

Telit Modules Software User Guide

1w0300784 rev.13 2013-02-14



APPLICABILITY TABLE

NOTICE: the information provided by the present document covers the products having the software version equal or less than the versions showed in the table. The rules used to describe features and AT Commands concerning different products or software versions are illustrated in chapter 2.

To get more information about the AT commands covered by the present guide and their syntax, see the document [1] and [17] referring to the software versions indicated in the table.

Table Legend: • command is supported; – command is not supported; * factory setting

| | Software Version | AT Ref. Guide | Standards | #SELINT=0 | #SELINT=1 | #SELINT=2 |
|----------------------------------|------------------|---------------|---------------|-----------|-----------|-----------|
| GC Family (Compact) | | | | | | |
| GC864-QUAD | 10.00.xx7 | [1] | GSM/GPRS | • | • | * |
| GC864-QUAD V2 | 10.00.xx7 | [1] | GSM/GPRS | • | • | * |
| GC864-DUAL V2 | 10.00.xx7 | [1] | GSM/GPRS | – | – | • |
| GE/GL Family (Embedded) | | | | | | |
| GE864-QUAD | 10.00.xx7 | [1] | GSM/GPRS | • | • | * |
| GE864-QUAD V2 | 10.00.xx7 | [1] | GSM/GPRS | – | – | • |
| GE864-QUAD Automotive V2 | 10.00.xx7 | [1] | GSM/GPRS | – | – | • |
| GE864-QUAD ATEX | 10.00.xx7 | [1] | GSM/GPRS | – | – | • |
| GE864-DUAL V2 | 10.00.xx7 | [1] | GSM/GPRS | • | • | * |
| GE864-GPS | 10.00.xx7 | [1] | GSM/GPRS | – | – | • |
| GE865-QUAD | 10.00.xx7 | [1] | GSM/GPRS | – | – | • |
| GL865-DUAL | 10.00.xx7 | [1] | GSM/GPRS | – | – | • |
| GL865-QUAD | 10.00.xx7 | [1] | GSM/GPRS | – | – | • |
| GL868-DUAL | 10.00.xx7 | [1] | GSM/GPRS | – | – | • |
| GE910-QUAD | 13.00.xx3 | [1] | GSM/GPRS | – | – | • |
| GL865-DUAL V3 | 16.00.xx2 | [1] | GSM/GPRS | – | – | • |
| GL868-DUAL V3 | 16.00.xx2 | [1] | GSM/GPRS | – | – | • |
| GT Family (Terminal) | | | | | | |
| GT863-PY | 10.00.xx7 | [1] | GSM/GPRS | – | – | • |
| GT864-QUAD | 10.00.xx7 | [1] | GSM/GPRS | – | – | • |
| GT864-PY | 10.00.xx7 | [1] | GSM/GPRS | – | – | • |
| HE910 Family | | | | | | |
| HE910 ¹ | 12.00.xx3 | [17] | HSPA-GSM/GPRS | – | – | • |
| HE910-GA | 12.00.xx3 | [17] | HSPA-GSM/GPRS | – | – | • |
| HE910-D | 12.00.xx3 | [17] | HSPA-GSM/GPRS | – | – | • |
| HE910-EUR / HE910-EUD | 12.00.xx3 | [17] | HSPA-GSM/GPRS | – | – | • |
| HE910-EUG / HE910-NAG | 12.00.xx3 | [17] | HSPA-GSM/GPRS | – | – | • |
| HE910-NAR / HE910-NAD | 12.00.xx3 | [17] | HSPA-GSM/GPRS | – | – | • |

Tab. 1: Products, Software Versions and Interface Style supported

¹ HE910 is the “type name” of the products marketed as HE910-G & HE910-DG.



The following list, organized in alphabetical order, shows the AT commands covered by this User Guide. The number close to each command indicates the page of the first AT command occurrence.

