Wakeup
- MBus Protocol

	· 🔺	
Enable Flow Control	Serial Wakeup	Connect
/Bus Protocol		
EN13757-4:2005	~	
EN 13757-4:2005 EN 13757-4:2010 EN 13757-4: EN 13757 E)
EN 13757-4 + EN 13757-5 EN 13757-5 Mode Q]
Kaw Data		
ASCII command		
Command Tune	Hexadecimal	Send Command
ASCII		
ASCII)	
ASCII		



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- Connect the WM-Bus module to the serial port selected:
 - o Switch the SR board OFF (SW2).
 - Turn the programming switch OFF (SW4) on the SR board.
 - o Switch the SR board ON (SW2).

Once fixed the Serial and MBus Protocol Information click the button **Connect** in order to connect to the WMBus Module.





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🕇 MBus Management	
COM2 V 19200	Configuration Wizard
Enable Flow Control Serial Wakeup	Disconnect
MBus Protocol	
EN 13757-4:2010	
Free command	
HEX command	
Raw Data	
Data	
Command Type ASCII O Hexadecimal	Send Command
OUT: +++	~
OUT: 2b 2b 2b	
IN: 4f 4b 0d	
Clear Log Load Log	Save Log

The previous window allows to send Hex or ASCII commands to the MBus module:

- Select the Command Type •
- If the Command Type selected is HEX: •
 - o fill the Raw Data field to send.
- If the Command Type selected is ASCII: •



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- o fill the Data field to send
- Click the button Send
- The Text Box shows responses from the module. .



After sent ASCII command ATO to come back in configuration mode give the command 2b 2b 2b in Hexadecimal command window.





Example:

🕇 MBus Management		
Serial Protocol COM2 I9200 Enable Flow Control Serial V	Wakeup	Configuration Wizard Disconnect
EN 13757-4:2010	~	
Free command HEX command Raw Data ASCII command Data AT/V		
Section Command Type O Hexadec	imal	Send Command
OUT: AT/V OUT: 41 54 2f 56 IN: GC.U03.01.0 IN: 47 43 2e 55 30 2d 42 30 30 34 2e 30 31 2e 30 37	Od 0-B004.GC.B00.0 30 33 2e 30 31 Od 47 43 2e 42 Od	▲ 1.07 2e 30 30 30
Clear Log	Load Log	Save Log

- The responses log can be saved, cleared or loaded. •
- Starting from this window the user can open the configuration wizard clicking • the button **Configuration Wizard** or disconnect from the WM-Bus module clicking the button **Disconnect** (for example to select another Serial or MBus Protocol)



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3.3.2.1. **WM-Bus Configuration Wizard**

 \bigcirc

The Configuration wizard allows configuring and reading registers of TinyOne Lite 868 MHz, ME50 868MHz and ME50 169MHz modules.

When the Configuration Wizard is started it shows the default values. •

The values in the window have not been read from the module

Module Informations	Serial Tx Format	Radio Output Power	Serial Speed		Commands
Serial Number	Length CField	O 0 dBm O +5 dBm	 1200 bits/s 2400 bits/s 	0 0 1 0 2 0 3 0	Apply Values
Firmware Version	A Field		 4800 bits/s 9600 bits/s 		Read Values
SootLoader Version	LQI Wake-up Char	Wakeup Options	 19200 bits/s 38400 bits/s 57600 bits/s 	0809	Restart Module
1-Bus Mode		Serial	0 115200 bits/s		
S1 Meter O T2 Other O N1 Meter	Preamble Length Short Preamble				Default Values
S2 Meter R2 Other N2 Meter S2 Other C1 Meter N2 Other T1 Meter C1 Other N2 Other	O Long Preamble	0			Load From File
T1 Other C2 Meter T2 Meter C2 Other	Sleep Time	Serial Time-Out			Save To file
VE50-868 advanced features Rx Filter Rx filter Rx filter Enable check on duty cy	cle limit	Part 5 Enable part 5 Enable network manag	jement		
		Disable upstream frame	e forwarding		
Meter Options (Write Only) Meter Addre	res rer ID			Add Meter	
- Manufactu				Permaten	
Do not filter Enable encryption				Meter	
Do not filter Enable encryption				Meter	

ME50-868: Protocol EN13757-4:2005





ME50-868: Protocol EN13757-4:2013

M-Bus (EN13757-4:2005/EN13757-4:20	10/ EN13757-5 Ma	de R2) Configurations				
Module Informations Serial Number Firmware Version BootLoader Version	Serial Rx Format	Badio Channel 1 0 0 1 2 3 4 6 7 5 6 7 8	Radio Dutput Power O D dBm +5 dBm +10 dBm +14 dBm	Serial Speed 1200 bits/s 2400 bits/s 4800 bits/s 9600 bits/s 19200 bits/s	Wakeup Options	Commands Apply Values Read Values
M-Bus Mode S S1 Meter T2 Other N1 Meter S 20 Meter R2 Meter N1 Other S 20 Meter C1 Meter N2 Other T1 Meter C1 Other T1 Meter C1 Other T2 Meter C2 Other	Serial Tx Format Length C Field M Field C Field C Field C Field L QI Wake-up Char RSSI	Preamble Length Short Preamble MBus Fields C Field M Field 174 12	Serial Time-Out 5 A Field 120 86 52	38400 bits/s 57600 bits/s 115200 bits/s 18	Vakeup Time-Dut	Restart Module Default Values Load From File Save To file
Advanced features Rx Filter Repeater Rx Filter Enable Tx Options Multicast Address Multicast Address Address LBT Adv Options FAC ALOHA LBT Enable	e e txD FAC time	Part 5 Enable part 5 Enable network management Disable upstream frame forwardi Multichannel LBT BD max Enable upstream frame forwardi BD max Enable upstream frame forwardi FAC fast FAC fast FAC fast FAC fast	AC options Freq access cycle Slow response delay ow r	Channel Plan Ta@4800 Tb@4800 Current Channel - Read Only) Sing Ch LBT B0 - max Sing Ch LBT - delay	LBT Threshold	
Registered Meters Meter Options (Write Only) O not filter Enable encryption Meter Key	Address		Add Meter Remove Meter	- Sing Ch LBT RA - period	Sing Ch LBT RA max	





ME50-169: Protocol EN13757-4:2013

S2 Meter R2 Other N2 Meter S2 Other C1 Meter S2 Other C1 Meter T1 Meter C1 Other T2 Meter C2 Other T2 Meter C2 Other	A Field Cl Field LQI Wake-up Char RSSI	MBus Fields C Field 68 174 12	A Field		CI Field	Load From Fil	
Ivanced features			MBus Field A Field C Field M Field A Field 68 174 12 120 86 52		7 120	Load From File	
Ix Filter Repeater Rx filter Enable X Ditions Enable Reserved (Don't check) Multicast Address Manufacture ID Address		Part 5 Enable part 5 Enable network management Disable upstream frame forwardin B0 max	AC options	Channel Pfan	LBT Threshold		
LBT Adv Options ALOHA LBT	FAC time	out FAC fast FAC sk	Slow response delay	Sing Ch LBT	Sing Ch LBT B0		
Meter Options (Write Only) Do not filter Enable encryption Meter Kev	Address		Add Meter Remove Meter	Sing Ch LBT RA - period	Sing Ch LBT RA max Sing Ch LBT RA		

ME70-169: Protocol EN13757-4:2013



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Vodule Informations	Serial Rx Format	Radio Channel	Constant of the	Radio Output Power	Serial Speed	Wakeup Options	Commands
Gerial Number	Length C Field M Field	1a@4800 (2a@2400 (3a@4800 () 1b@4800) 2b@2400) 3b@4800	 → +21 dBm → +24 dBm 	 1200 bits/s 2400 bits/s 	Low Power Serial	Apply Value
BootLoader Version	A Field	○ 0@19200 (○ 2b@4800) 2a@4800) 9	● +27 dBm ○ +30 dBm	 4800 bits/s 9600 bits/s 19200 bits/s 	Sleep Time	Read Value
4-Bus Mode	Serial Tx Format	Preamble Length Short Preamble	,	Serial Time-Out	 38400 bits/s 57600 bits/s 115200 bits/s 	Wakeup Time-Out	Restart Modu
S1 Meter T2 Other N1 Meter S1 Other R2 Meter N1 Other	C Field M Field	MBus Fields	·				Default Value
S2 Meter CR2 Uther N2 Meter S2 Other C1 Meter N2 Other T1 Meter C1 Other	Cl Field	C Field	ield	A Field	10-10-1	Cl Field	Load From Fi
T1 Other C2 Meter T2 Meter C2 Other	□ Wake•up Char □ RSSI	68 174	12	120 86 52	18	7 120	Save To file
dvanced features Rx Filter	я 	Part 5		BX Pin	Channel Plan	Indications	
Rx filter	ble	Enable part 5 Enable network	management	0	☐ 1a@4800 /	Enable	
Reserved (Don't check)	140	Disable upstream	n frame forwarding	0	- Current Channel -	LBT Threshold	
Multicast Address Manufacturer ID		Multichan B0 max	nel LBT - FA	C options		99	
0 128 0 0 0	0.00	6		Freq access cycle Slow response delay	Sing Ch LBT BO	Sing Ch LBT BO	
LBT Adv Options	C txD FAC time	FAC fast tROmax	FAC slo tR0min	w FAC slow tROmax	5	3	
		101	1100	1101	Sing Ch LBT delay	Sing Ch LBT BO	
Hegistered Meters - Meter Options (Write Only)	58			Add Meter	Cma Ch L DT DA	Sing Ch LPT PA	
Do not filter	er ID Address			Remove	period	max 3	
MatarKau		ar liss of he		Meter	FAC fast tROmin	Sing Ch LBT RA	
					100	flat 3	





T M-Bus (EN13757-4:2005/EN13757-4:2010/ EN13757-5 Mode R2) Configurations Commands Module Informatio Serial Rx Format Radio Channel Radio Output Power Serial Speed Wakeup Options Length C Field M Field A Field Cl Field Serial Number 1200 bits/s 2400 bits/s 4800 bits/s 9600 bits/s 19200 bits/s 38400 bits/s 57600 bits/s 115200 bits/s O 0 dBm Low Power Apply Values 0 2 3 ○ +5 dBm Serial Firmware Version 04 5 🔘 +10 dBm 0.6 7 Read Values 🛞 +14 dBm BootLoader Version 0.8 9 Serial Tx Format Serial Time-Out Preamble Length Restart Module Wakeup Time-Out Length C Field A Field CI Field CI Field LQI Wake-up Char RSSI Short Preamble Long Preamble M-Bus Mode 5 S1 Meter S1 Other S2 Meter S2 Other T1 Meter T1 Other T2 Meter C T2 Other R2 Meter R2 Other C1 Meter C1 Other C2 Meter C2 Other N1 Meter Default Values N1 Other N2 Meter MBus Fields N2 Other C Field M Field A Field CI Field Load From File 68 174 12 120 86 52 18 120 1 7 Save To file Advanced features - Bx Filter Repeater Part 5 RX Pin Channel Plan Enable part 5 Enable network management Disable upstream frame forwarding 📃 Enable ☐ 1a@4800 ☐ 1b@4800 Rx filter ~ × Enable Tx Options * Enable check on duty cycle limit Current Channel (Read Only) LBT Threshold-Multicast Address Multichannel LBT BO max Manufacturer ID Sing Ch LBT BO Sing Ch LBT BO FAC timeout FAC slov (ROmax LBT Adv Ontions FAC IND ALOHA LBT *) Sing Ch LBT Sing Ch LBT BO Registered Meter Meter Options (Write Only) Meter Address Add Meter Sing Ch LBT RA Sing Ch LBT RA Manufacturer ID Address Do not filter Enable encryption Remove Meter FAC fast tROmi Sing Ch LBT RA Meter Key

ME50-868 : Protocol EN13757-4 + EN13757-5 Mode R2





Module Informations	Radio Channel	Serial Speed	Serial Time-Out	Commands
Serial Number	 ○ 0 ○ 1 ○ 2 ○ 3 	 1200 bits/s 2400 bits/s 	5	Apply Values
BootLoader Version	○ 4 ○ 5 ○ 6 ○ 7	 4800 bits/s 9600 bits/s 	Low power	Read Values
M-Rue Mode	0809	19200 bits/s	Radio frame	Restart Module
Primary station Enable network lay Secondary station	er Radio Output Power	 38400 bits/s 57600 bits/s 	Sleep Time	Default Values
Serial Rx Format Cerial Tx Format	🔍 🔘 +5 dBm	115200 bits/s		Load From File
Length	🔿 +10 dBm	Duty Cycle	Wakeup Time-Out	Court - Ch
DA Field DA Field	() +14 dBm	disabled	10	Save to file
SA Field SA Field	SA Field			
DLY Field DLY Field	0 0 0	0 0 0 0		
C Field	DA Field			
192 Wake-up Char	0 0 0	0 0 0 0		
Registered Nodes Registered Node Options Enable AES-128 encryption and decryption fr Node Key	or node	Address		Add Node Remove Node

ME50-868: Protocol EN13757-5 Mode Q





The button **Apply Values** allows configuring registers with desired values, • after filling the different fields and selecting the radio buttons, click on the button **Apply Values** in order to configure the module.

Module Informations	Serial Rx Format	Radio Channel	Radio Output Power	Serial Speed	Wakeup Options	Commands
Serial Number	Length C Field	0 0 1 2 0 3 0 4 0 5	◯ 0 dBm ◯ +5 dBm	 ○ 1200 bits/s ○ 2400 bits/s 	Low Power Serial	Apply Values
BootLoader Version	A Field	0 6 0 7 0 8 0 9	 ○ +10 dBm ③ +14 dBm 	 4800 bits/s 9600 bits/s 19200 bits/s 	Sleep Time	Read Values
	Serial Tx Format	Preamble Length	Serial Time-Out	38400 bits/s 57600 bits/s		Restart Modul
M-Bus Mode S1 Meter T2 Other N1 Meter	Length	 Short Preamble Long Preamble 	5	0 115200 bits/s		
S1 Dther OR2 Meter N1 Other	M Field	- MBus Fields				Default Value
S2 Meter R2 Uther N2 Meter S2 Other C1 Meter N2 Other T1 Meter C1 Other	Cl Field	C Field M Field	A Field	1	Cl Field	Load From File
◯ T1 Other ◯ C2 Meter ◯ T2 Meter ◯ C2 Other	RSSI	68 174 12	120 86 52		7 120	Save To file
dvanced features			DO D	- OF - OF	1. 4. Sat	
Rx filter	able	Enable part 5	I I I I I I I I I I I I I I I I I I I	Channel Plan		
Tx Options		Enable network managemen	nt CTX Pin	16@4800	Enable	
Reserved (Don't check)	11-11 11-11			Current Channel	LBT Threshold	
Multicast Address		Multichannel LBT	FAC options) (head only)		
Manufacturer ID Address		BU max	Freq access cycle	Ch. Chint PO		
لـــــالــــال			Slow response delay	_ Sing Ch LBT BU	flat	
LBT Adv Options	C txD FAC tim	FAC fast	C slow			
ALOHA LBT				Sing Ch LBT	Sing Ch LBT BO	
Registered Meters				Gelay	pendd	
Meter Options (Write Only)	988		Add Meter	- Sing Ch L BT BA	Sing Ch BT BA	
Do not filter	Address			period	max	
	ـــــــا زلـــــ		Remove Meter			
Meter Key				FAC fast tROmin	Sing Ch LBT RA	
					UGC	







Iodule Informations		Serial Rx Format	🕆 🕝 Radio Channel	Radio Output Power	Serial Speed	Wakeup Options	Commands
Serial Number	GCAJ4400024	Length		◯ 0 dBm ◯ +5 dBm	 1200 bits/s 2400 bits/s 	Low Power	Apply Values
BootLoader Version	GC.B00.01.07	A Field		 ○ +10 dBm ⊙ +14 dBm 	 4800 bits/s 9600 bits/s 19200 bits/s 	Sleep Time	Read Values
1-Bus Mode		Serial Tx Format	Preamble Length Short Preamble	Serial Time-Out	 38400 bits/s 57600 bits/s 115300 bits/s 	Wakeup Time Out	Restart Modul
S1 Meter O S1 Other O	T2 Other ON1 Meter R2 Meter N1 Other	C Field	C Long Preamble	5	U 115200 bits/s	0	Default Value
S2 Meter S2 Other T1 Meter	R2 Other N2 Meter C1 Meter N2 Other C1 Other	A Field CI Field LQI Wake-up Char	C Field M Field	A Field	10 1	Cl Field	Load From File
) T1 Other O) T2 Meter O	C2 Meter C2 Other	RSSI					Save To file
Ivanced features Ix Filter Rx filter	Repeate	er ble	Part 5 Enable part 5 Enable network management	BX Pin	Channel Plan	Indications	
Reserved (Don't	check)			FAC options	Current Channel - (Read Only)	- LBT Threshold	
Manufacturer ID				Freq access cycle Slow response delay	Sing Ch LBT BO	Sing Ch LBT BO	
LBT Adv Options		CitxD FAC tim	eout FAC fast FAC	Inin FAC slow	Sing Ch LBT	Sing Ch LBT BO	
Registered Meters - Meter Options (Wr Do not filter Enable encryp	tion	ss er ID Address		Add Meter Remove Meter	Sing Ch LBT RA	Sing Ch LBT RA	
Meter Key					- FAC fast (ROmin-	Sing Ch LBT RA	

The button **Read Values** allows reading registers value from the module. •





The button Restart Module leads to send ATO command to the module.

After the ATO command the user shall reconnect to the module in order to continue the configuration, otherwise the module is in operating mode.





- The button **Default Values** leads to send **ATR** command:
- using this command it is possible to restore all parameters to their default values. After ATR command the user shall **Read Values** in order to refresh the window with default values read from the module.
- The button Load From File allows configuring registers with values stored in • a configuration file (see for example MBus_Default.txt). After loaded the file click the button Apply All in order to set effectively the values.
- The button Save To File allows saving the values present in the window into a • file (for example in order to save a specific configuration).
- The button Add Meter/Node, Remove Meter/Node allows adding/removing an entry in the registered meters/nodes.

3.3.3. Management of S-One Technology

In order to use the Management features you have to select Serial Protocol information:

- Serial Port: serial port where is connected the SR Module
- Baudrate: the speed of the serial port (19200 bits/s default)
- Parity: serial port parity type
- Stop bits: serial port stop bits
- Flow control: serial port flow control type
- N. data Bits: number of data bits.





SOne Ma	nagement			
COM1	col V	19200	~	Configuration Wizard
Parity		None	~	Connect
Flow contro	ol	None	¥	
Stop bits	1 bit 💌	N. Data Bits 8	bits 💌	
ASCII com Data	mand			×
Command • ASCII	Туре — Н	exadecimal		Send Command
		Clear Log	Load Log	g Save Log

- Connect the S-One module to the serial port selected: ٠
 - Switch the SR board OFF (SW2).
 - Turn the programming switch OFF (SW4) on the SR board.
 - o Switch the SR board ON (SW2).





