BlueMod+S42
Testmode Reference

80512NT11496A Rev. 0 – 2016-08-18

TELIT
TECHNICAL
DOCUMENTATION

[04.2016]

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

NOTICE

While reasonable efforts have been made to assure the accuracy of this document, Telit assumes no liability resulting from any inaccuracies or omissions in this document, or from use of the information obtained herein. The information in this document has been carefully checked and is believed to be reliable. However, no responsibility is assumed for inaccuracies or omissions. Telit reserves the right to make changes to any products described herein and reserves the right to revise this document and to make changes from time to time in content hereof with no obligation to notify any person of revisions or changes. Telit does not assume any liability arising out of the application or use of any product, software, or circuit described herein; neither does it convey license under its patent rights or the rights of others.

It is possible that this publication may contain references to, or information about Telit products (machines and programs), programming, or services that are not announced in your country. Such references or information must not be construed to mean that Telit intends to announce such Telit products, programming, or services in your country.

COPYRIGHTS

This instruction manual and the Telit products described in this instruction manual may be, include or describe copyrighted Telit material, such as computer programs stored in semiconductor memories or other media. Laws in the Italy and other countries preserve for Telit and its licensors certain exclusive rights for copyrighted material, including the exclusive right to copy, reproduce in any form, distribute and make derivative works of the copyrighted material. Accordingly, any copyrighted material of Telit and its licensors contained herein or in the Telit products described in this instruction manual may not be copied, reproduced, distributed, merged or modified in any manner without the express written permission of Telit. Furthermore, the purchase of Telit products shall not be deemed to grant either directly or by implication, estoppel, or otherwise, any license under the copyrights, patents or patent applications of Telit, as arises by operation of law in the sale of a product.

COMPUTER SOFTWARE COPYRIGHTS

The Telit and 3rd Party supplied Software (SW) products described in this instruction manual may include copyrighted Telit and other 3rd Party supplied computer programs stored in semiconductor memories or other media. Laws in the Italy and other countries preserve for Telit and other 3rd Party supplied SW certain exclusive rights for copyrighted computer programs, including the exclusive right to copy or reproduce in any form the copyrighted computer program. Accordingly, any copyrighted Telit or other 3rd Party supplied SW computer programs contained in the Telit products described in this instruction manual may not be copied (reverse engineered) or reproduced in any manner without the express written permission of Telit or the 3rd Party SW supplier. Furthermore, the purchase of Telit products shall not be deemed to grant either directly or by implication, estoppel, or otherwise, any license under the copyrights, patents or patent applications of Telit or other 3rd Party supplied SW, except for the normal non-exclusive, royalty free license to use that arises by operation of law in the sale of a product.

USAGE AND DISCLOSURE RESTRICTIONS

I. License Agreements

The software described in this document is the property of Telit and its licensors. It is furnished by express license agreement only and may be used only in accordance with the terms of such an agreement.

II. Copyrighted Materials

Software and documentation are copyrighted materials. Making unauthorized copies is prohibited by law. No part of the software or documentation may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, without prior written permission of Telit

III. High Risk Materials

Components, units, or third-party products used in the product described herein are NOT fault-tolerant and are NOT designed, manufactured, or intended for use as on-line control equipment in the following hazardous environments requiring fail-safe controls: the operation of Nuclear Facilities, Aircraft Navigation or Aircraft Communication Systems, Air Traffic Control, Life Support, or Weapons Systems (High Risk Activities"). Telit and its supplier(s) specifically disclaim any expressed or implied warranty of fitness for such High Risk Activities.

IV. Trademarks

TELIT and the Stylized T Logo are registered in Trademark Office. All other product or service names are the property of their respective owners.

V. Third Party Rights

The software may include Third Party Right software. In this case you agree to comply with all terms and conditions imposed on you in respect of such separate software. In addition to Third Party Terms, the disclaimer of warranty and limitation of liability provisions in this License shall apply to the Third Party Right software.

TELIT HEREBY DISCLAIMS ANY AND ALL WARRANTIES EXPRESS OR IMPLIED FROM ANY THIRD PARTIES REGARDING ANY SEPARATE FILES, ANY THIRD PARTY MATERIALS INCLUDED IN THE SOFTWARE, ANY THIRD PARTY MATERIALS FROM WHICH THE SOFTWARE IS DERIVED (COLLECTIVELY “OTHER CODE”), AND THE USE OF ANY OR ALL THE OTHER CODE IN CONNECTION WITH THE SOFTWARE, INCLUDING (WITHOUT LIMITATION) ANY WARRANTIES OF SATISFACTORY QUALITY OR FITNESS FOR A PARTICULAR PURPOSE.