| | | |
|----------------------------|----------------------|--------------------|
| +++ 67 | AT#SHSNR 58 | AT+CMGS 109 |
| AT 17 | AT#SHSSD 56 | AT+CMGW 115 |
| AT# JDRENH 135 | AT#SII 22 | AT+CMSS 115 |
| AT#AUTOBND 24 | AT#SIMDET 29 | AT+CMUT 55 |
| AT#BND 24 | AT#SLED 135 | AT+CNMI 113 |
| AT#CAP 53 | AT#SLEDSAV 135 | AT+COPS 36 |
| AT#CCLK 81 | AT#SMSMODE 109 | AT+CPBF 75 |
| AT#CMGLCONCINDEX 127 | AT#SNUM 32 | AT+CPBR 76 |
| AT#CODEC 64 | AT#TTY 70 | AT+CPBS 73 |
| AT#CODECINFO 63 | AT#WAKE 144 | AT+CPBW 76 |
| AT#CPUMODE 96 | AT&P0 20 | AT+CPIN 26 |
| AT#CSURV 42 | AT&W0 20 | AT+CPMS 111 |
| AT#CSURVB 43 | AT+ CGSMS 120 | AT+CPOL 33 |
| AT#DTMF 95 | AT+CALA 139 | AT+CRC 81 |
| AT#ENCALG 79 | AT+CALD 140 | AT+CREG 35 |
| AT#ENS 43 | AT+CAPD 143 | AT+CRSM 31 |
| AT#GPIO 129 | AT+CBST 66 | AT+CSCA 110 |
| AT#HFMICG 59 | AT+CCLK 138 | AT+CSCB 126 |
| AT#HSMICG 56 | AT+CFUN 98 | AT+CSCS 106 |
| AT#MONI 39 | AT+CGATT 121 | AT+CSIM 31 |
| AT#NITZ 80 | AT+CGMM 17 | AT+CSMP 105 |
| AT#QSS 27 | AT+CGMR 17 | AT+CSNS 68 |
| AT#RFSTS 41 | AT+CGSMS 121 | AT+CSQ 38 |
| AT#SELINT 18 | AT+CLCK 85 | AT+FCLASS 53 |
| AT#SERVINFO 41 | AT+CLIP 82 | AT+IPR 19 |
| AT#SHDN 25 | AT+CLIR 83 | AT+VTD 94 |
| AT#SHFAGC 61 | AT+CLVL 55 | AT+VTS 94 |
| AT#SHFEC 60 | AT+CMEE 19 | AT+WS46 23 |
| AT#SHFNR 61 | AT+CMGD 122 | ATA 68 |
| AT#SHFSD 60 | AT+CMGF 104 | ATD 63 |
| AT#SHSAGC 57 | AT+CMGL 124 | ATH 64 |
| AT#SHSEC 57 | AT+CMGR 114 | |



*SPECIFICATIONS 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 entirely 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

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.

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

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.

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.

Copyright © Telit Communications S.p.A.



Contents

| | |
|--|-----------|
| 1. Introduction | 11 |
| 1.1. Scope | 11 |
| 1.2. Audience | 11 |
| 1.3. Contact Information, Support | 11 |
| 1.4. Related Documents | 12 |
| 2. Basic Operations..... | 13 |
| 2.1. RTS/CTS handshaking | 14 |
| 2.2. Module Identification | 17 |
| 2.3. AT Interface Style Selection | 18 |
| 2.4. Enable Extended Error Result codes | 19 |
| 2.5. Main Serial Port Speed Configuration | 19 |
| 2.6. Auxiliary Serial Port Arrangement | 22 |
| 2.7. Select Cellular Network | 23 |
| 2.8. Band Configuration | 24 |
| 2.9. Software Shutdown | 25 |
| 2.10. SIM..... | 26 |
| 2.10.1. SIM Presence and PIN Request | 26 |
| 2.10.2. Enter PIN code..... | 26 |
| 2.10.3. Enter PUK code | 27 |
| 2.10.4. SIM Status | 27 |
| 2.10.5. SIM Detection Mode | 29 |
| 2.10.6. SIM/USIM Access File | 30 |
| 2.10.7. MSISDN | 31 |
| 2.10.8. Preferred Operator List..... | 33 |
| 2.11. Network Information | 35 |
| 2.11.1. Network Status | 35 |
| 2.11.2. Network Operator Identification..... | 36 |
| 2.11.3. Signal Strength & Quality | 38 |
| 2.11.4. Fast Network Status Check..... | 38 |
| 2.11.5. Network Survey | 42 |
| 2.11.6. BCCH Survey | 43 |
| 2.11.7. Enhanced Network Selection and AT&T functions | 43 |
| 2.11.7.1. Software Versions: greater than or equal 10.00.xx5/16.00.xx2 | 44 |
| 2.11.7.2. Software Version: greater than or equal 13.00.xx2 | 46 |
| 2.11.7.3. Software Version: 12.00.xx2 | 48 |