Once fixed the Serial Protocol Information and connected to the module click the button **Connect** in order to connect to the S-One Module.

SOne Managemer	nt	86
Serial Protocol	19200	Configuration
Parity	None	Disconnect
Flow control	None	~
Stop bits 1 bit	👻 N. Data Bits	8 bits 👻
Free command HEX command Raw Data		Y
ASCII command Data		~
Command Type ASCII	O Hexadecimal	Send Command
OUT: 41 5 IN: GC.S IN: 47 43 35 2d 42 3 2e 30 31 2e	4 2f 56 0d 00.01.05-B002. 3 2e 53 30 30 3 30 32 0d 47 e 30 37 0d	GC.B00.01.07 2e 30 31 2e 30 43 2e 42 30 30
	Clear Log	Load Log Save Log

The section SigFox is active only in case of stack SigFox plus S-One.



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COM6 -	19200 -	Configuration
Panty	None *	Disconnect
Flow control	None +	bisconnect
Stop bits 1 bit 🔹	N. Data Bits 🛛 😽 👻	
HEX command Raw Data		
Command Type ASCII) Hexadecimal	Send Sommand
Command Type ASCII) Hexadecimal 2f 56 0d	Send Sommand
Command Type ASCII	Hexadecimal 2f 56 0d .00.01-B004.GP.B00	Send Sommand
Command Type ASCI OUT: 41 54 IN: GP.S03 IN: 47 50 31 2d 42 <u>30</u>) Hexadecimal 2f 56 0d .00.01-B004.GP.B00 2e 53 30 33 2e 30 30 34 0d 47 5 <u>0 2</u> e	Send Sommand .01.0C 30 2e 30 42 30 30
Command Type ASCII OUT: 41 54 IN: GP.S03 IN: 47 50 31 2d 42 30 2e 30 31 2e) Hexadecimal 2f 56 0d .00.01-B004.GP.B00 2e 53 30 33 2e 30 30 34 0d 47 50 2e 30 43 0d	Send Command .01.0C 30 2e 30 42 30 30

The previous window allows to send Hex or ASCII commands to the S-One module:

- Select the Command Type •
- If the Command Type selected is HEX: •
 - o fill the Raw Data field to send.



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- If the Command Type selected is ASCII:
 - o fill the Data field to send
- Click the button Send
- The Text Box shows the responses from the module.





Example:

SOne Mana	gement			
Serial Protoco COM42	-	19200		Configuration Wizard
Parity		None	*	Disconnect
Flow control		None	Y	<u> </u>
Stop bits [1 bit 🖂	N. Data Bits	8 bits 💌	
HEX comma Raw Data ASCII comm Data	nd and			×
Command Ty ACCII	vpe 🔿 H	exadecimal		Send Command
A TUC: TUC:	AT/V 11 54 2f	56 Od		^
EN: 0 EN: 4 35 2d 4 2e 30 3	GC.SOO.O 47 43 2e 42 30 30 31 2e 30	1.05-B00 53 30 3 32 0d 4 37 0d	2.GC.B00 0 2e 30 7 43 2e	.01.07 31 2e 30 42 30 30
		Clear	Log Load	1Log Save Log



After sent the ASCII command ATO, before Disconnect the module send the command +++



After sent ASCII command ATO or ATX to come back in configuration mode give the command 2b 2b in Hexadecimal command window.



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- The responses log can be saved, cleared or loaded. •
- Starting from this window the user can open the configuration wizard clicking • the button Configuration Wizard or disconnect from the S-One module clicking the button **Disconnect** (for example to select another Serial Protocol)

In case of stack SigFox plus S-One:




Serial Protocol			
COM6 👻	19200	*	Configuration Wizard
Parity	None	*	Disconnect
Flow control	None	*	L
Stop bits 1 bit	▼ N. Data Bits	8 bits 💌	
ree command			
HEX command Raw Data			
- 			÷
ASCII command			
noon command			
Data			
Data			¥
Data			÷
Command Type	Hexadecimal		▼ Send Command
Command Type	Hexadecimal		Send Command
Data Command Type ASCII OUT: 41 54	© Hexadecimal 2f 56 0d		Send Command
Data Command Type ASCII OUT: 41 54 IN: GP.SO	⊙ Hexadecimal 2f 56 0d 3.00.01-B004	.GP.B00.(Send Command
Data Command Type ASCII OUT: 41 54 IN: GP.SO IN: 47 50	○ Hexadecimal 2f 56 0d 3.00.01-в004 2e 53 30 33	.GP.B00.0 2e 30 30	Send Command
Data Command Type ASCII OUT: 41 54 IN: GP.SO IN: 47 50 31 2d 42 30	Hexadecimal 2f 56 0d 3.00.01-B004 2e 53 30 33 30 34 0d 47	.GP.B00.0 2e 30 30 50 2e 42	Send Command 01.0C 02e 30 2 30 30
Data Command Type ASCII OUT: 41 54 IN: GP.SO IN: 47 50 31 2d 42 30 2e 30 31 2e	Hexadecimal 2f 56 0d 3.00.01-B004 2e 53 30 33 30 34 0d 47 30 43 0d	.GP.B00.0 2e 30 30 50 2e 42	Send Command
Data Command Type ASCII OUT: 41 54 IN: GP.SO IN: 47 50 31 2d 42 30 2e 30 31 2e	Hexadecimal 2f 56 0d 3.00.01-B004 2e 53 30 33 30 34 0d 47 30 43 0d	.GP.B00.(2e 30 30 50 2e 42	Send Command
Data Command Type ASCII OUT: 41 54 IN: GP.SO IN: 47 50 31 2d 42 30 2e 30 31 2e	Hexadecimal 2f 56 0d 3.00.01-B004 2e 53 30 33 30 34 0d 47 30 43 0d	.GP.B00.0 2e 30 30 50 2e 42	Send Command
Data Command Type ASCII DUT: 41 54 IN: GP.SO IN: 47 50 31 2d 42 30 2e 30 31 2e SinFor Comments	Hexadecimal 2f 56 0d 3.00.01-B004 2e 53 30 33 30 34 0d 47 30 43 0d	.GP.B00.0 2e 30 30 50 2e 42	Send Command
Data Command Type ASCII OUT: 41 54 IN: GP.SO IN: 47 50 31 2d 42 30 2e 30 31 2e SigFox Commands	Hexadecimal 2f 56 0d 3.00.01-B004 2e 53 30 33 30 34 0d 47 30 43 0d	.GP.B00.0 2e 30 30 50 2e 42	Send Command
Data Command Type ASCII OUT: 41 54 IN: GP.SO IN: 47 50 31 2d 42 30 2e 30 31 2e SigFox Commands elect	Hexadecimal 2f 56 0d 3.00.01-B004 2e 53 30 2e 53 30 33 30 34 0d 47 30 43 0d	.GP.B00.0 2e 30 30 50 2e 42	Send Command 01.0C 0 2e 30 2 30 30 2 30 30
Data Command Type ASCII DUT: 41 54 IN: GP.SO IN: 47 50 31 2d 42 30 2e 30 31 2e SigFox Commands lect. Hect. IN ATX	 Hexadecimal 2f 56 0d 3.00.01-B004 2e 53 30 33 30 34 0d 47 30 43 0d 	.GP.B00.0 2e 30 30 50 2e 42	Send Command 01.0C 0 2e 30 2 30 30 2 30 30 5 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9

- The section SigFox Commands allows to send the commands: ATX,Send Payload, AT\$SB, AT\$SF, AT/L to the module.
- Send Payload:





f Send Payload To SigFox	
Type DATA 🗸	Sequnce Number (Hex) 01 Send
Payload BIT KEEP	Payload len 4
0111AABB	

• Send AT\$SB:

	Status	Ack	
ATSSR=	On/Off	Disabled	Send

• Send AT\$SF:

	Frame		A 1.	
	Trance	_	Ack	1
AISSF=		- 80	Disabled	Send

3.3.3.1. S-One Configuration Wizard

The Configuration wizard allows configuring and reading registers of the LE50-868 MHz, LE50-433 MHz, LE70-868 MHz, LE70-915 MHz, LE51-868 and LT70-868 MHz modules.

• When the Configuration Wizard is started it shows the default values.



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LE50:868:

odule Informations			Telemetry	1/05 Config			Commands
mware Version			I/O cpy dis ○ I/O copy Client ○ I/O copy Serv. ○ Telem Client	Status dedica	ated 💌	1	Apply Values
			I/01 Config	- 1/06 Config -			Read Values
JULLUAUEI VEISIUN			Status dedicated	Status dedica	ated 🔽		Restart
adio			- 1/02 Config	1/07 Config			SigFox Hestart
) -8dBm () +1dBm () +10dBm () +24dBm () +2	7dBm 🔿 -8dBm 🔿 AdBm		Status dedicated 🛛 👻	Status dedica	ated 💌		Default Values
) •5dBm ○ +4dBm ⊙ +14dBm ○ +25dBm ○ +7	'dBm 🔘 -5dBm 🔘 +1dBi	n	1/03 Config	1/08 Config			
) -2dBm () +7dBm () +23dBm () +26dBm () +1	OdBm () -2dBm () +4dbh	4	Status dedicated	Status dedica	ated 💌		Load From File
adio Baud Rate	Band of Band o	Channel	1/04 Config	1/09 Config		5	Save To file
) 19.2 Kbps () 38.4 Kbps () 115.2 Kbps	O Bnd g3 O Bnd g4		Status dedicated 💌	Status dedica	ated 🔽		Save rome
adio Whit Charac	Bnd g Bnd 866 Bnd 915		Operation Euroption Mode	BT	Numb Betries	Since	- Low Power
8			Transparent O SigFox (OFF	2	Mode	Type of Low-power
rial Link			Addr Sec and Telem Smart Rep Coord	ON High Sens	Random Waiting	Syncr	Serial Wake On Rad
19200 bits/s	Tx		O Smart Rep Node	ON Low Sens	💿 OFF 🔘 ON		Cýclic wake up —
] Rx	Network Cont	rol		_AEC Example	in Kau	Period 1000
lumber Stop Bits Parity	1	Network Id	Client Number Network	Options		ion Key	Wake on Radio
🤌 1 bit 🔘 2 bits 🛛 🛞 None 🔘 Even 🔘 Odd				Bet B			Duration 10
ow Control	N. Data Bits	Default Add	ress Default Tel Address NH	2B	1991		- Stand-by Timeout
) Hardware: CTS/RTS 🔘 Software: Xon/Xoff 💿 N	one 🔘 7 💿 8	0	0				100

LE50-433:

todule Informations	- 1/0 control	DODOLICA	Commands
erial Number	I/O cpv dis I/O copv Client	Status dedicated	Apply Values
irmware Version	O I/O cpy Serv O Telem Client		
ootLoader Version	-I/01 Config	1/06 Config	Read Values
	Status dedicated	Status dedicated 🛛 👻	Restart Restart
adio Ortant Round	1/02 Config	1/07 Config	SigFox
) -8dBm	Status dedicated 🛛 👻	Status dedicated 🛛 👻	Default Values
⊙ •5dBm ⊙ +4dBm ⊙ +14dBm ○ +25dBm ○ +7dBm ○ -5dBm ○ +1dBm	1/03 Config	1/08 Config	
) •2dBm () •7dBm () +23dBm () +26dBm () +10dBm () -2dBm () +4dbM	Status dedicated 🛛 👻	Status dedicated 💌	Load From File
Radio Baud Rate Frequency Sub-Band Channel	1/04 Config	1/09 Config	
192 Khos 38 4 Khos 115 2 Khos Bid g3 Brid g4	Status dedicated 🛛 🖌	Status dedicated 🛛 👻	Save to file
Badio Whit Charac Badio Carrier length Badio Carrier len	Operation		ei
0 8 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0	Function Mode	OFF Numb Hetries	Mode Type of Low-power
	Addr Sec and Telem	ON High Sens	Client Hard Pin
erial Link Serial Speed Serial Link T-Out Sungword Conf	🔿 Smart Rep Coord 🚫	ON Med Sens Random Waiting	O Syncr Wake On Radi
19200 bits/s V 5	O Smart Rep Node	ON Low Sens 💿 OFF 🔘 ON	Cyclic wake up
Network C	Control	_ AEC Execution	Period 1000
Number Stop Bits Parity Network	Id Client Number Network 0	Iptions	-Wake on Radio -
1 bit 2 bits None Even Odd	1 V [*]		Duration 10
Tow Control N. Data Bits Default /	Address Default Tel Address NH	28	- Chand by Timory t
Hardware: CTS/RTS Software: Xon/Xoff None 7 8 0	0	Variation of the second s	Stand-by Timebox





LE70-868:

