LE70-868 Demokit User Guide
# APPLICABILITY TABLE

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>LE70-868</th>
</tr>
</thead>
</table>

| SW Version | GJ.S00.02.03 |
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1. Introduction

1.1. Scope

The aim of this document is to present the functional aspects of the Demokit dedicated to Telit Star Network Protocol Stack.

Demokit is based on the LE70-868 module, embedding Telit in house stack. After a short description of the Demokit and its installation principles, its functioning will be detailed in more advanced operation modes.

1.2. Audience

This document is intended for developers using Telit LE70-868 Module.

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:


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. Document Organization

This document contains the following chapters

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


“Chapter 3: “Installation” describes how to connect different parts of Demokit.

“Chapter 4: “Advanced Operation” gives the reference for the complete use of the Demokit.

“Chapter 5: “Safety Recommendations” describes recommendation for proper usage.

“Chapter 6: “Glossary” shows acronyms used in the document.


1.5. Text Conventions

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

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

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

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

1.6. Related Documents

2. **General Description**

2.1. **DemoKit philosophy**

The goal of the DemoKit is to show to customers the possibilities offered by the Telit Star Network firmware and the performances of the Telit modules.

2.2. **Hardware Considerations**

The DemoCase contains devices based on LE70-868 module, which is a up-to-500mW radio module, allowing range up to 10 km.

For more HW information on LE70, please refer to the dedicated documentation [1] available on the Telit web site.

2.3. **Star Network Considerations**


2.4. **SR Manager Tool Considerations**

SRManagerTool is the PC software to configure and monitor a Star Network.

For installation and detailed use, refer to the dedicated documentation [2] available on the Telit web site.

2.5. **List of equipment**

The LE70-868 Demokit supplies the following items:

- 2 USB EVKs
- 2 LE70-868 modules installed on their DIP-WA support
- 2 USB cables
- 2 Antennas (SMA)
- 2 Lithium primary batteries (+9V)
- 2 Power supply 100-240VAC/5,9VDC 1150mA
- 2 Jack straight coaxial connector
3. Detailed equipment description

3.1. EVK Description

<table>
<thead>
<tr>
<th>Designation</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW1</td>
<td>Stand-by switch</td>
</tr>
<tr>
<td>SW3</td>
<td>Programming switch</td>
</tr>
<tr>
<td>SW2</td>
<td>Reset push button</td>
</tr>
<tr>
<td>SW4</td>
<td>ON/OFF switch</td>
</tr>
<tr>
<td>LD1</td>
<td>PROG Yellow LED</td>
</tr>
<tr>
<td>LD2</td>
<td>ON/OFF Yellow LED</td>
</tr>
<tr>
<td>LD3</td>
<td>Red LED</td>
</tr>
<tr>
<td>LD4</td>
<td>Green LED</td>
</tr>
</tbody>
</table>
3.2. LE70-868 DIP Pin Out
4. Installation

4.1. Demoboard Construction

In order to build each demoboard:

1. Plug 1 DIP module on 1 EVK board.
2. Screw a SMA antenna on each DIP module.
3. Plug a USB cable to each EVK board.
4. Plug a +9V battery if needed
4.2. **DemoBoard Connection**

In order to connect a demoboard:

1. Connect the USB cable to the PC.

   *The DemoBoard is supplied directly through the USB connection. In case of mobility is needed, a +9V battery can be used. When battery is plugged, it has priority on the USB power supply.*

2. Check that stand-by (STBY, SW1) and programming (PROG, SW3) switches are turned OFF.

3. Switch the DemoBoard ON (SW4).

4. Check that the yellow LED LD2 lights on when power supplying the DemoBoard, and that both LEDs LD3 and LD4 blinks once.

5. Red LED LD3 lights on when the module is transmitting data frames on RF link.

6. Green LED LD4 lights on when the module is receiving data frames from RF link.

4.3. **SR Tool Installation**

Refer to SR Tool user guide ([2]) for a detail description of SR tool installation.
5. **Advanced operations**

5.1. **Flashing operation**

In order to reflash a demoboard:

1. Switch the DemoBoard OFF (SW2).
2. Turn programming switch (PROG, SW4) to ON.
3. Switch the DemoBoard ON (SW2).
4. Reflash the demoboard using SR Tool (Refer to SR Tool user guide ([2]) for a detailed description of flashing procedure)
5. Switch the DemoBoard OFF (SW2).
6. Turn programming switch (PROG, SW4) back to OFF.

5.2. **Functional operation**

Refer to SR Tool user guide ([2]) and Wireless Star Network Protocol Stack user guide ([3]) for a detailed description of usage.
6. Safety Recommendations

READ CAREFULLY

Be sure the use of this product is allowed in the country and in the environment required. The use of this product may be dangerous and has to be avoided in the following areas:

- Where it can interfere with other electronic devices in environments such as hospitals, airports, aircrafts, etc.
- Where there is risk of explosion such as gasoline stations, oil refineries, etc. It is responsibility of the user to enforce the country regulation and the specific environment regulation.

Do not disassemble the product; any mark of tampering will compromise the warranty validity. We recommend following the instructions of the hardware user guides for a correct wiring of the product.

The product has to be supplied with a stabilized voltage source, Safety Extra Low Voltage, with no energy hazard. The wiring has to be conforming to the security and fire prevention regulations. The product has to be handled with care, avoiding any contact with the pins because electrostatic discharges may damage the product itself.

The system integrator is responsible of the functioning of the final product; therefore, care has to be taken to the external components of the module, as well as of any project or installation issue, because the risk of disturbing external devices or having impact on the security. Should there be any doubt, please refer to the technical documentation and the regulations in force.

When installed in final product, a fire protection enclosure must be provided. Every module has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (20 cm).

The European Community provides some Directives for the electronic equipments introduced on the market. All the relevant information’s are available on the European Community website:

http://ec.europa.eu/enterprise/sectors/rtte/documents/

The text of the Directive 99/05 regarding telecommunication equipments is available, while the applicable Directives (Low Voltage and EMC) are available at:

http://ec.europa.eu/enterprise/sectors/electrical/
7. Glossary

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

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2013-05-22</td>
<td>First Release</td>
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