| | | |
|--------------|---|-----------|
| 2.11.7.4. | Software Version: greater than or equal 12.00.xx3 | 50 |
| 2.12. | Voice Call Establishment - Originate | 53 |
| 2.12.1. | Set Module in Voice Mode..... | 53 |
| 2.12.2. | Set Audio Path Active | 53 |
| 2.12.3. | Set Volume on Speaker | 55 |
| 2.12.4. | Set Microphone Mute | 55 |
| 2.12.5. | Hand Set Path Commands | 56 |
| 2.12.5.1. | HS Microphone Gain | 56 |
| 2.12.5.2. | HS Sidetone | 56 |
| 2.12.5.3. | HS Echo Canceller..... | 57 |
| 2.12.5.4. | HS Automatic Gain..... | 57 |
| 2.12.5.5. | HS Noise Reduction..... | 58 |
| 2.12.6. | Hands Free Path Commands..... | 59 |
| 2.12.6.1. | HF Microphone Gain | 59 |
| 2.12.6.2. | HF Sidetone | 60 |
| 2.12.6.3. | HF Echo Canceller..... | 60 |
| 2.12.6.4. | HF Automatic Gain..... | 61 |
| 2.12.6.5. | HF Noise Reduction..... | 61 |
| 2.12.7. | Dialing a Phone Number | 63 |
| 2.12.8. | Audio Codec Information | 63 |
| 2.12.9. | Setting Audio Codec..... | 64 |
| 2.12.10. | Disconnect a Call..... | 64 |
| 2.12.11. | Modules: HE910-D/DG/EUD/EUG/NAD | 65 |
| 2.13. | CSD Data Call Establishing - Originate | 65 |
| 2.13.1. | Set Module in Data Mode..... | 65 |
| 2.13.2. | Set Modulation and Speed | 66 |
| 2.13.3. | Dialing a Phone Number | 67 |
| 2.13.4. | Exit Data Mode and Enter Command Mode | 67 |
| 2.13.5. | Disconnect Data Call | 67 |
| 2.14. | Answering an Incoming Call | 68 |
| 2.15. | GSM Single Numbering Scheme | 68 |
| 2.16. | TTY Feature..... | 69 |
| 3. | Advanced Operations | 71 |
| 3.1. | Access to the Phonebook | 71 |
| 3.1.1. | Select Phonebook Memory Storage..... | 73 |
| 3.1.2. | Search Phonebook Entries | 75 |
| 3.1.3. | Read Phonebook Entries..... | 76 |
| 3.1.4. | Write Phonebook Entry | 76 |
| 3.1.5. | Delete Phonebook Entry | 77 |
| 3.1.6. | Dial Phonebook Entry | 78 |
| 3.2. | Encryption Algorithm | 79 |
| 3.3. | Automatic Data/Time updating..... | 80 |
| 3.4. | Call Management..... | 81 |



| | | |
|-------------|--|------------|
| 3.4.1. | Identifying the Call Type..... | 81 |
| 3.4.2. | Identify the Caller..... | 82 |
| 3.4.3. | Calling Line Indication..... | 83 |
| 3.4.3.1. | CLIR Service Status..... | 83 |
| 3.4.3.2. | Restrict/Allow Caller Line ID Indication..... | 83 |
| 3.4.4. | Call Barring Control..... | 85 |
| 3.4.4.1. | Lock/Unlock the Module..... | 85 |
| 3.4.4.2. | Call Barring Service Status..... | 86 |
| 3.4.4.3. | Bar/Unbar All Incoming Calls..... | 87 |
| 3.4.4.4. | Bar/Unbar Incoming Calls in International Roaming..... | 88 |
| 3.4.4.5. | Bar/Unbar All Outgoing Calls..... | 89 |
| 3.4.4.6. | Bar/Unbar All Outgoing International Calls..... | 90 |
| 3.4.4.7. | Bar/Unbar All Outgoing International Calls except to Home Country..... | 91 |
| 3.4.4.8. | Unbar All Calls..... | 92 |
| 3.5. | DTMF Tones..... | 94 |
| 3.5.1. | DTMF Decoder..... | 95 |
| 3.6. | GSM Power Saving Modes..... | 98 |
| 3.7. | SMS Management..... | 104 |
| 3.7.1. | Select SMS Format Type..... | 104 |
| 3.7.1.1. | Set Text Mode Parameters..... | 105 |
| 3.7.1.2. | Character Sets..... | 106 |
| 3.7.1.3. | IRA Character Set..... | 108 |
| 3.7.1.4. | UCS2 Character Set..... | 109 |
| 3.7.2. | Read SMSC Number..... | 110 |
| 3.7.3. | Set SMSC Number..... | 110 |
| 3.7.4. | Select/Check SMS Memory..... | 111 |
| 3.7.5. | Select Message Indication..... | 113 |
| 3.7.6. | Write a new SMS..... | 115 |
| 3.7.7. | Send a Stored SMS..... | 118 |
| 3.7.8. | Send a New SMS without Storing It..... | 119 |
| 3.7.9. | Send a New SMS using GPRS service..... | 120 |
| 3.7.10. | Delete an SMS..... | 122 |
| 3.7.11. | Read an SMS..... | 123 |
| 3.7.12. | SMS Status..... | 124 |
| 3.7.13. | Cell Broadcast Service..... | 126 |
| 3.7.14. | Read concatenated SMS..... | 127 |
| 3.8. | GPIO Pins..... | 129 |
| 3.8.1. | Set GPIO Pin as OUTPUT..... | 129 |
| 3.8.2. | Set GPIO Pin as INPUT..... | 132 |
| 3.8.3. | GPIO Pin Status..... | 132 |
| 3.8.4. | GPIO & Alternate Function..... | 133 |
| 3.8.4.1. | GPIO4 Pin as RF Transmission Control..... | 133 |
| 3.8.4.2. | GPIO5 Pin as RFTXMON OUTPUT..... | 133 |
| 3.8.4.3. | GPIO6 Pin as ALARM OUTPUT..... | 134 |
| 3.8.4.4. | GPIO7 Pin as BUZZER OUTPUT..... | 134 |
| 3.8.4.5. | Set STAT_LED GPIO..... | 135 |
| 3.8.4.6. | Set "Jam" GPIO..... | 135 |