Madde Internations UD contig UD contig Filmware Version ID (2 syst ds U/D contig Status dedoated ID (2 syst ds Pade Dipul Power UD (2 syst ds U/D (2 syst ds U/D (2 syst ds ID (2 syst ds </th <th>Homostois Lunder I/O contidie UDS Corlig Distant declared I/O Corlig In Version I/O Corlig Distant declared I/O Corlig Distant declared I/O Corlig Prover Selection -2268m -2268m</th> <th>Nache Hunden </th> <th>)ne/SigFox Configurations</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	Homostois Lunder I/O contidie UDS Corlig Distant declared I/O Corlig In Version I/O Corlig Distant declared I/O Corlig Distant declared I/O Corlig Prover Selection -2268m	Nache Hunden)ne/SigFox Configurations							
Name Version Status dedicated Image Version immaes Version IOD cop dis I/D cop dis I/D cop dis I/D cop dis I/D cop dis Image Version addo IOD cop dis I/D cop dis Image Version Imag	With Charge Parket Set Values Prove Estatus dedicated W V101 Cordig V102 cordig V102 Cordig V101 Cordig V101 Cordig V102 Cordig V101 Cordig V102 Cordig V102 Cordig V102 Cordig V102 Cordig V102 Cordig Status dedicated W V102 Cordig V102 Cordig Status dedicated W Status dedicated W Status dedicated W V102 Cordig Status dedicated W Status dedicated W V102 Cordig Status dedicated W Status dedicated W V102 Cordig Status dedicated W Status dedicated W	Warden Version	dule Informations		1/0 control Telemetry			- 1/05 Config		Commands
voll.oader Version VOB Config Float Pead voll.oader Version VOB Config Status dedicated VOB Config Pead voll.oader Version voll.oader Version VOB Config Status dedicated VOB Config Pead voll.oader Version voll.oader Version voll.oader Version VOB Config Status dedicated VOB Config voll.oader Version voll.oader voll.oader VOB Config Status dedicated VOB Config voll.oader Version voll.oader voll.oader VOB Config Status dedicated VOB Config voll.oader Version voll.oader voll.oader VOB Config Status dedicated VOB Config voll.oader Version voll.oader voll.oader VOB Config Status dedicated VOB Config voll.oader Version voll.oader voll.oader VOB Config Status dedicated VOB Config voll.oader Version voll.oader voll.oader VOB Config Status dedicated VOB Config voll.oader Version voll.oader voll.oader Voll.oader Voll.oader Voll.oader voll.oader Version	der Verinin I/06 Corrig Statut deficiated I/07 Corrig I/08 Corrig Flower Statut deficiated I/07 Corrig I/07 Corrig I/08 Corrig Statut deficiated VI02 Corrig I/08 Corrig I/08 Corrig I/08 Corrig Statut deficiated VI02 Corrig I/07 Corrig I/07 Corrig I/07 Corrig I/07 Corrig Statut deficiated VI02 Corrig I/08 Corrig I/08 Corrig I/08 Corrig I/08 Corrig Statut deficiated VI02 Corrig I/08 Corrig <td< td=""><td>volloader Version HOE Config VOE Config ReadV volloader Version Status dedicated VOE Config Status dedicated VOE Config volloader Version 1-102 Config VOE Config Status dedicated VOE Config Default volloader Version +103 Config Status dedicated VOE Config Default Default volloader Version +22dBm <td< td=""><td>nware Version</td><td></td><td> I/O cpy dia I/O cpy Se </td><td>s 🔘 I/O erv 🔘 Tele</td><td>copy Client em Client</td><td>Status dedicat</td><td>ed 💌</td><td>Apply Values</td></td<></td></td<>	volloader Version HOE Config VOE Config ReadV volloader Version Status dedicated VOE Config Status dedicated VOE Config volloader Version 1-102 Config VOE Config Status dedicated VOE Config Default volloader Version +103 Config Status dedicated VOE Config Default Default volloader Version +22dBm +22dBm <td< td=""><td>nware Version</td><td></td><td> I/O cpy dia I/O cpy Se </td><td>s 🔘 I/O erv 🔘 Tele</td><td>copy Client em Client</td><td>Status dedicat</td><td>ed 💌</td><td>Apply Values</td></td<>	nware Version		 I/O cpy dia I/O cpy Se 	s 🔘 I/O erv 🔘 Tele	copy Client em Client	Status dedicat	ed 💌	Apply Values
Nuclear Header Status dedicated Image: Status dedicated Image: Status dedicated 1158/m0 1128/m0 +2/48/m0 +2/48/m0 </td <td>Statu dedicated Isatu dedicated Isatu dedicated Flower Isatu dedicated Isatu dedicated Isatu dedicated Statu dedicated Isatu dedicated Isatu dedicated Isatu dedicated Statu dedicated Isatu dedicated Isatu dedicated Isatu dedicated Isatu dedicated Statu dedicated Isatu dedicated Isatu dedicated Isatu dedicated Isatu dedicated Isatu dedicated Statu dedicated Isatu d</td> <td>Status dedicated Image: Status dedicated</td> <td>all andre Marrien</td> <td></td> <td>- I/01 Config</td> <td></td> <td></td> <td>- 1/06 Config</td> <td></td> <td>Read Values</td>	Statu dedicated Isatu dedicated Isatu dedicated Flower Isatu dedicated Isatu dedicated Isatu dedicated Statu dedicated Isatu dedicated Isatu dedicated Isatu dedicated Statu dedicated Isatu dedicated Isatu dedicated Isatu dedicated Isatu dedicated Statu dedicated Isatu dedicated Isatu dedicated Isatu dedicated Isatu dedicated Isatu dedicated Statu dedicated Isatu d	Status dedicated Image: Status dedicated	all andre Marrien		- I/01 Config			- 1/06 Config		Read Values
do upuk Power inpuk Power inpuk Power inpuk Power inpuk Power instance instance <	Prover Same VD2 Config VD2 Config Same Default Values SdBm +13dBm +22dBm	doi ways Prover VIO2 Config VIO2 Config VIO2 Config Delaukt +15dBim +2ddBim +2ddBim <t< td=""><td></td><td></td><td>Status dedical</td><td>ted</td><td>~</td><td>Status dedicati</td><td>ed 🔽</td><td>Bestart</td></t<>			Status dedical	ted	~	Status dedicati	ed 🔽	Bestart
utput Prover Status dedicated Image: Status dedicated	PPower Status dedicated Istatus dedicated Image: Control of the c	utget Power	dio		-1/02 Config			- 1/07 Config		SigFox Rest
Hodelmon + Hodelmon + Zodelm → Zodelm → Zodelm → Sodelm → Gold m → Gold	Sdam - Hodelin - Vacenin	+ Hoomon + Johem - 22dim - 22dim - 22dim - 22dim - 32dim - 104m			Status dedical	ted	~	Status dedicat	ed 🗸	Default Values
+174Bm + 204Bm + 234Bm + 104Bm - 248m + 44bM did Bade Rate 1.2Kbps 0 24Kbps + 0.48Kbps 0 36 Kbps Brd g3 Brd g3 Brd g4 Brd g 0 Brd g8 did Whit Charec Radio Carrier length al Lrik rial Speed al Lrik rial Speed Derivation Mode Sense 5 mit Rep Code 0 Dit w 2 bits 0 None 0 Even 0 Odd w Control Hardware: CTS/RTS 0 Software: Xon/Xoff 0 None 7 0 B Brench Branch Bra	7dBm +20dBm +10dBm 22Bm +4dM Baad Rae Frequency StubBad Dannel Status dedicated Image: Status dedicated <td>+17dBm + 20dBm + 23dBm + 10dBm 23Bm + 4dbM doi Band Rate 12Xbpc + 2X4bp + 24Xbp + 4 Kkpc 3 Kk bpc Frequency Sub-Band D Taxbps + 2 Xkbp + 4 Kkpc 3 Kk bpc Frequency Sub-Band D Hod Sad Bind g + Bind h Bind</td> <td>+15dBm +18dBm +21dBm +21dBm +24dBm +24dBm +22dBm -8dBm UdBm +16dBm +19dBm +22dBm +22dBm +1dBm +1dBm +1dBm</td> <td>8</td> <td>-1/03 Config</td> <td></td> <td></td> <td>- 1/08 Config</td> <td></td> <td>D'erdeix verdes.</td>	+17dBm + 20dBm + 23dBm + 10dBm 23Bm + 4dbM doi Band Rate 12Xbpc + 2X4bp + 24Xbp + 4 Kkpc 3 Kk bpc Frequency Sub-Band D Taxbps + 2 Xkbp + 4 Kkpc 3 Kk bpc Frequency Sub-Band D Hod Sad Bind g + Bind h Bind	+15dBm +18dBm +21dBm +21dBm +24dBm +24dBm +22dBm -8dBm UdBm +16dBm +19dBm +22dBm +22dBm +1dBm +1dBm +1dBm	8	-1/03 Config			- 1/08 Config		D'erdeix verdes.
die Baud Rate Prequency Sub-Band Channel U/04 Config V/09 Config Status dedicated Status dedicated <td>Baud Rate Prequency Sub-B and DND 2 24 Kbps 0 24 Kbps 0 36 Kbps Bind g1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td> <td>dia Baud Rate 12 Ktops 0 24 Ktops 0 36 Ktops 0 36 Ktops 0 6 Ktops 0 md g2 md g2 0 md g2 0 md g2 0 md g2 0 md g2 md g2 md g2 md g</td> <td>+17dBm 🔿 +20dBm 🔿 +23dBm 🔿 +26dBm 🔿 +10dBm 💍 -2dBm 🔿 +4dbM</td> <td></td> <td>Status dedical</td> <td>ted</td> <td>~</td> <td>Status dedicat</td> <td>ed 💌</td> <td>Load From File</td>	Baud Rate Prequency Sub-B and DND 2 24 Kbps 0 24 Kbps 0 36 Kbps Bind g1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	dia Baud Rate 12 Ktops 0 24 Ktops 0 36 Ktops 0 36 Ktops 0 6 Ktops 0 md g2 md g2 0 md g2 0 md g2 0 md g2 0 md g2 md g2 md g2 md g	+17dBm 🔿 +20dBm 🔿 +23dBm 🔿 +26dBm 🔿 +10dBm 💍 -2dBm 🔿 +4dbM		Status dedical	ted	~	Status dedicat	ed 💌	Load From File
1.2 Ktps © 24 Ktps © 9.6 ktps © 9.8 ktps © 3.8 4 Ktps © 3.8 4 Ktps © 5.6 ktps © 9.6 ktps	2 Kbps 2 K Kbps 3 K Kbps Bnd g1 Bnd g2 Bnd g1 Bnd g2 Bnd g3 Bnd g3 <td>12 Kbpc 24 Kbpc 0 Status dedicated Save T 132 Kbpc 384 Kbpc 57.6 kbps Bind g4 Bind g4<td>dio Baud Rate Frequency Sub-Band</td><td>Channel</td><td>-1/04 Config</td><td></td><td></td><td>- 1/09 Config</td><td></td><td></td></td>	12 Kbpc 24 Kbpc 0 Status dedicated Save T 132 Kbpc 384 Kbpc 57.6 kbps Bind g4 Bind g4 <td>dio Baud Rate Frequency Sub-Band</td> <td>Channel</td> <td>-1/04 Config</td> <td></td> <td></td> <td>- 1/09 Config</td> <td></td> <td></td>	dio Baud Rate Frequency Sub-Band	Channel	-1/04 Config			- 1/09 Config		
132 Xbps ③ 38 4 Kbps ④ 57 6 kbps Bind g3 ⊕ Bind g3 ⊕ Bind g4 ⊕ did Whit Charac Radio Carrier length Bind g4 ⊕ g1 Link Bind g5 ⊕ Bind g4 ⊕ Operation 14 Link Serial Link T-Out Synoword Conf 12 Link Sind K Sec and Telem O NH High Sens 12 Diblor/s Smart Rep Coad O NL ow Sens 2000 bits/s Smart Rep Coad O NL ow Sens 2010 bits/s Smart Rep Node O NL ow Sens 2010 bits/s Network Control Network Control Network Id Client Number N* * AES = ACK 0 Network Control Network Control Network Id Client Number N* * AES = ACK 0 Network Id Address Default Tel Address AKF = RSSI 0 0 0 0 StandtPy 1 1 bit 2 bits Software: Xon/Xoff None 7 <> 8 1 1 bit 2 bits Software: Xon/Xoff None 7 <> 8 1 1 bit 0 0 0 0 0 0 1 1 bit 1 bit 1 bit 1 bit	12 Kbps @ 384 Kbps @ 57.6 kbps Bind g @ Bind g	132 Xbps @ 384 Kbps @ 57.6 kbps Bnd gs @ 50 gg a Bnd gs Smatt Rep Node ON Mode Sens ON Low Sens OFF ON Low Sens Sendt Rep Node OR Act Se Encopplion Key Wake on R Out gs O O	1.2 Kbps 0 2.4 Kbps 0 4.8 Kbps 0 9.6 Kbps 0 Bnd g1 0 Bnd g2	0	Status dedical	ted	~	Status dedicati	ed 🗸	Save To file
dia Whit Charac Badio Camier length Bind 315 Bind 315	Whit Charac Radio Carrier length Bnd 315 Bnd 315 Bnd 315 Breach Bnd 315 Breach Bnd 315 Breach Stand Telem Speed Smart Rep Coold Dikt/s Smart Rep Node Dikt/s Numb Retries Stand Telem ON Low Sens ON Low Sens OFF Dikt/s None Er Stop Bits Parity Ibit 0 2 bits Stand Telep Node ON Low Sens Own one Even Odd 1 Period 1 Period 1 Period 1 Default Address Default Tel Address O 0 Default Address Default Tel Address NH 28 Standby Timeoc. 100 Use Standby Timeoc. 100 Inch Branch Branch Branch Standby Timeoc. 100 0 0 0 Inch Branch Branch Branch Branch<	dia Whit Charac Badio Carrier length B B b runch in d S15 B b runch in d S15 B b runch in d S15 B b runch in d S15 B control B B Control Network Control Network Control Networ	19.2 Kbps ③ 38.4 Kbps ⑤ 57.6 kbps ⑤ Bind g3 ⑥ Bind g4 ⑧ Bind g4 ⑧ Bind g5 ⑧ Bind g4		<u>l</u>		<u> </u>	U.		
Image: Serial Link T-Out Syncwood Conf Add: See and Telem O DFF Add: See and Telem O Ningh Sens Bandom Waiting Smart Rep Coord Smart Rep Coord O Ningh Sens Control The Rx Network Control None © Even © Odd W Control N. Data Bits Hardware: CTS/RTS © Software: Xon/Xoff © None 7 © 8 Default Address Default Tel Address Default Address Default Tel Address Network Control N. Data Bits Hardware: CTS/RTS © Software: Xon/Xoff © None 7 © 8 Default Address Default Tel Address Default Address Default Tel Address Network Control N. Data Bits Hardware: CTS/RTS © Software: Xon/Xoff © None 7 © 8 Brench Branch Branch	8 Image: seried Link T-Out Syneward Conf Add See and Telem ON High Sens Pandom Waiting Shead T were Small Rep Cood ON Med Sens On Med	8 Itansparent SigFox OFF 2 al Link Add Sec and Telem OH High Sens Pandom Walting D00 bite/s 5 Tx Smart Rep Coord ON High Sens OFF 0 D00 bite/s 5 Tx Network Control ON High Sens OFF 0 OFF 0 D00 bite/s 5 Tx Network Control ON High Sens OFF 0 OFF 0 OFF 0 OFF Senset Rep Coord ON High Sens OFF 0 OFF Ore Senset Rep Coord ON High Sens OFF ON High Sens OFF ON High Sens OFF Ore Senset Rep Coord Ore Senset Rep Coord ON High Sens OFF OFF Ore Senset Rep Coord	dio Whit Charac Radio Carrier length O Bnd 915		- Operation - Function Mode		LBT		Numb Retries	Low Power
Internal Speed Serial Link T-Dut Synoword Conf Smart Rep Coord O DN Med Sens Time Wake 2200 bits/s S Smart Rep Node O N Med Sens O DF ○ DN Cyclic we motor Stop Bits Parity None ○ Even ○ Odd Network Control Network Options: O N Low Sens O DF ○ DN AES Encuption Key Wake on v Control Intervenk Id Image: StandAddress Default Address Default Address Default Address Default Address Default Address StandAby w Control Hardware: CTS/RTS ○ Software: Xon/Xoff ○ None 7 ○ 8 8 0 0 0 0 0 0 StandAby aft Repeater Coordinator StandAby StandA Branch Branch Branch Branch Branch Branch Branch Branch StandAby 0<	Speed Seial Link T-Dut Synoword Conf Smart Rep Coord O N Med Sens Time Wake Un R 0 bits/s S Rx Smart Rep Node O N Low Sens O DF O N er Stop Bits Parity Network Control Network Control Network Options O N AES Encryption Key Wake on Radio Control Image: Software: Xon/Koff None 7 8 Default Address Default Tel Address N N Mode Sens Smart Rep Node Smart Rep Node Smart Rep Node Branch D Default Address Default Tel Addres	It is Speed Serial Link T-Dut Synoword Conf It is Speed O M Med Sens Time It is Speed 3200 bits/s S S It is Speed O M Low Sens It is Speed It is Speed It is Speed O M Med Sens It is Speed It is Speed <td></td> <td></td> <td> Transpare Addr Sec </td> <td>nt 🔘 Sig and Telem</td> <td>Fox O</td> <td>OFF ON High Sens</td> <td>2</td> <td>Type of Low-pow Hard Pin Serial</td>			 Transpare Addr Sec 	nt 🔘 Sig and Telem	Fox O	OFF ON High Sens	2	Type of Low-pow Hard Pin Serial
200 bits/s 5 Tx Rx F Tx Rx Curlic Washes AES Encuption Key Washes Washes Washes Washes Washes Curlic Washes Washes Curlic Washes Washes Curlic Washes Curlic Washes Washes Curlic Washes Washes Curlic Washes Curlic Washes Washes Curlic Washes Washes Curlic Washes Curlic Washes Period Washes Washes Curlic	0 bits/s 5 1x Rx er Stop Bits Paily Image: Stop Bits Paily Network Control Network Control Network Control AES Encoption Key Paily 10 bits/s Image: Stop Bits Paily Image: Stop Bits Network Control Network Control Network Control Network Control Network Control Image: Stop Bits AES Encoption Key Wake on Radio Control 1 Image: Stop Bits None Trimes O Network Control Network Control Network Control Make on Radio Control 1 Image: Stop Bits Network Control Network Control Image: Stop Bits Ima	2000 bits/s S Tx Tx Parity Import Stop Bits	ial Speed Serial Link T-Out Syncword Conf		O Smart Rep	o Coord	0	ON Med Sens	Time	Wake On R
Network Control Network Id Network Id <td>er Stop Bits Parity Network Control Network Control AES Encuption Rey bit 0 2 bits</td> <td>International product Stop Bits Parity None Even Odd It bit 2 bits None Even Odd W Control Image: Standbard Stan</td> <td>3200 bits/s 💉 5</td> <td></td> <td></td> <td>NOUE</td> <td></td> <td>ON LOW SENS</td> <td></td> <td>Period Trans</td>	er Stop Bits Parity Network Control Network Control AES Encuption Rey bit 0 2 bits	International product Stop Bits Parity None Even Odd It bit 2 bits None Even Odd W Control Image: Standbard Stan	3200 bits/s 💉 5			NOUE		ON LOW SENS		Period Trans
Index Jobs ander Jobs Tell X (all left rideling Tell X (all left rideling Tell X (all left rideling Wetwack (all left rideling Walk (all left rideling Walk (all left rideling Walk (all left rideling Wetwack (all left rideling Walk (al	Bit O 2 bits • None • Even • Odd • Network 10 • Default Tel Address • Default Tel Address • Default Tel Address • Default Tel Address • Network 10 • Standtaddress • Standtaddress • Standtaddress • Standtaddress • Standtaddress • Default Tel Address • Network 10 • Standtaddress • Event 10 • Event 10 • Event 10 Event 10 Event 10 Event 10 Event 10 <	Index 3 pbils Paily Paily Paily Paily Wake on F 0 <td>mbar Stee Bits Parity</td> <td>Network Control</td> <td> _ Client Num</td> <td>har</td> <td>Mahuadi Or</td> <td>ntions</td> <td>AES Encryption Key</td> <td>1000</td>	mbar Stee Bits Parity	Network Control	 _ Client Num	har	Mahuadi Or	ntions	AES Encryption Key	1000
W Control Image: Contro Image: Control Image: Cont	active Central Centra Central Central	Image: Stand Branch	1 bit O 2 bits O None O Even O Ddd					aes ac	ĸ	Wake on Radio
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Art Repeater Mode mart Repeater Coordinator Didd N+1 Ds Branch Branch <td>Repeater Mode IRepeater Coordinator Smark Branch /td> <td>art Repeater Mode mart Repeater Mode mart Repeater Mode mart Repeater Coordinator Didd N+1 Ds Branch Branch</td> <td>Hardware: CTS/HTS () Software: Xon/Xoff () None () 7 () 8</td> <td>0</td> <td><u> </u></td> <td>J</td> <td></td> <td></td> <td></td> <td>100</td>	Repeater Mode IRepeater Coordinator Smark Branch	art Repeater Mode mart Repeater Mode mart Repeater Mode mart Repeater Coordinator Didd N+1 Ds Branch	Hardware: CTS/HTS () Software: Xon/Xoff () None () 7 () 8	0	<u> </u>	J				100
Child N+1 IDs Branch <	Branch	Child N+1 IDs Branch Branch <th>art Repeater Mode</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Smart Repeater Node</th> <th></th>	art Repeater Mode						Smart Repeater Node	
Branch Branch<	Branch	Branch Branch<	Child N+1 IDs						Branch ID Main Branch	Sub Branch
D 0	0 0	0 0	Branch Branch Branch Branch Branch Branch Branch Bran 0 1 2 3 4 5 6 7 8	nch Branch 9	Branch Branch 10 11	Branch 12	Branch Br 13 14	anch Branch 15		O
Node IDs Inde N+2 IDs Branch Branch <td>Inch Branch Branch</td> <td>Branch Branch Branch<</td> <td></td> <td>0 1</td> <td>0 0</td> <td>0</td> <td>0 0</td> <td>0</td> <td></td> <td></td>	Inch Branch	Branch Branch<		0 1	0 0	0	0 0	0		
Note N+2 ID: Branch	Net 2:10: unch Branch Branch <th< td=""><td>Node N+2 IDs Branch Branch</td><td></td><td>al ad</td><td>L.</td><td>da al</td><td></td><td>1</td><td>Vode IDs</td><td></td></th<>	Node N+2 IDs Branch		al ad	L.	da al		1	Vode IDs	
Branch Branch<	Branch Branch<	Branch Branch<	lode N+2 IDs						NID N-2 N-1	N+1 N+2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		Branch Branch Branch Branch Branch Branch Branch Branch Bra	nch Branch	Branch Branch	Branch	Branch Br	anch Branch		
			0 1 2 3 4 5 6 7 8	9	10 11	12	13 14	. 15		
				U	U U	U	υ 0	U		





LE70-915:

Iodule Informations		1/0 control				7	Commands
erial Number		Telemetry	er	- 1/05 Config			Applu Values
irmware Version		I/U cpy dis 0 I/U copy 0 I/U copy Serv 0 Telem Cli	Ulient	Status dedicated	~		Apply values
		- I/01 Config	555 J	1/06 Config			Read Values
		Status dedicated	~	Status dedicated	~		Bestart
adio		- 1/02 Config		- 1/07 Config			SigFox Restart
		Status dedicated	~	Status dedicated	f 💌		Default Values
) +15dBm () +19dBm () +21dBm () +24Bm () +27dBm () +7dBm () -5dBm () +1dBm		1/03 Config		1/08 Config			
) +17dBm () +20dBm () +23dBm () +26dBm () +10dBm () -2dBm () +4dbM		Status dedicated	~	Status dedicated	*		Load From File
Radio Baud Rate	Tab Ch	1/04 Config		1/09 Config			
1.2 Kbps 2.4 Kbps 4.8 Kbps 9.6 Kbps Bnd g1 Bnd g2 Bnd g3 Bnd g4		Status dedicated	~	Status dedicated	*		Save To file
Radio Whit Charac Radio Carrier length 0 8nd 915	0	Operation Function Mode Transparent SigFox Addt Sea and Talas		FF N High Cana	Numb Retries	Sincr Mode S Client	- Low Power - Type of Low-powe Hard Pin
erial Link erial Speed Serial Link T-Out Syncword Conf 19200 bits/s S T Rev		Smart Rep Coord	00	N High Sens N Med Sens N Low Sens	Random Waiting Time ⊚ OFF ◯ ON	O Syncr	Vake On Rac
Aumber Stop Bits Parity	Network Control	Client Number	twork Opti	ions	AES Encryptic	on Key	- Wake on Radio
I bit O 2 bits None O Even O Odd	0		N*	AES ACK)	Duration 10
Tow Control N. Data Bits	Default Addres	Default Tel Address		」⊓etH55]28	×		- Stand by Timonut
🔵 Hardware: CTS/RTS 🔘 Software: Xon/Xoff 💿 None 🛛 🔘 7 💿 8	0	0					100