NO THIRD PARTY LICENSORS OF OTHER CODE SHALL HAVE ANY LIABILITY FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS), HOWEVER CAUSED AND WHETHER MADE UNDER CONTRACT, TORT OR OTHER LEGAL THEORY, ARISING IN ANY WAY OUT OF THE USE OR DISTRIBUTION OF THE OTHER CODE OR THE EXERCISE OF ANY RIGHTS GRANTED UNDER EITHER OR BOTH THIS LICENSE AND THE LEGAL TERMS APPLICABLE TO ANY SEPARATE FILES, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

APPLICABILITY TABLE

PRODUCTS

- BLUEMOD+S42

CONTENTS

1. INTRODUCTION

1.1. Scope

This document specifies the testmode interface for the BlueMod+S42.

1.2. Audience

This document is intended for Telit customers about to perform RF testing in a test laboratory and for production testing.

1.3. Contact Information, Support

For general contact, technical support services, technical questions and report documentation errors contact Telit Technical Support at:

- TS-SRD@telit.com

Alternatively, use:

http://www.telit.com/support

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

http://www.telit.com

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. 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.

1.5. Related Documents

- [1] BlueMod+S42 Hardware User Guide, 1VV0301303
- [2] BlueMod+S42 Software User Guide, 1VV0301318
- [3] BlueMod+S42 AT Command Reference, 80512ST10771A
- [4] Bluetooth 4.0 Core Specification

2. GENERALS

The BlueMod+S42 supports a Telit proprietary “Testmode” and the Direct Test Mode “DTM” as specified in the Bluetooth Core Specification [4].

The “Testmode” is required for regulatory testing of products implementing a pre-tested ISM radio module. Test engineers will ask you to transmit modulated signals with full power on specific frequencies. You can initiate this by using the commands described in chapter 4.

The DTM allows a specific Bluetooth Tester to control the radio. Therefore you don’t need to issue any commands. Once the Testmode connection to the Bluetooth Tester is established all settings can be controlled by the test lab engineer via the Bluetooth Tester user interface. This is required for Bluetooth Qualification and product testing.

As a pre-condition all test modes require access to the BlueMod+S42 UART interface, either to connect these signals to a PC COM port (mostly virtual COM port on a USB port) or to the COM port of the Bluetooth Tester. Therefore products implementing the BlueMod+S42 should be prepared to get test access to these signals. If the product doesn’t make use of the BlueMod+S42 UART interface it should make the UART signals accessible on test points. If the product uses the BlueMod+S42 UART interface for connecting a host, the connections should be made such that the host could be disconnected and the BlueMod+S42 UART interface could be accessed.

Furthermore the product implementing the BlueMod+S42 should have the signals TESTMODE# and BOOT0 available for connecting them either to GND or VDD.

2.1. Testmode

In Testmode the UART interface is configured to 38400 baud 8N1 as serial parameters.

2.2. DTM

The Direct Test Mode is specified by the Bluetooth SIG. Our implementation implements the 2-wire UART interface and uses 19200 baud 8N1 as serial parameters.

3. ENABLING TESTMODE OR DTM

For enabling the different Testmodes the BlueMod+S42 provides two IO pins.

The pin TESTMODE# is low active. Active in the following table means connect to GND.

The pin BOOT0 is high active. Active in the following table means connect to VDD.

The other two combinations start the bootloader for firmware update of the programmed firmware. These two modes are not scope of this document.

The following table shows the possible combinations.

ACTIVE MODE	IO PIN TESTMODE#	IO PIN BOOT0
Testmode	Active	Inactive
DTM	Active	Active
Bootloader	Inactive	Active
Firmware	Inactive	Inactive

Table 1: IO pin combinations

4. COMMANDS IN TESTMODE

In this chapter you can find all supported commands.

If a command was successful, the prompt '#' is shown on the next line.

In case of an error e.g. "-ERR 002;unknown cmd" is shown.

HELP	show command list

Syntax: **HELP**

This command shows a table of the available commands.

BOAD	show/set Bluetooth address

Syntax: **BOAD=<value>**

The command "BOAD" shows the Bluetooth address.

For manufacturing purpose it is possible to assign **once a public Bluetooth address** to the module. To delete this address again from the module it is necessary to delete the flash and reprogram the complete firmware. The following syntax has to be used.

e.g. BOAD=008025000042

DEVAD	show Device ID

Syntax: **DEVAD**

The command "DEVAD" shows the Device ID.

For manufacturing purpose it could be used for identification of the module. If no Device ID is available the command shows an error.