| | | |
|-----------|---------------------------------------|------------|
| 3.8.5. | Clock and Alarm Functions | 137 |
| 3.8.5.1. | Set Module Clock..... | 138 |
| 3.8.5.2. | Read the Current Date and Time..... | 138 |
| 3.8.5.3. | Set Alarm Time | 139 |
| 3.8.5.4. | Postpone Alarm Time | 143 |
| 3.8.5.5. | Stop Alarm Activity | 143 |
| 3.8.5.6. | Alarm Status..... | 144 |
| 3.8.5.7. | A simple Alarm Application | 144 |
| 4. | Firmware Update Tool | 146 |
| 4.1. | Xfp Tool..... | 146 |
| 4.1.1. | Upgrade Procedure | 146 |
| 4.1.1.1. | Command Line running Xfp tool | 149 |
| 5. | Document History | 151 |
| 6. | Abbreviation and acronyms..... | 152 |



Figures

| | |
|--|-----|
| fig. 1: RTS/CTS control lines | 14 |
| fig. 2: RTS control line..... | 15 |
| fig. 3: CTS control line..... | 16 |
| fig. 4: TTY device – module connection | 69 |
| fig. 5: Control Serial lines | 103 |
| fig. 6: CFUN Mode vs. DTR event | 103 |

Tables

| | |
|--|-----|
| Tab. 1: Products, Software Versions and Interface Style supported..... | 2 |
| Tab. 2: SIM/USIM..... | 30 |
| Tab. 3: DTMF tones | 94 |
| Tab. 4: CFUN modes | 102 |
| Tab. 5: GPIO pins description | 131 |



1. Introduction

The purpose of this document is to describe the more significant standard and proprietary AT commands supported by Telit Modules. Several module functions are taken into consideration and for each one of them the pertaining AT commands are described by mean of examples.

1.1. Scope

The Tab. 1 summarizes the Telit Modules and the relating Software Versions covered by the present document.

1.2. Audience

This User Guide is intended for users that need to learn and try quickly standard and proprietary AT commands provided by the Telit Modules. The reader can approach to the AT commands by means of the examples showed by the present document and then deepen the interested AT commands reading the documents [1], [17].