LE51-868:

Adule Informations			- I/O control		LOFC		1	Commands
erial Number				1	1/US Config			Applu Values
irmware Version			O I/O cpy dis O I/O copy dis O I/O copy dis	nt	Status dedica	ited 💌		
ootLoader Version			I/01 Config		- I/O6 Config			Read Values
			Status dedicated	~	Status dedica	ted 🔽		Restart
adio Jutout Power			- 1/02 Config		-1/07 Config			SigFox
) -8dBm (○) +1dBm (○) +10dBm (○) +24dBm (○) +2	27dBm 🔘 -8dBm 🔘 0dBm		Status dedicated	~	Status dedica	ited 🗹 🔽		Default Values
🕽 •5dBm 🔘 +4dBm 💿 +14dBm 🔿 +25dBm 🔿 +7	′dBm ○-5dBm ○+1dBm	0	- I/03 Config	1	-1/08 Config			
) -2dBm () +7dBm () +23dBm () +26dBm () +1	IOdBm 🔘 -2dBm 🔘 +4dbM		Status dedicated	~	Status dedica	ted 💌		Load From File
Radio Baud Rate	Frequency Sub-Band Cha	Channel	1/04 Config		1/09 Config			Caus Ta Ga
19.2 Kbps 38.4 Kbps 115.2 Kbps	Bnd g3 O Bnd g4	0	Status dedicated	~	Status dedica	ted 🔽		Save runie
Radio Whit Charac — Radio Carrier length —	O Bnd g O Bnd 866		Operation	IDT		Musch Bucks	Circu	- Low Power
0 8	U Brid 313		 Transparent SigFox 	0	OFF	2	Mode	Type of Low-power
			O Addr Sec and Telem	Õ	ON High Sens		O Client	Hard Pin Serial
erial Link Serial Speed Serial Link T-Out Sy	neword Conf		Smart Rep Coord	0	ON Med Sens	Handom Waiting	O Syncr	🔲 Wake On Rad
19200 bits/s 💉 5] Tx		Smart Rep Node	0	ON Low Sens	💿 OFF 🔘 ON		Cyclic wake up
] Rx	Network Contro	b			- AES Execution	an Kau	1000 1000
Number Stop Bits Parity		Network Id	Client Number Netv	vork Op	otions	- Concrease	lotricey	Wake on Radio
I bit O 2 bits I bit O 2 bits I bit O 0 dd				N' [CB [Bet B	SSI		Duration 10
Flow Control	N. Data Bits	Default Addre	Default Tel Address	NH [228	39,0		- Stand-by Timeout
🔘 Hardware: CTS/RTS 🔘 Software: Xon/Xoff 💿 No	one 🔘 7 💿 8	0	0		100			100





LT70-868:

newsBrow countBrownone									
ule Informations		-1/0 cor	ntral						Commands
al Number		Lelen	netry	0.00			5 Config		Applu Values
une Version		O R	U opy als	0 1/0	copy Lilen	¢.		×.	Apply Values
		01	U cpy serv	(United	em client	-			Bead Values
Loader Version		-1/011	Config				6 Contig		- Troad Falloo
					~			×	Restart Rest
0		-1/021	Config			-1/0	7 Config		Sighox
154Pm (194Pm) 214Pm (2024Pm) 274Pm (20274Pm) 24Pm	. 1				~			~	Default Value
+16dBm () +19dBm () +21dBm () +25dBm () +7dBm () -5dBm () +1dB	1 (m	-1/03.0	Confia			-1/0	8 Config		
+17dBm () +20dBm () +23dBm () +26dBm () +10dBm () -2dBm () +4db	M		57007		10				Load From File
dio Baud Rate Frequency Sub-Band	Channel	1/0.41					0.02262		
1.2 Kbps O 2.4 Kbps O 4.8 Kbps O 9.6 Kbps O Bnd g1 O Bnd g2	0	-1/041	Loring				a counilg		Save To file
19.2 Kbps 💿 38.4 Kbps 🔿 57.6 kbps 💿 Bnd g3 💮 Bnd g4					~				
🕒 Mill Charge 🖉 Bada Charles Innette		Operati	ion						
Did whit character haddo canter length		Funct	ion Mode			.BT		Numb Retries	- Low Power Type of Low-pow
		(⊙ T	ransparent	O Si	gFox (OFF		2	🔲 Hard Pin
al Link		O A	ddr Sec ar	nd I elem		ON HI	gh Sens	Random Waiting	Serial
ial Speed Serial Link T-Out Syncword Conf		0 5	mart Rep L mart Rop M	.oora lada			ed Sens		Wake un h
200 bits/s 😽 5		0.0	marchiepr	1006		J OIN LO	W Jena	O OFF O ON	Cyclic wake up
Hx	Network Contr	ol						- AES Encruption Key	1000
mber Stop Bits Parity	Network Id		ent Numbe	a	Network	Options		ALC LINGPOOL KOY	Wake on Badio
1 bit 🔿 2 bits 💿 None 🔿 Even 🔘 0 dd	0	1	P.		✓ N*	AE	IS 🔲 ACI	ж	Duration 10
w Control	- Default Addr	ess De	efault Tel A	ddress		E Re	et 📙 RS	SSI .	
Hardware: CTS/RTS O Software: Xon/Xoff None O 7 8	0	C	1		I NH	<u> </u>			Stand-by Timeou
	<u>()</u>				<u>.</u>				100
rt Repeater Mode									
hart Hepeater Loordinator								Smart Hepeater Node	
Pranch Pranch Pranch Pranch Pranch Pranch Pranch Pranch P	ranah Dranah	Dranah	Propole	Dranah	Dranah	Propoh	Propoh	Main Branch	Sub Branch
0 1 2 3 4 5 6 7 8	9	10	11	12	13	14	15	0	0
	0	0	0	0	0	0	0		
								Node IDs	
									10
								NUD N-2 N-	-1 N+1 N+2
0 0 0 0 0 0 0 0 0 0								N ID N-2 N- ID ID	-1 N+1 N+2 ID ID
0 0 0 0 0 0 0 0 0 Inde N+2 IDs Branch Branch	ranch Branch 9	Branch 10	Branch 11	Branch 12	Branch 13	Branch 14	Branch 15	N ID N-2 N- ID ID ID 1 0 25	1 N+1 N+2 ID ID 5 0 0
0 0	ranch Branch 9	Branch 10	Branch 11	Branch 12 0	Branch 13	Branch 14	Branch 15	N ID N-2 N- ID ID 1 0 25	-1 N+1 N+2 ID ID 5 0 0
0 0	ranch Branch 9 0	Branch 10 0	Branch 11 0	Branch 12 0	Branch 13 0	Branch 14 0	Branch 15 0	N ID N-2 N- ID ID 1 0 25	-1 N+1 N+2 ID ID 5 0 0





The button Apply Values allows to configure registers with desired values, after filling the • different fields and selecting the radio buttons, click on the button Apply Values to configure the module.

Adule Informations		1/0 control			3	Commands
erial Number		Telemetry	1/05 Config			[
irmware Version		I/Ocpy dis OI/Ocopy Clien 1/Ocpy Serv O Telem Client	t Status dedicat	ed 💌		Apply Values
ootLoader Version		-I/01 Config	- 1/06 Config			Read Values
		Status dedicated	Status dedicat	ed 🔽		Restart Restart
adio Outra Review		-1/02 Config	-1/07 Config			SigFox
→ -8dBm → +1dBm → +10dBm → +24dBm → +27dBm → -8dBm → 0dBm		Status dedicated	Status dedicat	ed 💌		Default Values
◯ -5dBm ◯ +4dBm ⊙ +14dBm ◯ +25dBm ◯ +7dBm ◯ -5dBm ◯ +1dBm		1/03 Config	1/08 Config			
<mark>) -2dBm </mark>		Status dedicated	Status dedicat	ed 💌		Load From File
Radio Baud Rate	Channel	1/04 Config	1/09 Config			Cours To Ob
19.2 Kbps 38.4 Kbps 115.2 Kbps Bnd g3 Bnd g4		Status dedicated	Status dedicat	ed 💌		Save To file
Radio Whit Charac Radio Carrier length O Bnd g O Bnd 866		Operation Europion Mode	BT	Numb Betries	Since	- Low Power
0 8		Transparent O SigFox (OFF	2	Mode	- Type of Low-powe
		O Addr Sec and Telem (🔿 ON High Sens	Pandam Mailing	Client	Serial
Serial Link T-Out Synoword Conf		Smart Rep Coord	ON Med Sens	Time	Syncr	Wake On Rad
19200 bits/s 💉 5		Smart Hep Node	UN LOW Sens	O UFF O UN		Cyclic wake up
	Network Cont	ol		- AES Encryptio	n Keu	1000
1 bit 2 bits Party	Network Id	Lient Number Network		ĸ		Wake on Radio
				SI		Duration 10
flow Control N. Data Bits	Default Addr	ess Default Tel Address NH	🔲 2B			Stand-by Timeout
Hardware: CTS/RTS O Software: Xon/Xoff O None O 7 O 8	U					100







• The button **Read Values** allows to read registers value from the module.

todule Informations		- 1/0 control Telemetry			1	Commands
imware Version GC.S00.01.05-B002		 I/O cpy dis I/O copy Client I/O cpy Serv Telem Client 	Status dedica	ted 💌		Apply Values
ootLoader Version GC B00.01.07		- I/01 Config	- I/O6 Config			Read Values
		Status dedicated 🛛 👻	Status dedica	ted 💌		Restart
adio		1/02 Config	- 1/07 Config			SigFox
Jupput Power		Status dedicated 🛛 👻	Status dedica	ted 🕑		Default Values
) •5dBm () +4dBm () +1dBm () +25dBm () +7dBm () •5dBm () +1dBm ()		1/03 Config	I/08 Config			
<mark>) -2dBm () +7dBm ()</mark> +23dBm () +26dBm () +10dBm () -2dBm () +4dbM		Status dedicated 🛛 😪	Status dedica	ted 💌		Load From File
Tadio Baud Rate Frequency Sub-Band	Channel	1/04 Config	I/09 Config			
1.2 Kbps 2.4 Kbps 4.8 Kbps 9.6 Kbps Band g1 Bind g2 19.2 Kbps 38.4 Kbps 115.2 Kbps Bind g3 Bind g4	0	Status dedicated	Status dedica	ted 💌		Save To file
Radio Whit Charac Radio Carrier length O Bnd g O Bnd 866		Operation Function Mode	BT	Numb Retries	Since	- Low Power
8		Transparent SigFox	OFF	2	Mode	Type of Low-power
		Addr Sec and Telem	ON High Sens	Bandom Waiting	O Client	Serial
Serial Speed Serial Link T-Out Syncword Conf		Smart Rep Coord	ON Med Sens		John	Wake On Radi
19200 bits/s 💉 5			J UN LOW SERS	O UFF O UN		Cyclic wake up
	Network Cont	rol		- AES Encryptic	on Keu	1000
Iumber Stop Bits ③ 1 bit ○ 2 bits ◎ None ○ Even ○ 0dd	0	Client Number Network 1 I	AES A			Wake on Radio
low Control	Default Add		Het H	221		
Hardware: CTS/BTS O Software: Xon/Xoff None 07 8	0	0	L_ 20			stand-by Timeout



- The button **Restart** leads to send **ATO** command to the module.
- The button **Restart SigFox** leads to send **ATX** command to the module in case of stack SigFox plus S-One.



After the ATO or ATX command the user shall reconnect to the module in order to continue the configuration, otherwise the module is in operating mode.





- The button **Default Values** leads to send **ATR** command:
- using this command it is possible to restore all parameters to their default ٠ values. After ATR command the user shall **Read Values** in order to refresh the window with default values read from the module.
- The button Load From File allows configuring registers with values stored in • a configuration file (see for example SOne_Default.txt). After loaded the file click the button Apply All in order to set effectively the values.
- The button Save To File allows saving the values present in the window into a • file (for example in order to save a specific configuration).





3.3.4. Management of ZigBee Technology

In order to use the Management features you have to select the following information:

- ZB Protocol: ZB protocol type •
- Serial Protocol (disabled in case of GPRS/GSM connection): .
 - o serial port where is connected the SR Module
 - o speed of the serial port if ZB protocol is PRO, if ZB protocol is 2007 the serial port is 115200 bits/s

🕇 ZigBee Management	
ZB Protocol Serial Protocol PR0 COM1 115200	Configuration Wizard
Enable Flow Control	Connect
Free command HEX command Raw Data ASCII command Data	
Command Type ASCII I Hexadecimal Network Discovery	Send Command
Local/GG863-SR Commands Select Clear Log Load Log	Save Log







Management in case of GPRS/GSM connection is supported only for ZEx1

- Connect the ZigBee module to the serial port selected: •
 - o Switch the SR board OFF (SW2).
 - o Turn the programming switch OFF (SW4) on the SR board.
 - o Switch the SR board ON (SW2).

Once fixed the Serial Protocol Information and connected to the SR module click the button **Connect** in order to connect to the ZigBee Module.





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T ZigBee Management	
ZB Protocol Serial Protocol PRO COM1 115200 Enable Flow Control	Configuration Wizard Disconnect
Free command	
HEX command Raw Data	
	~
CASCII command	
Data	
	×
Command Type ASCII I Hexadecimal Network Discovery	Send Command
07/05/2013 10.00.14	
OUT: 2b 2b 2b	
IN: Od	
Local/GG863-SR Commands	
Select 💙 Clear Log Load Log	Save Log

The previous window allows to send generic **Hex** commands or specific **Commands** to the ZigBee module.

Hex command:

- fill the Raw Data field to send.
- Click the button Send
- The Text Box shows the responses from the module. .

For example:





ZB Protocol Serial Protocol PRO COM1 115200 Wizard
Enable Flow Control Disconnect
Free command HEX command Raw Data
ASCII command Data
Command Type ASCII I Hexadecimal Network Discovery Send Command
IN: Od 🔨
IN: 15 15 00 04 11 46 53 2e 5a 31 32 2e 30 32 2e 30 30 2d 42 30 30 33
Local/GG863-SR Commands Select V Clear Log Load Log Save Log

Specific Commands:





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COM1 Enable Flor command Command Data Il command a mand Type (SCI) Od U 14 04	w Control	covery Send Comman
Enable Flor command Command Data	w Control	covery Send Comman
command command Data Il command a mand Type (SCII I Hexadecimal) Od U: 02 14 04	Network Disco	overy Send Comman
Command Data Il command mand Type SCII I Hexadecimal Od I COL 14 04	Network Disco	overy Send Comman
Il command Il command mand Type SCII I Hexadecimal Od I: 02 14 04	Network Disco	overy Send Comman
Il command a mand Type (SCI) ③ Hexadecimal Od	Network Disco	covery Send Comman
Il command a mand Type (SCII I Hexadecimal) Od	Network Disco	covery Send Comman
mand Type SCII I Hexadecimal	Network Disco	overy Send Comman
mand Type \SCII ③ Hexadecimal Od	Network Disc	covery Send Comman
mand Type \SCII ③ Hexadecimal Od	Network Disco	overy Send Comman
Mand Type SCII (SCII) Od 100 14 04	Network Disc	sovery Send Comman
Od	Network Disc	Send Comman
Od • 02 14 04	20-	-300.0 ⁻⁵
·· 02 14 04		
·· 02 1 <u>4 04</u>		
15 15 00 04	11 46 53	2e 5a 31 32
30 32 Ze 30 30	2d 42 30	30 33
GG863-SR Commands		
v (ClearLog	
	Cicar Log	Load Log Savel
·······	Cicar Log	Load Log Savel

- Send the following specific commands:
 - o Add/Remove Group: add or remove group to an endpoint



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• Application Frame Indirect: used to communicate with a bind application of a remote device

🕇 ApplicationFram	eIndirectForm	_	
	Src EndPoint	31	(Hex)
APS Ack	Cluster ID	0002	(Hex)
AEDII	Broadcast Radius	00	(Hex)
AABBCC			
6 AFDU Len		Send	





• Application Frame Group: used to communicate with a group of a remote application

T Application Fran	ne Group	_	
Tx Options Encrypt request APS Ack Frag AFDU AABBCC	Group Address Src EndPoin Cluster ID Broadcast Radius	s 0001 t 31) 0002 s 00	(Hex) (Hex) (Hex) (Hex)
6 AFDU Len		Send	

• Set Installation Code (Trust Center): used to set an Installation code used to create a Trust Center Link Key.

🕇 Set I	nstallation Co	ode Trust Ce	nter 📃 🗖 🔀
Install	ation code		IEEE Address of Joining Device (Hex)
	Speed Id	Installatiion Code Size without CRC (Hex)	Installation Code (Hex)
۲	0	6	
0	1	8	
0	2	12	CRC Settings (Hex)
0	3	16	02
			Send

• Set Installation Code (Other Dev): used to set an Installation code used to create a Trust Center Link Key.





🕇 Set	Installation (Code Other D	evices
[Instal	lation code		Installation Code (Hex)
	Speed Id	Installatiion Code Size without CRC (Hex)	CRC Settings (Hex)
۲	0	6	02
0	1	8	
0	2	12	
0	3	16	Send

- the responses log can be saved, cleared or loaded.
- open the configuration wizard in order to configure the module with desired values clicking the button Configuration Wizard
- get the Topology Network clicking the button Network Discovery
- disconnect from the ZigBee module clicking the button **Disconnect** (for example to select another Serial Protocol)

3.3.4.1. ZigBee Configuration Wizard



Configuration Wizard is disabled in case of GPRS/GSM connection

The Configuration Wizard allows configuring and reading registers of the ZE50/ZE60 and ZE51/ZE61 (Coordinator, FFD, RFD) modules.

In order to verify the accuracy of data written by the user in every textbox the tool needs a specific XML file. This file is closely linked together with the ZigBee stack version and stack type. The files are provided by Telit and are stored in the folder ./ConfigTool/ZigBee and the name of each file is composed in this way: Info_ZB_<Type>_<Maj>_<Min>.xml, where Maj and Min are the major and minor number of stack version and Type is the stack type (PRO or 2007)

i.e.: if the stack version is EH.Z02.01.05-B002 the xml file name will be Info ZB 2007 01 05.xml, where the 2007 type is caused by the '0' after the 'Z' in the stack version string; if after the 'Z' there is a '1' the firmware type will be PRO.

The user shall not modify the xml files; if the file is not present or corrupted the SRManagerTool returns a caution popup. In the future, when a new firmware version will be available. Telit will make available a new XML file for the SR Tool and the user will take care to put it in the correct folder. If the module is not





connected to the selected serial port or it is not responding, the configuration wizard won't start and it will show an error popup.

When the Configuration Wizard is started it shows the default values. .



The values in the window have not been read from the module



Stacks ZBPRO FS.X0x.11.00-B001.s28, FR.X0x.11.12-B002.s28, FS.X0x.11.12-B002.s28, FY.X0x.11.12-B002.s28, FX.X0x.11.12-B002.s28 are managed with some limitations relating to Serial Speed. During "Apply Values" and "Read Values" the following popups appear.