VER	show the firmware version

AT syntax: **VER**

This command shows the firmware version.

WD write 32bit value

AT syntax: **WD <address> <value>**

Write the specified 32bit hexadecimal value to the specified hexadecimal address. Separators are spaces.

Write value 0xFFFFFFFF to address 0x20002000: WD 20002000 FFFFFFFF

WW write 16bit value

AT syntax: **WW <address> <value>**

Write the specified 16bit hexadecimal value to the specified hexadecimal address. Separators are spaces.

Write value 0xFFFF to address 0x20002000: WW 20002000 FFFF

WB write 8bit value

AT syntax: **WB <address> <value>**

Write the specified 8bit hexadecimal value to the specified hexadecimal address. Separators are spaces.

Write value 0xFF to address 0x20002000: WB 20002000 FF

DD dump/read 32bit value

AT syntax: **DD <address>**

Read the specified 32bit value from the specified hexadecimal address. Separators are spaces.

Read the content of address 0x20002000: DD 20002000

DW dump/read 16bit value

AT syntax: **DW <address>**

Read the specified 16bit value from the specified hexadecimal address. Separators are spaces.

Read the content of address 0x20002000: DW 20002000

DB — dump/read 8bit value

AT syntax: **DB <address>**

Read the specified 8bit value from the specified hexadecimal address. Separators are spaces.

Read the content of address 0x20002000: DB 20002000

RFOFF — switch off radio

AT syntax: **RFOFF**

This command switches receiver and transmitter off and has to be issued after each test and before beginning the next test.

RFCHAN — set frequency offset

AT syntax: **RFCHAN <value>**

This command sets the frequency offset to 2400 MHz in MHz. Value range is 0 to 80.

E.g. RFCHAN 10: resulting frequency is 2410 MHz

TXPWR — set tx power

AT syntax: **TXPWR <value>**

This command sets the RF power to be used.

VALUE	DESCRIPTION
0	4 dBm
1	0 dBm
2	-4 dBm
3	-8 dBm
4	-12 dBm
5	-16 dBm
6	-20 dBm
7	-40 dBm

Table 2: Tx power values

RXON — enable receiver

AT syntax: **RXON**

This command enables the receiver of the module.

TXCW — enable unmodulated carrier

AT syntax: **TXCW**

After this command the module sends an unmodulated carrier.

TXMOD — enable BLE modulated carrier

AT syntax: **TXMOD**

After this command the module transmits a 1Mbit BLE modulated carrier.

DCDC — enable DCDC mode

AT syntax: **DCDC <value>**

With this command the module enables/disables the DCDC mode.

VALUE	DESCRIPTION
0	Disable DCDC mode
1	Enable DCDC mode (default)

Table 3: DCDC values

5. EXAMPLES

5.1. Tx Modulated

To send a BLE modulated carrier on a frequency of 2448 MHz with a tx power of -8 dBm issue the following commands:

RFOFF

TXPWR 3

RFCHAN 48

TXMOD

[Perform testing]

RFOFF

5.1. Tx Unmodulated

To send an unmodulated carrier on a frequency of 2480 MHz with a tx power of -12 dBm issue the following commands:

RFOFF

TXPWR 4

RFCHAN 80

TXCW

[Perform testing]

RFOFF

Note:

Changing parameters of the RF signal, e.g. frequency, power or modulation requires to switch the RF signal off. Use command RFOFF. Then reinitialize the wanted RF signal completely new.

---

6. DOCUMENT HISTORY

Revision	Date	Changes
0	2016-08-18	First issue

SUPPORT INQUIRIES

Link to **www.telit.com** and contact our technical support team for any questions related to technical issues.

www.telit.com

Telit Communications S.p.A.
Via Stazione di Prosecco, 5/B
I-34010 Sgonico (Trieste), Italy

Telit IoT Platforms LLC
5300 Broken Sound Blvd, Suite 150
Boca Raton, FL 33487, USA

Telit Wireless Solutions Inc.
3131 RDU Center Drive, Suite 135
Morrisville, NC 27560, USA

Telit Wireless Solutions Co., Ltd.
8th Fl., Shinyoung Securities Bld.
6, Gukjegeumyung-ro8-gil, Yeongdeungpo-gu
Seoul, 150-884, Korea

Telit Wireless Solutions Ltd.
10 Habarzel St.
Tel Aviv 69710, Israel

Telit Wireless Solutions
Technologia e Servicos Ltda
Avenida Paulista, 1776, Room 10.C
01310-921 São Paulo, Brazil

[04.2016]

Mod. 0809 2016-08 Rev.7