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-EMEA@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. Related Documents

- [1] AT Commands Reference Guide, Telit document: 80000ST10025a
- [2] Refer to the specific “Telit Product Description” document
- [3] Refer to the specific “Telit Hardware User Guide” document
- [4] Easy GPRS User Guide, Telit document: 80000ST10028
- [5] ETSI GSM 07.07, 27.07
- [6] EVK2 User Guide, Telit document: 1vv0300704
- [7] ETSI GSM 03.38, 23.038
- [8] /
- [9] Device Requirements AT&T, Document Number 13340
- [10] /
- [11] /
- [12] ITU-T Recommendation E.164
- [13] ETSI GSM 11.11, 51.011, 31.101, 31.102
- [14] ITU-T Recommendation V.24
- [15] UC864/CC864 Windows 2000, XP and Vista Driver, Telit document: 1vv0200903.
- [16] ETSI GSM 11.14, 51.014
- [17] HE910 AT Commands Reference Guide, Telit document: 80378ST10091A
- [18] /
- [19] ETSI GSM 27.005
- [20] Telit’s Easy Scan, User Guide, Telit document: 1vv0300972



2. Basic Operations

Before dealing with the description of the AT commands examples, it is advisable to define a way to point out the differences, if any, among modules belonging to different families, or having different software versions. The rules listed below will be used:

- Under *GSM/GPRS Standards* label are reported features and AT commands examples concerning the modules supporting the GSM/GPRS standards. Where needed, software version is specified.
- Under *HSPA-GSM/GPRS Standards* label are reported features and AT commands examples concerning the modules supporting the HSPA-GSM/GPRS standards. Where needed, software version is specified.
- If features and AT command examples are not concerning a specific product but are generally valid, no labels are indicated.

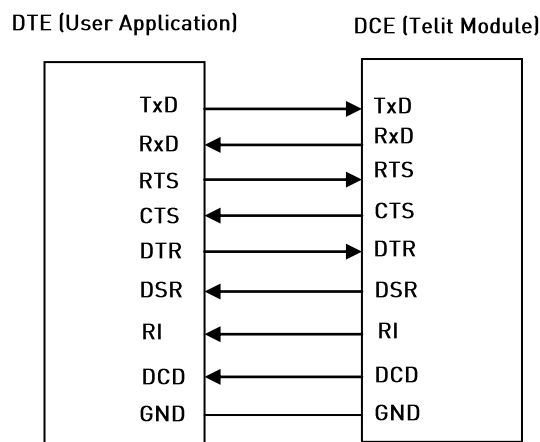


WARNING: AT commands syntax is described in the documents [1] and [17] in accordance with the used module. The AT commands described in this guide refer to the #SELINT=2 AT Interface Style.



2.1. RTS/CTS handshaking

For reader convenience hereafter is showed the V.24 serial interface provided by the Telit Modules.



After power on, the Telit Module is ready to receive AT commands on its Main Serial Port. In general, its second serial port, called Auxiliary, is used for factory test. To have more hardware information refer to [3] in accordance with the module under test. The figures below show the RTS/CTS handshaking of the Main Serial Port:

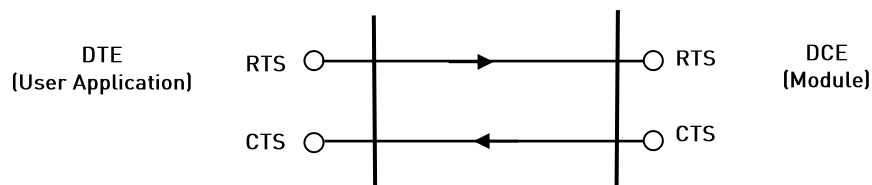


fig. 1: RTS/CTS control lines



GSM/GPRS Standards

RTS control line

The RTS control line indicates permission to the DCE (module) to send data to the DTE (user equipment). The RTS (output) of DTE is checked by the module every GSM TDMA frame (4.61 ms). As soon as the RTS of the DTE is detected as not asserted, the module immediately stops the transmission of the bytes toward the DTE.

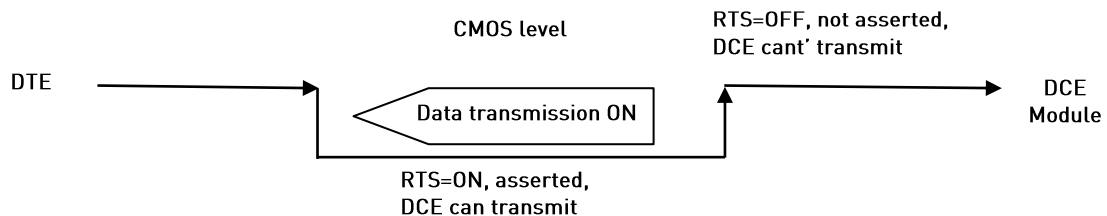


fig. 2: RTS control line

The maximum number of characters that Telit Module can send to the DTE after the transaction RTS asserted to RTS NOT asserted depends upon the used serial port speed. In any case, to take into account delays due to software tasks priorities it is necessary to consider a detection interval equal to $4,61 \times 2 = 9,22$ ms.