Coordinator:

ZigBee Configurations				
Module Informations(Read Only) EEE Address	Sleeping Time	Radio Channel	Frgm Wd Sz	Commands Apply Values
Stack Version BootLoader Version	StdBy pin action	Channel 12	Frgm Inter Frm Delay	Read Values
Application Version	Sleeping	Channel 14	Use Security	Hard Reset
Current Channel PAN ID (Hex)	USB Device	Channel 16	HasPrecNwkKey	Soft Reset
Nwk address (Hex) Type of Device PAN C	Serial Speed	Channel 19	C Enable	Start Network
Is Associated	 19200 bits/s 38400 bits/s 	Channel 21	Disable Enable	Save To file
Write Only Attributes Nwk Key (Hex) FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	 57600 bits/s 115200 bits/s 	 Channel 23 Channel 24 Channel 25 	Extended PAN ID (Hex)	<u>, -</u>
Lnk Key(16) + IEEE Add(8) (Hex)	Output Power Attenuation	Channel 26 Select/Deselect All		
Advanced Settings Join Type Join Type One Shot Periodic Phase 1 (Hex) Join Period 0000003C Join Retries 0F Jitter 0F Join Period 0000003C Jitter 0F Join Period 0F Jitter 0F Join Period 0F Jitter 1E	Rejoin Parameters Rejoin Type Periodic Rejoin Unsecure Rejoin Secure Rejoin Rejoin Interval (Hex)- 0000003C Max Rejoin Int (Hex)- 00000384	Max Rej Retr Ph 1 (H FF Sec Rejoin Retr (Hex 01 Rejoin Retries (Hex)- 01	EP Prof ID 00 0000 Dev ID Dev Ver 0000 00 In Clust Count 00 In Clust List	Hex) Clear Read Out Clust Coun O0 Out Clust List
ED Bind Tmout [Hex]	Fragmentation Wind EP (Hex) 01 Wind Sz 0 1 0 2 0 3 0 FF	Apply Comp Smp D	Descr	



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RFD:

odule Informations(R	ead Only)	Read/Write Attributes			Commando
EE Address		Sleeping Time	Radio Channel	Frgm Wd Sz	Commanus Apelu Malues
tack Version		StdBy pin action	Channel 12	010203	
lootLoader Version		Bx On When Idle	Channel 13	Frgm Inter Frm Delay	Read Values
pplication Version		◯ Sleeping	Channel 14		Hard Reset
ead Only Attributes	BUUE AL Y	Not Sleeping	Channel 16	💿 Disable 🔘 Enable	
Current Channel	PAN ID (Hex)	USB Device	🗹 Channel 17	HasPrecNwkKey	Soft Reset
Nwk address (Hex) –		💿 Normal 🔘 USB	Channel 18	Disable	Start Network
	RFD	Serial Speed	Channel 19		Load From Fil
s Associated		0 19200 bits/s	Channel 21	HasPrecTCLinKey Disable	
Is Associated		O 38400 bits/s	Channel 22	🔘 Enable	Save To file
/rite Only Attributes		57600 bits/s	Channel 23		<u></u>
Nwk Key (Hex) FFFFFFFFFFFFFFFFF	Trust Center (Hex)	I 15200 bits/s	Channel 24	Extended PAN ID (Hex)	
111 12 11 Julian 11 Julian 11		Attenuation	Channel 26		
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	1	Select/Deselect All		
dvanced Settings					
Join Parameters	Phase 1 (Hex)	Rejoin Parameters		Simple Descriptor (H	ex]
 One Shot Periodic 	Join Period 0000003C Join Retries 0F	✓ Periodic Rejoin ✓ Unsecure Rejoin ✓ Secure Rejoin	Max Rej Retr Ph 1 (H	ex) 00 0000 Dev ID Dev Ver	Apply Clear
Phase 2 (Hex) Join Period 00000	E10 Jitter 1E	Rejoin Interval (Hex)	Sec Rejoin Retr (Hex] In Clust Count	Read Out Clust Cour
	Sleeping Time (Hex)	Max Rejoin Int (Hex) 00000384	Rejoin Retries (Hex)	00	00 Out Clust List
	ED Bind Tmout (Hex	Fragmentation Wind EP (Hex) 01 Wind Sz	Apply Comp Smp I	Descr	



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FFD:

Module Informations(Read Only)	Read/Write Attributes			Commands
EEE Address	StdBy pin action	Radio Channel Channel 11 Channel 12 Channel 13 Channel 13 Channel 14	Frgm Wd Sz 1 2 3 Frgm Inter Frm Delay	Apply Values Read Values
Read Only Attributes	Not Sleeping	 Channel 15 Channel 16 	Use Security O Disable O Enable	Hard Reset
Current Channel PAN ID (F	USB Device	Channel 17	HasPrecNwkKey	Soft Reset
Nwk address (Hex)	evice Serial Speed	Channel 18	O Enable	Start Network
	● 9600 bits/s	 Channel 20 Channel 21 	HasPrecTCLinKey	Load From Fi
Is Associated	O 38400 bits/s	Channel 22	C Enable	Save To file
V <mark>rite Only Attributes</mark>		Channel 23	Extended PAN ID (Hex)	
FFFFFFFFFFFFF	FFFFFFFFF Output Power Attenuation	Channel 25	000000000000000000000000000000000000000	
Lnk Key(16) + IEEE Addr(8) (Hex) FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	FFFFFFFF	Select/Deselect All		
Advanced Settings Join Parameters Join Type One Shot Periodic Join Retries	DO00003C F F F DE DE DE DE DE DE DE DE DE DE	Max Rej Retr Ph 1 (F	ex) Simple Descriptor (F EP Prof ID 00 0000 Dev ID Dev Ver 0000 00	Apply Clear Bead
Phase 2 (Hex) Join Period 00000E10 Jitter	1E Rejoin Interval (Hex	Sec Rejoin Retr (Hex	In Clust Count	Out Clust Cour
- Sleep [00000 - ED Bi 14	Max Rejoin Int (Hex 003 Tragmentation Wind EP (Hex) 01 Wind Sz 0 1 0 2	Comp Smp	Descr d	Out Clust List



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The button Apply Values allows configuring registers with desired values, • after filling the different fields and selecting the radio buttons, click on the button **Apply Values** to configure the module.

Adule Informations(Rea	ad Only)	Read/Write Attributes			Commande
EEE Address		Sleeping Time	Radio Channel Channel 11	Frgm Wd Sz	Apply Values
Stack Version		StdBy pin action	 Channel 12 Channel 13 Channel 14 	Frgm Inter Frm Delay	Read Values
Application version		Sleeping Not Sleeping	Channel 15	Use Security	Hard Reset
Current Channel	PAN ID (Hex)	USB Device	Channel 16	- HasPrecNwkKey	Soft Reset
Nwk address (Hex)	Type of Device	⊙ Normal 🔿 USB	Channel 18	 Disable Enable 	Start Network
	PAN C	Serial Speed	Channel 20	HasPrecTCLinKey-	Load From File
Is Associated		 19200 bits/s 38400 bits/s 	Channel 21	 Disable Enable 	Save To file
/rite Only Attributes Nwk Key (Hex)		 57600 bits/s 115200 bits/s 	 Channel 23 Channel 24 	Extended PAN ID (Hex)	1000
FFFFFFFFFFFFFFFFFF	FFFFFFFFFFFFFFFFFFFFF	Output Power Attenuation	 Channel 25 Channel 26 	000000000000000000000000000000000000000	
Lnk Key[16] + IEEE Ad FFFFFFFFFFFFFFFFFFFFF	dd(8) (Hex) FFFFFFFFFFFFFFFFFFFFFFFF	1	Select/Deselect All		
dvanced Settings					
Join Parameters Join Type One Shot Periodic	Phase 1 (Hex) Join Period 0000003C Join Retries 0F Jitter 0F	Rejoin Parameters Rejoin Type Periodic Rejoin Unsecure Rejoin Secure Rejoin	Max Rej Retr Ph 1 (H	ex] Simple Descriptor (F EP Prof ID 00 0000 Dev ID Dev Ver 0000 00	Apply Clear
Phase 2 (Hex)	10 Jitter 1E	Rejoin Interval (Hex) -	Sec Rejoin Retr (Hex	In Clust Count	Out Clust Count
	Sleeping Time (Hex)	Max Rejoin Int (Hex)-	Rejoin Retries (Hex)	In Clust List	Out Clust List
	ED Bind Tmout (Hex	EP (Hex) 01 Wind Sz	Apply	Jescr J	





Success	×
()	Registers setting completed
	ОК





EE Address 00154 ack Version FS.	F1000500029				- A name has die
ack Version FS.		Sleeping Time	Radio Channel	Frgm Wd Sz-	Commanus
ack Version 15.	710.00.00.0000		Channel 11	01 0 2 0 3	Apply Values
	210.02.00-8003	StdBy pin action	Channel 12	- From Inter Frm Delau	
ootLoader Version FS.	B00.01.07	C Rx On When Idle	Channel 13	100	Head Values
oplication Version FS.	P00.02.00-8002	Sleeping	Channel 14	- Use Securitu	Hard Reset
ead Only Attributes		Not Sleeping	Channel 16	Ose Security Ose Disable O Enable	
Current Channel	PAN ID (Hex)	USB Device	Channel 17	- HasPrecNwkKey-	Soft Reset
1		💿 Normal 🔘 USB	Channel 18	Disable	Shart Mahuark
Wink address (Hex)	Type of Device	 Serial Speed 	Channel 19	🔘 Enable	Stalt Network
+++	PAN C	9600 bits/s	Channel 20	- HasPrecTCLinKev-	Load From File
s Associated		O 19200 bits/s	🗹 Channel 21	 Disable 	
Is Associated		38400 bits/s	Channel 22	🔘 Enable	Save To file
rite Only Attributes		◯ 57600 bits/s	Channel 23		1 cm
Wk Key (Hex)	Trust Center (Hex)	115200 bits/s	Channel 24	Extended PAN ID (Hex)	
TOTIFICITIE .	LLELLELLELLELLEL	- Output Power	Channel 25	000000000000000000000000000000000000000	
.nk Key(16) + IEEE Addr) FFFFFFFFFFFFFFFFFFF	8) (Hex)	1	Select/Deselect All		
dvanced Settings oin Parameters		Rejoin Parameters		Simple Descriptor (F	J Hex)
Join Type Ph Jo One Shot Jo	iase 1 (Hex) in Period 0000003C in Retries 0F	Rejoin Type Periodic Rejoin Unsecure Rejoin	Max Rej Retr Ph 1 (H	EP Prof ID 00 0000	Apply
O Periodic	er OF	Secure Rejoin		0000 00	Read
Phase 2 (Hex) Join Period 00000E10	Jitter 1E	Bejoin Interval (Hex)-	Sec Rejoin Retr (Hex	In Clust Count	Out Clust Coun
	Sleeping Time (Hex)-	Max Rejoin Int (Hex)-	Rejoin Retries (Hex)	In Clust List	Out Clust List
	ED Bind Trout (Hev)	Fragmentation Wind EP (Hex) 01	Apply	Descr J	

The button **Read Values** allows to read registers value from the module. •











• The button Hard Reset leads to restore default values.

After Hard Reset the user should reconnect to the module in order to continue the configuration.

• The button **Soft Reset** leads to disconnect of the network.



After Soft Reset the user should reconnect to the module in order to continue the configuration.

- The button **Start Network** leads to start the network or to associate the device to the network.
- The button Load From File allows configuring the module with values stored in a configuration file (see for example Coordinator_Default.Config.txt, FFD_Default_Config.txt, RFD_Default_Config.txt, Coordinator_Config.txt, FFD_Config.txt, RFD_Config.txt). After loaded the file click the button Apply Values in order to set effectively the values.
- The button **Save To File** allows to save the values present in the window into a file (for example in order to save a specific configuration).



At the moment due to a limitation on the ZB firmware Stack 2007 Bootloader Version and Application Version attributes are not managed.

3.3.4.2. ZigBee Network Discovery

The feature **Network Discovery** shows the topology of the network and some useful information such as:

- PAN-ID of the network discovered
- Channel used for network operations
- How many devices have been discovered in the network
- How many devices are not responding during discovery
- For each device (right click): Network address, Type of device (if detected), MAC address (if detected), Receiver on when idle (if detected and applicable), Father network address and a list of commands that can be sent to remote device (see 3.3.4.3)



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The topology can be get in two ways:

 Using one of the Telit modules of the network in field: by the tool Management of the SRManagerTool Connect to the module of the network (see section 3.3.4)



if device used for discovering receives data with high rate the performaces can be very slow.

2. Using the Telit M ZE51 USB dongle as an EndDevice of the Network in field:



In order to flash the M ZE51 USB dongle:

- Plug in the USB port of the PC the Telit M ZE51 USB dongle
- If needed install drivers present in the link: <u>http://www.ftdichip.com/Drivers/VCP.htm</u>

Refer to document [11].

 By the tool Flashing of the SRManagerTool flash the node Telit M ZE51 with firmware ZEx1.XS5.11.21-B004.s28 (see Appendix 1)

In order to configure the M ZE51 USB dongle:

- By the tool **Management** of the SRManagerTool **Connect** to the node M ZE51 (see section 3.3.4) and give the following commands:
 - 0x04 0x12 0x08 0x01 0x00 (to put the node in configuration mode) The response is: 0x03 0x13 0x00 0x08
 - 0x02 0x10 0x00 (to perform an Hard Reset) The response is: 0x02 0x11 0x00
 - 0x2b 0x2b 0x2b (to enter in command mode) The response is: 0x0D
 - 0x04 0x12 0x08 0x01 0x00: (to put the node in configuration mode) The response: is 0x03 0x13 0x00 0x08
- Configure the node with the parameters of channel and Extended PAN ID by the tool Configuration Wizard (see section 3.3.4.1)
- o Close the Configuration Wizard



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In order to associate the **M ZE51 USB** dongle to the network as End Device:

- o By the tool Management give the following commands:
 - 0x01 0x16 (to associate to the network) the response is:
 0x07 0x77 Nwk_Addr(2 bytes Little Endian) 0xXX(do not care)
 0xYY(do not care) 0x00 0x00 0x02 0x17 0x00(be care it is 00 → SUCCESS)
 - 0x02 0x14 0x96 (to get the network address of the dongle)
 The response is: 0x06 0x15 0x00 0x96 0x02 Nwk_Addr(2 bytes)

If the **M ZE51 USB** dongle is already associated to the network:

- o give the following command by the tool Management:
 - 0x04 0x12 0x08 0x01 0x00 (to put the node in configuration mode) The response is: 0x03 0x13 0x00 0x08
- 3. Using the **Telit GG863-SR** as an EndDevice of the Network in field:



- o In order to connect/setup the GG863-SR see section 2.2
- By the tool **Flashing** of the SRManagerTool flash the GG863-SR with firmware ZEx1.XS5.11.21-B004.s28 (see section 3.2)

In order to configure the GG863-SR:

- By the tool **Management** of the SRManagerTool **Connect** to the node (see section 3.3.4) and give the following commands:
 - 0x04 0x12 0x08 0x01 0x00 (to put the node in configuration mode) The response is: 0x03 0x13 0x00 0x08
 - 0x02 0x10 0x00 (to perform an Hard Reset) The response is: 0x02 0x11 0x00



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- 0x2b 0x2b 0x2b (to enter in command mode) The response is: 0x0D
- 0x04 0x12 0x08 0x01 0x00: (to put the node in configuration mode) The response: is 0x03 0x13 0x00 0x08
- Configure the node with the parameters of channel and Extended PAN ID of the network by following commands:
 - 0x05 0x12 0x01 0x02 channel(2 bytes) (to set channel)

The response is: 0x03 0x13 0x00 0x01

- 0x0B 0x12 0xC4 0x08 ExtPanId(8 bytes) (to set Ext PAN ID)

The response is: 0x03 0x13 0x00 0xC4

In order to associate the **GG863-SR** to the network as End Device:

- o By the tool Management give the following commands:
 - Ox01 0x16 (to associate to the network) the response is:
 0x07 0x77 Nwk_Addr(2 bytes Little Endian) 0xXX(do not care)
 0xYY(do not care) 0x00 0x00 0x02 0x17 0x00(be care it is 00 → SUCCESS)
 - 0x02 0x14 0x96 (to get the network address of the dongle)
 The response is: 0x06 0x15 0x00 0x96 0x02 Nwk_Addr(2 bytes)

If the GG863_SR is already associated to the network:

- o give the following command:
 - 0x04 0x12 0x08 0x01 0x00 (to put the node in configuration mode) The response is: 0x03 0x13 0x00 0x08
- In the Management window Click button Network Discovery
- Appears the following window:





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	Coordinator Router End Device sleeping End Device not sleeping		07/10/2011 15:08 22
	Not detected Information Incomplete		Save Log Load Log Clear L
me for each device:	Save		Save Command Send Comman Load Command Clear Comman
Summary	Status Bar	Summay	☐ Work offine

The field Time for each device is the time to wait for each device during the • network discovering.



If in the network there are sleeping devices it is recommended to type a time compliant to the maximum sleeping time in the network, otherwise some devices can be detected with information incomplete or not detected at all.



In case of GPRS/GSM connection it is recommended to use a Time for each device > 1

click the button Start Discovery: •





Notwork Discourse Text			
I Network Discovery foot			
E 0000 - 52:06 ⊇ C5:0C - 1A:D3	Coordinator Router End Device sleeping End Device not sleeping Not detected Information Incomplete		22/11/2011 14.10.32
Time for each device: 1 [sec.] Start Discovery Save PAN-ID: 20-78 Channel: 24 Devices discovered: 4 Devices not responding: 0	Close Status Bar	Load	Save Command Send Command Load Command Clear Command

- The button Save allows saving the topology shown in the left window to XML • file.
- The button **Load** allows loading in the right window the topology saved (XML ٠ file), for example for comparing two networks or the same network in two different times.





SR Manager Tool User Guide

T Network Discovery Tool			
E 0000	Coordinator Router End Device sleeping End Device not sleeping Not detected Information Incomplete	© 0000 5226 C50C	22/11/2011 14.10.32
Time for each device: 1 [sec.] Start Discovery Save - Summary - Summary - Summary	Close	Load	Save Command Send Command Load Command Clear Command
PAN-ID: 20-78 Channel: 24 Devices discovered: 4 Devices not responding: 0	Status Bar	PAN-ID: 20-78 Channet: 24 Devices discovered: 3 Devices not responding: 0	Work offline

An **Abort Discovery** pop up allows aborting the Network Discovering process:



A progress bar shows the network Level discovered.

Level 2



Attention: do not close the Management window or Disconnect from the module used to get the topology network when the Network Discovery window is opened, otherwise the serial connection is closed and the Network Discovery Tool can not communicate with the node.







- \triangleright The list can be cleared \rightarrow Clear Command, or saved (in xml format) \rightarrow Save Command.
- \triangleright The list can be reloaded \rightarrow Load Command
- \triangleright The list can be sent if the box **Work offline** is not checked and a Topology is displayed → Send Command
- To delete a row on the list \rightarrow click on the row \triangleright





3.3.4.3. ZigBee Remote Commands

Right click on the node of the topology in order to list all remote commands available.

Network Discovery	/ Tool			
□ 00.00		Coordinator	G 00-00	22/11/2011 14.10.32
= 5248 = C500 ■ AD	NODE INFORMATION Metwork address: 1A-D9 Type of device: End Device MAC address: 00-15-4F-00-00-50-00-33 Receiver on when idle: 1 Eather address: 02 00	Router I Device sleeping Device not sleeping Not detected mation Incomplete	C5-0C	
	Patter Network address: CS-UC Ping 1A-D9 Node-Descriptor 1A-D9 Active EndPoints 1A-D9 User Descriptor 1A-D9 Bind/Unbind(From-To) 1A-D9			SaveLog LoadLog ClearLog
Time for each devi	BindingList 1A-D9 Bind/Unbind(Table_Entry) 1A-D9	Close	Load	Save Command Send Command Load Command Clear Command
Summa PAN-ID Channe Devices Devices no	AFDirectRequest 1A-D9 bit responding: 0	Status Bar	Summary PAN-10: 20-78 Channet: 24 Devices discovered: 3 Devices not responding: 0	Work offline

Ping: pings the remote device sending for four times the command IEEE Addr • request. The statistics response is showed.





Node Descriptor: used to inquire for the node descriptor of the remote • device.



Active EndPoints: used to inquire for the list of endpoints on the remote . device

mercoledi 5 ottol	ore 2011	~
TIME: 10.01 Active EndPoint: Number active E EP: 1 EP: 2 EP: 3 EP: 3 EP: 4 EP: 5 EP: 5 EP: 7 EP: 7 EP: A	l.34 s on: DB-24 Ps: 8	
<		≥{{
Save Log	Load Log	Clear Log







User Descriptor: used to inquire for the user descriptor of the remote device. •




- **Bind/Unbind(From-To)**: the window allows the feature of binding or unbinding two remote devices (with DstAddrMode = IEEE Address).
 - Right click on a node on the topology \rightarrow Bind/Unbind(From-To), wait some seconds to retrieve information
 - Right click on another node on the topology → Bind/Unbind(From-To), wait some seconds to retrieve information





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- Double click on the desired Cluster Output (green) on the Source node 0
- o Double click on the desired cluster Input (green) on the Destination node

SOURCE	Clear		DESTIN	ATION	Clear
Simple Descriptor		-C	luster Output: 00	103	-
🚊 EndPoint: 1		- C	luster Output: 00)1c	
Cluster Input: 0004		- C	luster Output: 00)1d	
- Cluster Input: 0054		CI	luster Output: 10	000	
- Cluster Input: 0055		CI	luster Output: a0)a8	
- Cluster Input: 1001		C	luster Output: f0	00	
- Cluster Input: e001		🚊 EndP	oint: f0		
- Cluster Input: e000		C	luster Input: 000		
- Cluster Input: f001	目的	C	luster Input: 000	2	
- Cluster Input: f00a		Cl	luster Input: 000	3	
- Cluster Input: f00e		- Ci	luster Input: 001	c	
Cluster Output: 0001		- Ci	luster Input: 001	d	
- Cluster Output: 0002		- C	luster Input: 100	0	
- Cluster Output: 0003		- C	luster Input: a0a	8	
- Cluster Output: 001 c		Cl	luster Input: f000)	
Cluster Output: 001 d		C	luster Output: 00	04	
Cluster Output: 1000		- C	luster Output: 00)54	
Cluster Output: a0a8		C C	luster Output: 00)55	
Cluster Output: f000			luster Output: 10	001	
EndPoint: IU		- C	luster Uutput: eL	101	
Cluster Input: 0001		U U	luster Uutput: eL	100	
Cluster Input: 0002			luster Uutput: fül	01	
Charter Input: 0003			luster Output: rui	ua O-	
	*		iuster olutput, ru	ue	1
Profile Nwk Addr End	dPoint Cluster	Profile	Nwk Addr	EndPoint	Cluster
017F 1AD9	1 0001	017F	52C6	fO	0001
	Bindi	ng ding			

- Click on **Binding** or **Unbinding**. See the status of the operation in the 0 NetworkDiscovery window.
- Click on **Reverse** in order to reverse SOURCE and DESTINATION. 0



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o Click on **Clear** in order to clear the Simple Descriptor showed.

Selecting another node on the topology and clicking \rightarrow Bind/Unbind(From-To) its Simple Descriptor is showed and a new operation of Binding/ Unbinding can be performed.

- BindingList: the window shows the contents of the Binding table of one or . two nodes selected.
 - Right click on one node on the topology \rightarrow BindingList, wait some seconds to retrieve information
 - Right click on another node on the topology (optional) \rightarrow BindingList, wait some seconds to retrieve information











- **Binding/Unbinding(Table_Entry)**: the window allows the feature of adding (Binding) or deleting (Unbinding) a row on the binding table of a node. The DstAddrMode can be IEEE Address or Group Address.
 - o Right click on a node on the topology →
 Binding/Unbind(Table_Entry), wait some seconds to retrieve information



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🕇 Binding/Unbinding Single or Group
NODE
 Simple Descriptor EndPoint: 1 Cluster Input: 0004 Cluster Input: 0054 Cluster Input: 0055 Cluster Input: e001 Cluster Input: e000 Cluster Input: e001 Cluster Input: f00a Cluster Input: f00a Cluster Output: 0001 Cluster Output: 0002 Cluster Output: 001d Cluster Output: 0001 Cluster Output: 001d Cluster Output: 0001 Cluster Input: 0001
Profile Nwk Addr EndPoint Cluster 017F 1AD9
Destination Addr Mode IEEE Addr IEEE Addr MAC Addr Dst EP Group Addr Group Addr Group Addr (Hex)
Binding Clear Unbinding



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- o Double click on the desired Cluster Output (green) on the node
- o Select desired DstAddrMode: IEEE Addr or Group Addr
- Fill needed information (MAC Addr and DstEP for IEEE Addr, Group Addr (Hex) for Group Addr)

🕇 Binding/Unbindin	g Single or (Group	L		
	NODE				
 Simple Descriptor EndPoint: 1 Cluster Inp Cluster Ou Cluster Inp Cluster Inp Cluster Inp Cluster Inp 	NOI aut: 0004 aut: 0054 aut: 0055 aut: 1001 aut: e000 aut: f001 aut: f00a aut: f00a aut: f00a aut: f00a aut: f00a aut: f00a aut: f00a aut: 0001 aut: 0001 aut: 0002 aut: 0002	DE			
- Cluster Inp	ut: 001c			~	
Profile 017F	Nwk Addr 1AD9	EndPoint 1	Cluster 0001		
Destination Addr Mode IEEE Addr IEEE Addr MAC Addr Dst EP Group Addr Sroup Addr Group Addr (Hex) 0003					
Binding	Cle	ar	U	nbinding	





- o Click on **Binding** or **Unbinding**. See the status of the operation in the NetworkDiscovery window.
- o Clear: clears the Simple Descriptor showed.
- \circ Selecting another node on the topology and clicking \rightarrow Binding/Unbind(IEEEAddr-GrpAddr) its Simple Descriptor is showed and a new operation of Binding/Unbinding can be performed.
- **PermitJoining**: used to request that a remote device allow or disallow association

T PermitJoining	
Nwk Address 3CD0 Permit Duration Disallow association Allow association Time during allow association Time AQ	Apply TC Significance No TC relevance Affect TC authentication

Click **Apply** and see the status of the operation in the NetworkDiscovery window

Leave: used to ask at a remote device to leave the network

Ť Leave	
Dest Nwk Addr CAE7	Apply
BitMask	
🔲 Rejoin	
🔲 Remove Children	

Click Apply and see the status of the operation in the NetworkDiscovery window





AFDirectRequest: used to communicate with an application of a remote device

🕇 AF Direct Request		
NWK 5D2D (Hex)	EP Src 31 (Hex)	EP Dest 31 (Hex)
Tx Options	Cluster 0002 (Hex)	Broadcast Radius 00 (Hex)
Frag	AFDU (Hex)	AFDU len 6
Send		

3.4. Analyzer

SRManagerTool uses Wireshark network protocol analyzer in order to monitor a wireless network.

The **Analyzer** window collects the following information:

- Serial Port: serial port where is connected the SR Sniffer node (disabled in • case of GPRS/GSM connection)
- Analyzer: the path where is installed the Wireshark analyzer •



Analyzer is not available for LEx0, NE70-868









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The **Analyzer** window is the following and collects more:

- Source: TinyOnePro (firmware TransparentSnifferTinyProBoard.s19), NE50-869.525 3 RSSI levels (firmware Sniffer_XE50_RSSI3.hex), NE50-869.525 255 RSSI levels (firmware Sniffer XE50 RSSI255.hex), NE50-868-GC.MOS 3 Band (firmware GC.MOS.01.01-B005.hex for 868MHz), NE50-868-GC.MOS 13 Band (firmware GC.M0S.01.01-B007.hex for 868MHz), NE50-433-GD.M0S 8 Band (firmware GD.M0S.01.01-B005.hex for 433MHz).
- Radio Band and Rx Power: only for sniffer NE50-868-GC.MOS 3 Band, NE50-868-GC.MOS 13 Band, NE50-433-GD.MOS 8 Band
- **Rx Power Tool: starts a tool that** shows the received signal quality.



The sniffer TinyOnePro, NE50-869.525 3 RSSI levels and NE50-869.525 255 RSSI levels support only 869.525 MHz.

Sniffer Mana	ger Tool		
Teli	e wireless solutions	Dadia Danad	5- D
Serial Port	Source	Kadio Band	Rx Power
COM1	NE50-868-GC.M0S 13 Band	868.300 MHz 🛛 🗹	RSSI: 0-3 🛛 🛛 🖌
Analyzer C:\Pro	ogram Files\Wireshark\wireshark.exe		Browse
Wireshark	Close	[Rx Power Tool

The button Wireshark starts the analyzer that captures and save packets during a monitoring session.





Select a name for the folder where saving PCAP file with captured packets. ٠

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

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

Browse For Folder		?×
Select a directory where to save	captured packets	
🞯 Desktop		
🗉 🛑 My Documents		
🗉 👱 My Computer		
🕀 😏 My Network Places		
🥑 Recycle Bin		
Session_1		
🗉 🧰 Varie		
Make New Folder	ОК Са	ncel



In case of Serial connection be careful to select the Serial Port where the SR Sniffer node is really connected, SRManagerTool can not check it and it leads to no packet captured.









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The **Analyzer** window is the following and collects more:

- Radio Channel: radio channel to monitor with Wireshark.
- Source: source sniffer node
- **PAN-ID:** PAN-IDs to monitor with SRManagerTool relating to topology changes. The warnings about topology changes will be saved in a RTF file in the same folder where will be saved the PCAP file.
- Button Monitor: starts the Alarm Monitor during a monitoring session.

Sniffer Manager T	ol	
Telit	vireless olutions	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
Serial Port COM3 <mark>></mark>	Source Telit	
Analyzer C:\Program	les\Wireshark\wireshark.exe	Browse
Alarm Monitor Info		Monitor
Wireshark	Close	Packets Analysis

- The button Wireshark starts the analyzer that captures and save packets • during a monitoring session.
- Select a name for the folder where saving PCAP file with captured packets and RTF log file with warnigs about topology changes.

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

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





Browse For Folder	? 🗙
Select a directory where to save captured packets	
 Desktop My Documents My Computer My Network Places Recycle Bin Session_1 Varie 	
Make New Folder OK Cand	el

The button Packets Analysis starts the analysis of the captured packets in a • previous monitoring session. In order to allow this feature is mandatory to save the topology and packets exchanged in the monitored network as explained in the section 3.9.1.









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The **Analyzer** window is the following and collects more:

- Source: source sniffer node used
- Mode: Mode of operation
- Radio Channel: radio channel used only in case operating mode is R2 or Q ٠

Telit wireless solutions	5
COM22 V ME50-868 V R2	

- The button **Wireshark** starts the analyzer that captures and save packets • during a monitoring session.
- Select a name for the folder where saving 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





Browse For Folder	? ×
Select a directory where to save captured packets	
 Desktop My Documents My Computer My Network Places Recycle Bin Session_1 Varie 	
Make New Folder OK Car	ncel



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3.8. SR sniffer nodes

The SR sniffer node detects over-air packets.

Related to the technology, the right SR Hardware Sniffer (flashed with the right firmware) has to be connected to the serial port selected in the Analyzer Window.

3.8.1. ZigBee Technology

In order to analyze a ZigBee Network with Stack ZB2007 the following sniffer nodes can be used:

Freescale Sniffer:

- plug in the USB port the Freescale 1322X USB dongle.
- If needed install drivers supplied in the Freescale CD

Telit Sniffer M ZE51:



- Plug in the USB port of the PC the Telit M ZE51 USB dongle
- If needed install drivers present in the link: <u>http://www.ftdichip.com/Drivers/VCP.htm</u>
- use the SRToolManager in order to flash the dongle with the firmware ZEx1.XS5.11.21-B004.s28 (See Appendix 1)

Telit Sniffer on DemoBoard:

- use the SRManagerTool in order to flash a Telit module ZE50/ZE60 with the firmware EH.WS5.11.51-B002.s28 (See section Flashing).
- When the module is flashed:
 - o Switch the SR board OFF (SW2).
 - Turn the programming switch OFF (SW4) on the SR board.
 - o Switch the SR board ON (SW2).



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In order to analyze a ZigBee Network with ZBPRO the following sniffer nodes can be used:

Freescale Sniffer:

- plug in the USB port the Freescale 1322X USB dongle.
- If needed install drivers supplied in the Freescale CD

Telit Sniffer M ZE51:



- Plug in the USB port the Telit M ZE51 USB dongle •
- If needed install drivers present in the link: http://www.ftdichip.com/Drivers/VCP.htm
- Use the SRToolManager in order to flash the dongle with the firmware ZEx1.XS5.11.21-B004.s28 (See Appendix 1)

Telit Sniffer on DemoBoard:

- use the SRManagerTool in order to flash a Telit module ZE51/ZE61 with the firmware ZEx1.XS5.11.21-B004.s28 (See section3.2).
- When the module is flashed:
 - o Switch the SR board OFF (SW2).
 - Turn the programming switch OFF (SW4) on the SR board.
 - Switch the SR board ON (SW2).

Telit GG863-SR:



In order to connect/setup the GG863-SR (see section 2.2)





Use the SRManagerTool in order to flash the GG863-SR with firmware ZEx1.XS5.11.21-B004.s28 (see section 3.2)

3.8.2. Mesh Technology

In order to analyze a TinyOnePro Network with stack M_ONE the following sniffer node can be used:

Telit Sniffer on DemoBoard:

- use the SRManagerTool in order to flash a Telit module TinyOnePro with the firmware: TransparentSnifferTinyProBoard.s19 (See section Flashing).
- 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).

In order to analyze a NE50 Network with stack Low Power Mesh the following sniffer nodes can be used:

Telit Sniffer on DemoBoard NE50-869.525 3/255 RSSI levels:

- use the SRManagerTool in order to flash a Telit module NE50 with the firmware (See section Flashing):
 - XE50 RSSI3.hex to read RSSI in 4 levels scale:
 - RSSI = $0 \rightarrow$ worst signal
 - RSSI = 1 \rightarrow bad signal
 - RSSI = 2 \rightarrow good signal
 - RSSI = $3 \rightarrow$ best signal
 - o XE50_RSSI255.hex to read RSSI in 256 levels scale: RSSI < 73 \rightarrow worst signal 73 < RSSI < 83 \rightarrow bad signal 83 < RSSI < 94 \rightarrow good signal RSSI > 94 \rightarrow best signal
- When the module is flashed:
 - o Switch the SR board OFF (SW2).
 - Turn the programming switch OFF (SW4) on the SR board.
 - Switch the SR board ON (SW2).



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Telit Sniffer on DemoBoard NE50-868-GC.MOS 3 Band:

- use the SRManagerTool in order to flash a Telit module NE50-433 with the . firmware GC.M0S.01.01-B005.hex (3 Band)(See section Flashing)
- When the module is flashed:
 - o Switch the SR board OFF (SW2)
 - o Turn the programming switch OFF (SW4)
 - Switch the SR board ON (SW2)

Telit Sniffer on DemoBoard NE50-868-GC.MOS 13 Band:

- use the SRManagerTool in order to flash a Telit module NE50-868 with the firmware GC.M0S.01.01-B007.hex (13 Band)(See section Flashing)
- When the module is flashed:
 - Switch the SR board OFF (SW2)
 - o Turn the programming switch OFF (SW4)
 - Switch the SR board ON (SW2)

Telit Sniffer on DemoBoard NE50-433-GD.MOS 8 Band:

- use the SRManagerTool in order to flash a Telit module NE50-433 with the firmware GD.M0S.01.01-B005.hex (8 Band)(See section Flashing)
- When the module is flashed:
 - Switch the SR board OFF (SW2)
 - o Turn the programming switch OFF (SW4)
 - Switch the SR board ON (SW2)

Telit Sniffer on NE50-868 USB dongle NE50-868-GC.MOS 13 Band:





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- Plug in the USB port of the PC the Telit NE50-868 USB dongle •
- If needed install drivers present in the link: • http://www.ftdichip.com/Drivers/VCP.htm
 - o If needed use the SRToolManager in order to flash the dongle with the firmware GC.M0S.01.01-B007.hex (See Appendix 3)





3.8.3. WM-Bus Technology

In order to analyze a TinyOneLite 868 MHz WM-Bus Network with Stack WM-Bus Protocol EN13757-4:2005 the following sniffer node can be used:

Telit Sniffer on DemoBoard:

- use the SRManagerTool in order to flash a Telit module TinyOneLite with the firmware: SnifferMBus_Board.s19 (See section Flashing).
- When the module is flashed:
 - o Switch the SR board OFF (SW2).
 - o Turn the programming switch OFF (SW4) on the SR board.
 - o Switch the SR board ON (SW2).

In order to analyze a ME50-868 MHz WM-Bus Network with Stack MBus Protocol EN13757-4:2013, MBus Protocol EN13757-4 + EN13757-5 Mode R2 or MBus Protocol EN13757-5 Mode Q the following sniffer nodes can be used:

Telit Sniffer on DemoBoard:

- use the SRManagerTool in order to flash a Telit module ME50-868 with the firmware: GC.U0S.01.00-B004.hex (See section Flashing).
- When the module is flashed:
 - Switch the SR board OFF (SW2).
 - o Turn the programming switch OFF (SW4) on the SR board.
 - Switch the SR board ON (SW2).

Telit ME50-868 USB dongle:



- Plug in the USB port of the PC the Telit ME50-868 USB dongle
- If needed install drivers present in the link:<u>http://www.ftdichip.com/Drivers/VCP.htm</u>



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• If needed use the SRToolManager in order to flash the dongle with the firmware GC.U0S.01.00-B004.hex (See Appendix 2)

In order to analyze a ME50-169 MHz WM-Bus Network with Stack MBus Protocol EN13757-4:2013 firmware GI.U03.01.01-B001 the following sniffer node can be used:

Telit Sniffer on DemoBoard:

- use the SRManagerTool in order to flash a Telit module ME50-169 with the firmware: GI.UOS.01.00-B006.hex (See section Flashing).
- When the module is flashed:
 - o Switch the SR board OFF (SW2).
 - Turn the programming switch OFF (SW4) on the SR board. Switch the SR board ON (SW2).

In order to analyze a ME50-169 MHz WM-Bus Network with Stack MBus Protocol EN13757-4:2013 firmware GI.U03.01.02-B001 or later the following sniffer node can be used:

Telit Sniffer on DemoBoard:

- use the SRManagerTool in order to flash a Telit module ME50-169 with the firmware: GI.U0S.01.00-B006.hex (See section Flashing).
- 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).

In order to analyze a ME70-169 MHz WM-Bus Network with Stack MBus Protocol EN13757-4:2013 the following sniffer node can be used:

Telit Sniffer on DemoBoard:

- use the SRManagerTool in order to flash a Telit module ME70-169 with the firmware: GL.UOS.01.01-B001 (See section Flashing).
- When the module is flashed:
 - o Switch the SR board OFF (SW2).
 - Turn the programming switch OFF (SW4) on the SR board. Switch the SR board ON (SW2).





3.9. Wireshark

Clicking **Wireshark** appears the User Interface of Wireshark:

Capturing from \\.	\pipe\wireshark - Wireshark						
Eile Edit View Go	⊆apture <u>A</u> nalyze <u>S</u> tatistics Telepl	non <u>y T</u> ools <u>H</u> elp					
	B Z X Z A 9, 4	🕨 🌳 🧇 春 😫 🔳		2 Q 🖭 🌌 🕅	🔨 💥 🔯 👘		
Filter:		▼ Expres	ssion Clear	Apply			
802.11 Channel:	😪 Channel Offset:	✓ PCS Filter: All Frames	Vone	Wireless Settings,	Decryption Keys		
No. Time	Source			Destination		Protocol	Info
<u> </u>		<u>iii</u>					>
.\pipe\wireshark: <liv< td=""><td>e capture in progress> to No Packe</td><td>ts</td><td></td><td></td><td></td><td>Profile: Default</td><td>i di</td></liv<>	e capture in progress> to No Packe	ts				Profile: Default	i di





3.9.1. ZigBee Technology:

This is an example of ZigBee traffic during a monitoring session:

Capturing from \\.\pipe\wireshar	< - Wireshark				
<u>Eile Edit View Go Capture Analyze</u>	Statistics Telephony Iools Help				
	28 9 4 4 4 3 7 2 8	📳 Q, Q, Q, 🖭 🚟 🗹 🌉) 🔆 🖼		
Filter:	▼ Expres	sion Clear Apply			
802.11 Channel: 💦 🗸 Chi	nnel Offset: 🛛 👻 FCS Filter: All Frames	None Vireless Settings D	ecryption Keys		
No. Time Source	Destination	Protocol	Info		~
0.219000		IEEE 802.15.4	Ack		
0.21,000 0×0000	0×1431	ZiqBee ZDP	Node Descriptor Response,	Device: 0x0000,	Status:
0.219600		IEEE 802.15.4	Ack		
0.219000 0×0000	0×1431	ZigBee ZDP	Node Descriptor Response,	Device: 0x0000,	Status:
0.219000	0.0000	IEEE 802.15.4	Ack		
< 0.437000 0x1431	0x0001	ZIGHEE ZOP	Extended address Reduest.	Device: UXUUUI	>
<pre>IFEE: 802.15.4 Data, Dst: 0 IFEE: 802.15.4 Data, Dst: 0 IFTame Control Field: Dat Sequence Number: 76 Destination: 0x0001 Source: 0x0000 IFTame Check Sequence (TI RSSI: -7 dem FCS Valid: True LQI Correlation Value: IFTame Control Field: Dat</pre>	<pre>X001, Src: 0x0000 a (0x8851) CC24xx format): FCS OK 108 Dst: 0x1431, Src: 0x0000 a (0x0048) Frame Type: Data (0x0000) Protocol Version: 2 Discover Route: Enable (0x0001) Multicast: False Source Route: False Extended Destination: False Extended Source: False Layer Data, Dst Endpt: 0, Src Palae (0x00)</pre>	Endpt: 0			
Cluster: Unknown (0x8002 Profile: Zigbee Device F Source Endpoint: 0 Counter: 32 Eligbee Device Profile, Noc Sequence Number: 57 Status: Success (0) Device: 0x0000 ■ Node Descritor 0000 61 88 4c f7 35 01 00 0 0020 0e 10 40 58 02 41 00 5) rofile (0x0000) e Descriptor Response, Device: 0 00 48 00 31 14 00 00 09 a.L 0 20 39 00 00 10 40 8f 5 02 00 f9 ec	0x0000, Status: Success 5H <mark>m</mark> 1 9@. X.A.X			
Source Route (zbee.pwk.src_route), 1 byt	e Packets: 39 Displayed: 39 Marked: 0			Profile: Default	



More information about the dissector can be found at the link: http://wiki.wireshark.org/IEEE_802.15.4







To start another capturing packets session, Stop and Close Wireshark then click Wireshark to start another session from Analyzer window.

SR Tools Analyzer does not detect a long size data frame (len >= 80 Bytes) when Network Security is enabled and Freescale Sniffer is used.

During the monitoring session the user can monitor alarms about topology changes clicking the button Monitor:



Alarm legend:

: no warnings about possible network topology changes

: warnings about possible network topology changes

The button **Log** shows messages involded in latest network topology changes. The messages can be retrieved and inspected in the captured packets .PCAP file. The alarm can be Cleared \rightarrow Clear Alarm.

All Warnings about possible topology changes will be saved in .RTF file





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- After the monitoring session the user can stop capturing process stopping Wireshark, sniffed packets will be saved in the .PCAP file.
- The button Packets Analysis starts the analysis of the captured packets in • the previous monitoring session, the following window will appear:





T Packet Analyzer Tool			
	RefreshColor	Network Topology	
	Load .pcap file	Load Topology	Select and Start
	O MAC		Network
		Close	

- Select the analysis at MAC or Network level ٠
- Click on Load .pcap file in order to load the file of the captured packets in a previous monitoring session
- Click on Load Topology in order to load the topology of the monitored network
- Click on Select and Start in order to select and start the process tshark.exe • located in the folder where is installed Wireshark
- Wait same seconds .





T Packet Analyzer Tool Num. msg Sniffer RSSI(dev) Sniffer RSSI(mean) Sniffer LQI(mean) Sniffer LQI(dev) Source - Dest Network Topology 000 ■ 08-1A ■ 93-C4 ■ 73-3A ■ 93-BA ■ 82-06 00-00 0x0000-0x0b1a 4,6667 0,5926 108 0 0x0000-0x93ba 107 0 5 0x0000-0x93c4 108 0 0x0000-0xe37a 0 106,3333 0,1481 5 0x0000-0xf33a 12 4,75 0,0052 107 0,0833 107 4744 0x0000-Broadcas 78 4,3974 0.025 0,0035 0x0b1a-0x0000 3 11.3333 0.037 108 0 0x0b1a-0x93c4 108 0 3 13 0 0x0b1a-0xf33a 12,125 0,002 107,5 0,2812 8 OxOb1a-Broadcas 0,0523 107,4337 0,0039 83 12,0843 0x8206-0x93ba 215 -15,1256 0,0698 106,986 0,0048 0x93ba-0x0000 213 -18,4085 0.0008 106,8357 0.0064 0x93ba-0x8206 5 -18,4 0,392 107,2 0,008 0x93ba-0xf33a 13 -17.538 0.9217 107 5385 0.0164 57 -17.77 107.0351 0.0163 0x93ba-Broadcas 0.0105 0x93c4-0x0000 18 108 2 0 0 0x93c4-0x0b1a 18 108 0 0 Load Topology 3 Load .pcap file Select and Start 0x93c4-0xf33a 18 108 0 O Network MAC 0x93c4-Broadcas 76 ,7237 0,001 107,5395 0,0028 0xe37a-0x0000 4 17.75 3.5156 106.25 0.1406 0xf33a-0x0000 11 12,2727 0.0068 107,0909 0,1082 0xf33a-0x0b1a 8 12.25 0.0078 107.5 0.2812 0xf33a-0x93ba 12 12,5833 0.0145 107.6667 0.0093 0xf33a-0x93c4 11,7778 9 0,166 108 0 11,0147 0,0151 107,3088 Oxf33a-Broadcast 0,007 68 Close The table shows for each HOP the number of packets exchanged, mean and standard deviation of RSSI and LQI values (sniffed by sniffer node)

Example of analysis at MAC layer:







Example of analysis at Network layer:





Example of analysis at Network layer that reports an HOP with troubles:

T Packet An	nalyzer Tool			
Source -	- Route	n*	Data	Command
Dest		Packets	Packets	Packets
0-0000 0-0-10	0.0000.0.0.10**	2	2	0
0.0000.0.6512	0.0000.0.65(2**	2	2	0
0x0000-0x65r3	0x0000-0x65r3	0	0	U
0.0-10.0.0000	0x0000-0x8e68	2	2	0
	0.0.000000	2	2	U
0x8668-0x0000	000000000000000000000000000000000000000	2	2	U





3.9.2. Mesh Technology

This is an example of Mesh traffic:





At the moment for Mesh technology we are using Wireshark with no dissector, for this reason all raw RF packets in the network are displayed.





3.9.2.1. **Rx Power Tool**

The button **Rx Power Tool** starts a tool that shows the received signal quality, in order to decide if the geographic position is suitable or if a specific module can be used as parent.

- The tool can be used with any of the Source allowed •
- Select Serial Port, Source, Radio Band and Rx Power (if needed)
- Click Rx Power Tool
 - o Using a Source that returns an RSSI level in a range of 3 values (TinyOnePro, NE50-869.525 3 RSSI levels, NE50-868-GC.MOS 3 Band, NE50-868-GC.MOS 13 Band, NE50-433-GD.MOS 8 Band) appears:

CD.	MCD	Capacities	Deep	Bouter Position	DCCI 0	DCCI 1	PCCI 2	DCCI 2	Total Reacon
200	1150	Capacities	Deep	Trouver i Oskion	110010	113011	110012	110010	Total Deacon
11.00					Provention				
liter		Deep	Resu	E.	Frame ty	pe			
RS	SI	High	1			ames	Sta	rt	
Ca	oacities	- ingis	L		Beac	ons	-		
		Deep							





o Using a Source that returns an RSSI level in a range of 256 values (NE50-869.525 255 RSSI levels) appears:

ср	MCD	Conneities	Deep	Doutor Position	DCCI	Total Dassan	1	
.50	MOD	Capacities	Deep	Houlerrosition	11351	Total Deacon		
iter-		Deen	Beud	1	Frame typ			
BS	SI	O High	1		O All fran	nes	Start	
Car	acities	Cor mgn	-		Beaco	ns		
		Deep	C.A.H.	to many all			Stop	Clear List




Using a Source that returns the absolute value of received power in 0 dBm (Rx Power = Abs value dBm) appears:

SB	MSB	Capacities	Deep	Router Position	Abs dBm	Total Beacon		
							Ĩ	
ilter		- Deen	Besul	6	Frame ty	pe		
RS		O High				ames	Start	
Cap	acities	Deep			💿 Beac	ons		
En.		C. Loop	- Anie	de Eilber			Stop	Clear List

- Select the Frame Type to analyse: Beacon or All frames
- o Click button Start in order to start the frames analysis
- o Click Stop at the end of the analysis session
- It will be possible to apply a specific filter in order to select the best parent in a specific geographic position. The possible association criteria are:
 - o RSSI level
 - o Parent Capacity
 - o Network depth



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These association criteria can be selected checking the boxes in the **Filter** panel.

Network depth can be specified by **Deep** panel selecting Deep association or High association.

• Clicking Apply Filter button, the best parent is returned in Result.

The following example shows Beacons and only one possible parent:

LSB	MSB	Capacities	Deep	Router Position	RSSI 0	RSSI 1	RSSI 2	RSSI 3	Total Beacon
255	255	100	0	0	1	1	0	0	2
					_				
Filter					- Frank	100			
	21	Deep	Resu	k .	All to	ames	-		
	51	O High	255,2	255			Sta		
Cap	acities	0.0			Bea	oons			



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The following example shows All frames and their received signal quality:

After clicking **Stop** button, can be calculated the signal quality for each module with a double click on a specific row as shown in the following image.

LSB	MSB	TYPE	RSSI			
255	255	BEACON	1			
55	255	BEACON	0			
18	48	ASSO	0			
255	255	ACK	0			
255	255	BEACON	0			
		Attentic	10			
		Attentio	n			
		Attentio	n			
		Attentio	Double click or	module in order to calculate i	ts RSSI	
		Attentio	Double click or	module in order to calculate i	ts RSSI	
		Attentio	Double click or	module in order to calculate i	ts RSSI	
		Attentio	Double click or	module in order to calculate i	te RSSI	
		Attenti	Double click or	i module in order to calculate i	te RSSI	
		Attentic	Double click or	i module in order to calculate i	te RSSI	
		Attentic	Double click or	i module in order to calculate i	ts RSSI	
		Attentic	Double click or	i module in order to calculate i	ts RSSI	
		Attentio	Double click or	i module in order to calculate i	ts RSSI	
		Attentio	Double click or	i module in order to calculate i	ts RSSI	
		Attentio	Double click or	i module in order to calculate i	ts RSSI	
		Attenti	Double click or	i module in order to calculate i	te RSSI	
Ther		Attentic	Double click or	OK	te RSSI	
Filter 71 RS	si	Attentio	Double click or	Module in order to calculate i	te RSSI	
iller 2] RS	SI	Attentic Attentic Peep Result High [255,255	Double click or	i module in order to calculate i OK	te RSSI Start	
Ther 2 RS 2 Cal	SI SI	Attentic Attentic Attentic Attentic Seep Result High Disco	Double click or	ok	te RSSI Start	

In order to start a new session click **Clear List** button, then click **Start** button.



During capturing packets process the user can stop capturing process, captured packets will be saved in the .PCAP file. To start another capturing packets process, Close Wireshark analyzer and click Wireshark from SRManagerTool.





WM-Bus Technology: 3.9.3.

In order to allow Wireshark to inspect WM-Bus packets the following steps must be followed:

From the main Wireshark menu:

- Edit \rightarrow Preferences \rightarrow Protocols \rightarrow DLT_USER •
- Encapsulation Table \rightarrow Edit New
- New

Type:

🔼 User DLTs Table: Edit - P 🔲 🗖 🔀
DLT: User 1 (DLT=148)
Payload protocol: wmbus
Header size: 0
Header protocol:
Trailer size: 0
Trailer protocol:
<u>O</u> K <u>C</u> ancel

- 0K
- New

Type:





🗖 User DLTs Ta	able: Edit - P 🗐 🗖 🔀
DLT:	User 2 (DLT=149)
Payload protocol:	wmbus_mode_q
Header size:	0
Header protocol:	
Trailer size:	0
Trailer protocol:	
	<u>O</u> K <u>C</u> ancel

0K •

This is an example of WM-Bus traffic with Protocol EN13757-4 or EN13757-5 Mode R2:





📶 Capturing from \\.\pipe\w	rireshark - Wireshark			The second se	
Ele Edit Yiew Go Capture	Analyze Statistics Telephony	cools Help		k	
Filter:		▼ Expression Clear Apply			
No. Time	Source	Destination	Protocol	Info	
2 2011-06-06 11:1	4:59.771000		wireless M-Bus Wireless M-Bus	Send user data, no reply Send user data, no reply	
				ADDRAWD RECORDS AND LONGER -	
<u><</u>					
Frame 1: 23 bytes or Arrival Time: Jun	<pre>wire (184 bits), 23 by 6, 2011 11:14:32.0060</pre>	rtes captured (184 bits) 20000 W. Europe Davlicht Time			
Epoch Time: 130735	1672.006000000 seconds	state of Europe baying ite inte			
[Time delta from p [Time delta from p	revious captured frame revious displayed frame	0.000000000 seconds] 0.000000000 seconds]			
[Time since refere	nce or first frame: 0.0	000000000 seconds]			
Frame Number: 1 Frame Length: 23 b	vtes (184 bits)				
Capture Length: 23	bytes (184 bits)				
[Frame is marked: [Frame is ignored:	False] False]				
[Protocols in fram	e: user_dlt:wmbus:data				
DLT: 148 Wireless M-Bus					
L-field: 17					
A-field: 785634120	107				
CRC-field: 0xc24f	[correct]				
CI-field: EN 13757	-3 without header (0x7)	8)			
□ [wireless M-Bus bloc	ks (7 bytes): #1(7)]				
[Reassembled lengt	h: 7]				
Data (7 bytes)	A.				
[Length: 7]	Jua				
RSSI: -17					
0000 11 44 ae 0c 78 5	6 34 12 01 07 c2 4f 78	4d 45 54 .DxV4OxME	r		
0010 45 52 31 0d 7b 5	a et	ER1.{Z.			
Frame (22 hutae) (null) (2 hutae)					
Readulto load or capture	Backates 2 Dicela	adi 2 Markadi 0		Destiles	Default
Ready to load or capture	Packets! 2 Displa	You'r a manidul U		Profile: I	Derauk





This is an example of WM-Bus traffic with Protocol EN13757-5 Mode Q:

🗖 Capturing from 11. \pipe\wireshark - Wireshark	
Ele Edit Yew Go Capture Analyze Statistics Telephony Iools Help	
	👹 🗹 🥵 % 🔯
Filter: V Expression Clear Apply	
No. Time Source Destination	Protocol Info
1 2011-06-06 11:37:01.750000 000000000000 00000000000	wireless M-Bus Mode Q aData frame, requires acknowledge, direct connection, Unknown alarm
2 2011-06-06 11:37:01.828000 000000000000 0000000000	Wineless M-Bus Mode Q Acknowledge
4 2011-06-06 11:44:51.172000 00000000000000 000000000000000000	EN IS757-3 With full heads a rame, requires acknowledge, direct connection
4 2011-00-00 11.44.31.20000 00000000000 000000000	Whiteress model of Acknowledge
Frame 1: 28 bytes on wire (224 bits), 28 bytes captured (224 bits)	
Enoch Time: 1307353021 750000000 seconds	
Time delta from previous captured frame: 0.000000000 seconds]	
[Time delta from previous displayed frame: 0.000000000 seconds]	
[Time since reference or first frame: 0.000000000 seconds]	
Frame Number: 1	
Frame Length: 28 bytes (224 bits)	
Ename is marked: Falsel	
[Frame is ignored: False]	
[Protocols in frame: user_dlt:wmbus_mode_q:wmbus_mode_q_alarm]	
DLT: 149	
G Whreless M-Bus Mode Q	
DA_field: 000000000000 (device address)	
SA-field: 000000000000 (device address)	
⊟ FC-field: 0xd0	
. = Data: True	
. = Ack: True	
. = Direct: True	
niv-field: 43	
FCS: 0xb8a1 [correct]	
⊟ TLV: 7105aabbccddee	
Tag: Alarm reporting (0x71)	
Length: 5	
Alarm time: Unknown (0x22)	
Alarm information: bbccddee	
RSSI: -17	
0000 15 00 00 00 00 00 00 00 00 00 00 00 00 00	
0010 2b 00 71 05 aa bb cc dd ee b8 a1 ef +.q +.q.	
Frame (frame), 28 bytes Packets: 4 Displayed: 4 Marked: 0	Profile: Default





Capturing from \\.\pipe\wireshark_2012-5-16_16.14.19 - Wireshark Eile Edit View Go Capture Analyze Statistics Telephony Iools Help Filter: ▼ Expression... Clear Apply Info Send user data, no reply Destination Protocol Wireless M-Bus Wireless M-Bus Source 7 2012-05-16 16:14:58.023000 8 2012-05-16 16:14:59.648000 9 2012-05-16 16:15:09.726000 10 2012-05-16 16:15:13.023000 wireless M-Bus wireless M-Bus 11 2012-05-16 16:15:15.741000 Wireless M-Bus Send user data, no reply 12 2012-05-16 16:15:28.023000 13 2012-05-16 16:15:29.726000 Wireless M-Bus Wireless M-Bus Wireless M-Bus Wireless M-Bus 14 2012-05-16 16:15:31.835000 15 2012-05-16 16:15:43.023000 > ■ Frame 3: 23 bytes on wire (184 bits), 23 bytes captured (184 bits) Arrival Time: May 16, 2012 16:14:29.726000000 w. Europe Daylight Time Epoch Time: 1337177669.726000000 seconds [Time delta from previous captured frame: 1.125000000 seconds] [Time delta from previous displayed frame: 1.125000000 seconds] [Time since reference or first frame: 1.125000000 seconds] [Time since reference or first fram Frame Number: 3 Frame Length: 23 bytes (184 bits) Capture Length: 23 bytes (184 bits) [Frame is marked: False] [Frame is ignored: False] [Protocols in frame: user_dlt:wmbus:data] DLT: 148 Physical layer header: 0x011 = Frame format: Format B (1) ⊌ Wireless M-Bus L-field: 20 ⊮ C-field: 0x44 ■ Data (8 bytes) Data: 48656c6c6f35350d [Length: 8] RSSI: -47 0000 01 14 44 37 37 <mark>37 37</mark> 0010 6f 35 35 0d 30 fb d1 7 37 37 78 48 65 6c 6c ..D77<mark>777 777</mark>xHell o55.0.. Frame (23 bytes) Reassembled Wireless M-Bus data (8 bytes) Address of the meter (wmbus.A), 6 bytes Profile: Default Packets: 15 Displayed: 15 Marked: 0 Load time: 0:00.000

This is an example of WM-Bus traffic with Protocol EN13757-4:2013:



During capturing packets process the user can stop capturing process in order to start another capturing packets process: Close Wireshark analyzer and click Wireshark from SRManagerTool.





3.9.3.1. Protocol EN13757-4:2013 Network Monitor

After starting Wireshark and during its activity, the Tool Network Monitor allows to load the Topology of networks based on Protocol EN13757-4:2013 and to monitor the activity of the Meter nodes:



During network monitoring is strongly recommended to put the Sniffer node as close as possible to the Other node.

	• wireless		
Serial Port	Source	Mode V C Other V	
Analyzer CAP	ogram Files\Wireshark\wiresh	ark.exe	Browse

Click Network Monitor





T Network Topology	
	0ther
	M_B0 M_B1 A_B0 A_B1 A_B2 A_B3 A_B4 A_B5 Transmission Interval [s] * </th
L L	
	Delete Row Create Topology
Save Start Monitoring Load	
Close	

- Click Sliding (>) button in order to expand the window
- Add manually Manufacturer Id, Address and Transmission Interval of the nodes in the network: For example:
 - **Other**: M_B0 = 1; M_B1 = 2; A_B0 = 3; A_B1 = 4; A_B2 = 5; A_B3 = 6; A_B4 = 7; $A_B5 = 0;$
 - **Meter 1**: M_B0 = 1; M_B1 = 2; A_B0 = 3; A_B1 = 4; A_B2 = 5; A_B3 = 6; A_B4 = 7; A B5 = 1; Transmission Interval = 10 sec;
 - **Meter 2**: M_B0 = 1; M_B1 = 2; A_B0 = 3; A_B1 = 4; A_B2 = 5; A_B3 = 6; A_B4 = 7; - $A_B5 = 2$; Transmission Interval = 15 sec;
 - **Meter 3**: M_B0 = 1; M_B1 = 2; A_B0 = 3; A_B1 = 4; A_B2 = 5; A_B3 = 6; A_B4 = 7; $A_B5 = 3$; Transmission Interval = 20 sec;
 - **Meter 4**: M_B0 = 1; M_B1 = 2; A_B0 = 3; A_B1 = 4; A_B2 = 5; A_B3 = 6; A_B4 = 7; A B5 = 4; Transmission Interval = 25 sec;



Transmision Interval is the time interval within which it is expected the Meter nodes send packets to Other node.





Network Topology													
				M_BO	M_B1	A_BO	A_B1	A_B2	A_B3	A_B4	A_85		
			Other	1	2	3	4	5	6	7	0		
				M_BO	M_B1	A_BO	A_B1	A_B2	A_B3	A_B4	A_85	Transmission Interval [s]	
		_	1	1	2	3	4	5	6	7	1	10	
		_	2	1	2	3	4	5	6	7	2	15	
			3	1	2	3	4	5	6	7	3	20	
			4	1	2	3	4	5	6	7	4	25	
	R	*											
	U												
					alata Da			G	Tranta T	onologu	h		
								L	Sidale 1	opology	J		
Save Start Monitoring L	oad												
Close													

- Click **Create Topology**: before starting the monitoring, all Meters are colored in red • because packets have not yet been detected.
- The Topology can be Saved •





M = 1.2 A = 343.6.74 M _ B0 M_ B1 A _ B0 A _ B1 A _ B2 A _ B3 A _ B4 A _ B5 Transmission 1 1 2 3 4 5 6 7 1 10 2 1 2 3 4 5 6 7 3 20 4 1 2 3 4 5 6 7 4 25 * 0 <	M = 1.2 - A = 340 572	C	Other	M_80 1	M_B1 2	A_B0 3	A_B1 4	A_B2 5	A_B3 6	A_B4 7	A_85 0	
1 1 2 3 4 5 6 7 1 10 2 1 2 3 4 5 6 7 2 15 3 1 2 3 4 5 6 7 4 25 * 1 2 3 4 5 6 7 4 25 * 1 2 3 4 5 6 7 4 25 * 1 2 3 4 5 6 7 4 25 * 1 2 3 4 5 6 7 4 25 * 1 2 3 4 5 6 7 4 25 * 1 1 2 1<	- M = 1-2 - A = 3-4-5-6-7-4			M_BO	M_B1	A_80	A_B1	A_82	A_B3	A_84	A_B5	Transmission Interval [s]
2 1 2 3 4 5 6 7 2 15 3 1 2 3 4 5 6 7 3 20 * 1 2 3 4 5 6 7 4 25 * 1 2 3 4 5 6 7 4 25 * 1 2 3 4 5 6 7 4 25 * 1 2 3 4 5 6 7 4 25 * 1 2 3 4 5 6 7 4 25 * 1 2 3 4 5 6 7 4 25 * 1 2 1 1 2 3 4 5 6 7 4 25 * 1 2 1 1 1 2 1 1 1 2 1 1 1 1 <td< td=""><td></td><td></td><td>1</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>1</td><td>10</td></td<>			1	1	2	3	4	5	6	7	1	10
3 1 2 3 4 5 6 7 3 20 * 4 1 2 3 4 5 6 7 4 25 ** 0 0 0 0 0 0 0 0 0 0 C 0 0 0 0 0 0 0 0 0 C 0 <td< td=""><td></td><td></td><td>2</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>2</td><td>15</td></td<>			2	1	2	3	4	5	6	7	2	15
* 1 2 3 4 5 6 7 4 25 * -			3	1	2	3	4	5	6	7	3	20
*			4	1	2	3	4	5	6	7	4	25

Right click on the nodes in order to list information available •





SR Manager Tool User Guide

M = 1 2 - A = 345671			M_BO	M_81	A_80	A_B1	A_B2	A_B3	A_B4	A_85	
M = 1-2 - A = 3-4-5-6-7-7	NODE INF	ORMATION		-	3	4	5	6	7	0	
M=12 A=345673	M = 1-2 A = 3-4-5-6-7-2			81	A_B0	A_B1	A_82	A_B3	A_B4	A_85	Transmission Interval [s]
	Transmission Interv	val = 15		-	3	4	5	6	7	1	10
	Turned On = False				3	4	5	6	7	2	15
	Module Type = Me	ter			3	4	5	6	7	3	20
i.e.	0.	4	1	2	3	4	5	6	7	4	25
				elete B	nw			Create T	opologu	1	

Click Start Monitoring: nodes that send packets during the time (Trasmission Interval • (s)) expected are colored in green, otherwise in red. In this way the user can see which nodes are regularly transmitting or not.





T Network Topology											
☐ M = 1·2 · A = 3·4·5·6·7·0 M = 1·2 · A = 3·4·5·6·7·1			M_BO	M_B1	A_80	A_B1	A_82	A_83	A_84	A_85	
M = 1-2 - A = 3-4-5-6-7-2 M = 1-2 - A = 3-4-5-6-7-3		Othe	er 1	2	3	4	5	6	7	0	
M=12 - A=345874			M_BO	M_B1	A_80	A_B1	A_B2	A_B3	A_B4	A_85	Transmission Interval [s]
		▶ 1	1	2	3	4	5	6	7	1	10
		2	1	2	3	4	5	6	7	2	15
		3	1	2	3	4	5	6	7	3	20
		4	1	2	3	4	5	6	7	4	25
		*		w	w	w	w u		w .		W
		¢.		elete Ro	w			Create T	opology)	
Save Stop Monitoring Lo	bad										
Close											

The monitoring can be Stopped/Started •





Appendix 1 – How to flash the Telit M ZE51 4. USB dongle

The Telit M ZE51 USB dongle can be flashed through an automatic or manual procedure:

- 1. Plug in the USB port the Telit M ZE51 USB dongle
- 2. If needed install drivers present in the link: http://www.ftdichip.com/Drivers/VCP.htm

Refer to document [11].

Automatic Procedure:

- 3. Open the tool Flashing
- 4. Check Switch Prog Automatic
- 5. Select Local/GG863-SR
- 6. Flash the firmware ZEx1.XS5.11.21-B004.s28, Platform ZE51/ZE61





🕇 Flashing Manager t	ool	
Platforms Info	COM Port COM3 V Automatic	Results
Module Local/GG863-SR Remote	Radio Info Broadcast Max Number Modules to Flash Unicast Serial Number	Max Responding Success
Modules Responding-		Error
Firmware C:\FW_Sniffer\ZigBee\	ZBPRO\Sniffer_&_OTA\Supervisor\ZE51_ZE61\WA_IA\ZEx1.XS5.11.21-8004.s26	Browse
Flashing		Close

- 7. Close the tool **Flashing**
- 8. Unplug the Telit M ZE51 USB dongle
- 9. Plug in the USB port of the PC the Telit M ZE51 USB dongle

Manual procedure:

- 3. By the tool **Management** of the SRManagerTool **Connect** to the Node M ZE51 (see section 3.3.4)
- 4. Give the following commands:

0x04 0x12 0x08 0x01 0x00 (to put the node in configuration mode) the response is: 0x03 0x13 0x00 0x08

0x01 0xFF (to jump in the bootloader)

- 5. Close the tool Management
- 6. Open the tool Flashing
- 7. Uncheck Switch Prog Automatic
- 8. Select Local/GG863-SR
- 9. Flash the firmware ZEx1.XS5.11.21-B004.s28, Platform ZE51/ZE61



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- 10. Close the tool **Flashing**
- 11. Unplug the Telit M ZE51 USB dongle
- 12. Plug in the USB port of the PC the Telit M ZE51 USB dongle





Appendix 2 – How to flash the Telit ME50-868 5. USB dongle



TheTelit ME50-868 USB dongle can be flashed through an automatic or manual procedure:

- 1. Plug in the USB port of the PC the Telit ME50-868 USB dongle
- 2. If needed install drivers present in the link: http://www.ftdichip.com/Drivers/VCP.htm

Automatic Procedure:

- 3. Open the tool Flashing
- 4. Check Switch Prog Automatic
- 5. Select Local/GG863-SR
- 6. Flash the firmware GC.UOS.01.00-B004.hex





🕇 Flashing Manager tool	
Platforms Info Serial Info Switch Prog ME50-868 WM-Bus COM Port COM9 Automatic	
Programming Info	Results
C Module C Radio Info	Max
Local/GG863-SR Broadcast Max Number Modules to Flash	Responding
Remote Unicast Serial Number	Success
Modules Responding	Error
Firmware	
C:\FW_Sniffer\M-Bus\ME50-868\PacketFormatB\GC.U0S.01.00-B004.hex	Browse
Flashing	Close

- 7. Close the tool Flashing
- 8. Unplug the Telit ME50-868 USB dongle
- 9. Plug in the USB port of the PC the Telit ME50-868 USB dongle

Manual procedure:

- 3. By the tool Management of the SRManagerTool Connect with right baud rate to the Node ME50-868 USB dongle (see section 3.3.2)
- 4. Give the following commands in ASCII Type:

ATBL (switch to bootloade the response can be: OK or ERROR

- 5. If the response is OK close the tool Management else repeat from point 1
- 6. Open the tool Flashing
- 7. Uncheck Switch Prog Automatic
- 8. Select Local/GG863-SR
- 9. Flash the firmware GC.UOS.01.00-B004.hex
- 10. Close the tool Flashing
- 11. Unplug the Telit ME50-868 USB dongle
- 12. Plug in the USB port of the PC the Telit ME50-868 USB dongle



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Appendix 3 – How to flash the Telit NE50-6. 868/433 USB dongle



Follow this steps in order to flash the Telit NE50-868/433 USB dongle:

- 1. Plug in the USB port of the PC the Telit NE50-868/433 USB dongle
- 2. If needed install drivers present in the link: http://www.ftdichip.com/Drivers/VCP.htm

Automatic Procedure:

- 3. Open the tool Flashing
- 4. Check Switch Prog Automatic
- 5. Select Local/GG863-SR
- 6. flash the firmware GC.M0S.01.01-B007.hex (868)/GD.M0S.01.01-B005.hex (433).





🕇 Flashing Manager tool	
Platforms Info Serial Info Switch Prog NE50-868 Mesh COM Port COM9	
Programming Info Module Local/GG863-SR Broadcast Max Number Modules to Flash Unicast Serial Number	Results Max Responding Success Error
Firmware C:\FW_Sniffer\MeshLite\NE50\NE50-GC.M0S\868MHz_13_Bande\New\GC.M0S.0101-B005.hex Flashing	Browse

- 7. Close the tool Flashing
- 8. Unplug the Telit ME50-868 USB dongle
- 9. Plug in the USB port of the PC the Telit ME50-868/433 USB dongle

Manual procedure:

- 3. By the tool Management of the SRManagerTool Connect to the Node NE50-868/433 USB dongle (see section 3.3.1)
- 4. Give the following commands in Hexadecimal Command Type:
 - \circ 2b 2b 2b (ConfigMode) → response OK or ERROR
 - \If the response is OK give the command: 41 54 42 4C 0D (ATBL \rightarrow switch to bootloader) \rightarrow response OK or ERROR If the response is OK close the tool Management else repeat from point 1
- 5. Open the tool Flashing
- 6. Uncheck Switch Prog Automatic
- 7. Select Local/GG863-SR





- Flash the firmware GC.M0S.01.01-B007.hex (868)/GD.M0S.01.01-B005.hex (433).
- 9. Close the tool **Flashing**
- 10. Unplug the Telit NE50-868/433 USB dongle
- 11. Plug in the USB port of the PC the Telit NE50-868/433 USB dongle





7. Appendix 4 – Technology/Platform Firmware

Mesh:

- platform NE50-868, Stack Low Power Mesh
- platform NE50-433, Stack Low Power Mesh
- platform NE70-868, Stack Low Power Mesh
- Platform TinyOne Pro, Stack M_ONE

ZigBee:

- platform ZE50/ZE60, Stack ZB2007
- platform ZE51/ZE61- IA/WA, Stack ZBPR0

MBUS:

- platform TinyOneLite, Protocol EN13757-4:2005
- platform ME50-868, Protocol:EN13757-4:2005 + EN13757-5 Mode R2
- platform ME50-868, Protocol:EN13757-4:2013
- platform ME50-169, Protocol:EN13757-4:2013
- platform ME70-169, Protocol:EN13757-4:2013
- platform ME50-868, Protocol EN13757-5 Mode Q

SOne:

- platform LE50-868, Stack StarNetwork
- platform LE50-433, Stack StarNetwork
- platform LE70-868, Stack StarNetwork
- platform LE70-915, Stack Frequency Hopping StarNetwork
- platform LE51-868, Stack SigFox plus S-One
- platform LT70-868, Stack StarNetwork



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8. Appendix 5 – Troubleshooting

8.1. COM Port Error

Sometimes can happen that the serial COM port results busy even if no applications are using it. In this case the SRManagerTool is not able to open the port.

To solve this issue follow this steps:

- 1. Open Device Manager
- 2. Select the COM Port with trouble
- 3. Disable it
- 4. Enable it

8.2. Error Messages

8.2.1. Offset and length were out of bounds...

Rarely when trying to connect to SR module can happen the error message: "Offset and length were out of bounds

for the array or count is greather than the number of elements from index to the end of the source collection", in this case wait some seconds and try to connect again to the module.

8.2.2. CHECKSUM_ERR

Rarely when trying to flash a SR module can happen the error message: "CHECKSUM_ERR", in this case:

- Power the SR board OFF (SW2) (see section 2.3)
- Turn the programming switch ON (SW4) on the SR board (see section 2.3)
- Power the SR board ON (SW2) (see section 2.3)
- Click the Flashing button

8.2.3. The module does not respond

Rarely when trying to use the management and configuration wizard tool can happen the error message: "The module does not respond", in this case: close





the configuration wizard, disconnect from the module, wait some seconds and try to connect again to the module.

8.2.4. The operation has timed out

The SRManagerTool gives the error "The operation has timed out" when the module does not respond in the expected time.

This behaviour can happen for several reason:

- The module is switched to bootloader and can not respond to commands
- The module does not respond

8.2.5. Some Windows are not displayed properly

If some windows are not displayed properly try changing the Screen resolution.





9. Acronyms and Abbreviations

SR: Short Range WM-Bus: Wireless M-Bus