Example:

- at 115200 8N1 the maximum number of transmitted characters (bytes) by DCE is 107:
 $115200 \text{ 8N1} \Rightarrow 115200 \text{ bit/s} = 11520 \text{ char/s} = 11.52 \text{ char/ms} = 106.2 \text{ char/GSM frame} \times 2$;
- at 57600 8N1 the maximum number of transmitted characters (bytes) by DCE is 54;
- at 9600 8N1 the maximum number of transmitted characters (bytes) by DCE is 9.



NOTE: for the GE910-QUAD the maximum number of transmitted bytes is 288, regardless the selected baud rate.



HSPA-GSM/GPRS Standards

RTS control line

The RTS control line indicates permission to the DCE (module) to send data to the DTE (user equipment). The low-high RTS transition generates an interrupt signal. Between the RTS transition and the interrupt signal recognition the module can send at most one character toward DTE.

GSM/GPRS Standards, HSPA-GSM/GPRS Standards

CTS control line

The CTS control line indicates permission to the DTE (user equipment) to send data to the DCE (module). The CTS (output) of the DCE is not asserted when the data in its receiver buffer is greater than 75% of its capacity, the DTE transmission is stopped. The CTS is asserted when data in the receiver buffer of the module is lower than 25% of its capacity, the DTE transmission starts again.

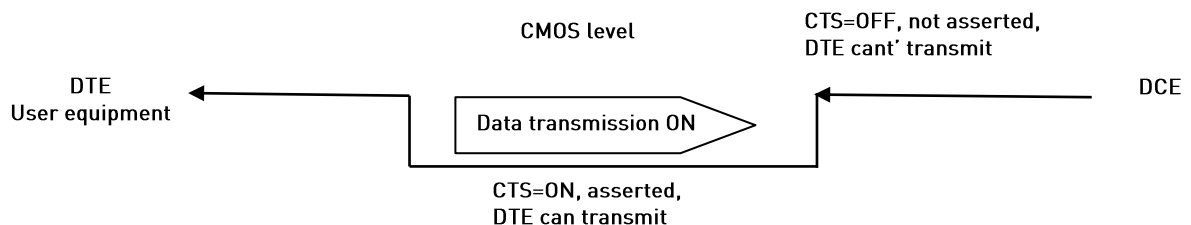


fig. 3: CTS control line



2.2. Module Identification

Use the following AT command (as example) to verify if the DTE/DCE connection is working. Refer to chapter 2.5 to see the factory setting of the Main Serial Port speed of the module (DCE).

AT
OK

Use the following AT commands to verify the Software Versions and Telit Module Identification:

- **AT+CGMR:** Returns the Software Versions information
- **AT+CGMM:** Returns the Telit Module identification

Examples

Check the Software Versions

AT+CGMR
10.00.004
OK

Check the Module Identification

AT+CGMM
GM862-QUAD
OK

Check the Module Identification

AT+CGMM
HE910-EU
OK



2.3. AT Interface Style Selection

Use the following AT command to check the current AT Interface Style:

AT#SELINT?

GSM/GPRS Standards

Examples

After powering ON the module, check the current AT command Interface Style:

AT#SELINT?

#SELINT: 0

OK

Check the AT command Interfaces Set supported:

AT#SELINT=?

#SELINT: (0-2)

OK

Select the desired AT command Interface Set:

AT#SELINT=2

OK

Select a wrong AT command Interface Set just to see the response:

AT#SELINT=7

ERROR

Check which AT command Interface is active:

AT#SELINT?

#SELINT: 2

OK

HSPA-GSM/GPRS Standards

Check the supported AT Command Interface Style:

AT#SELINT=?

#SELINT: (2)

OK

← a single interface style: 2



2.4. Enable Extended Error Result codes

Disable the Error Report in numerical and verbose format:

AT+CMEE=0
OK

Enable the Error Report in numerical format:

AT+CMEE=1
OK

Enable the Error Report in verbose format:

AT+CMEE=2
OK

2.5. Main Serial Port Speed Configuration

| Standards (refer to Tab. 1) | Software Version equal/greater than: | Main Serial Port Speed Configuration |
|--------------------------------|--------------------------------------|--------------------------------------|
| GSM/GPRS | 10.00.xx5, 16.00.xx2 | Autobauding |
| GSM/GPRS | 13.00.xx2 | No autobauding, use 115200 bit/sec |
| HSPA-GSM/GPRS | 12.00.xx.2 | No autobauding, use 115200 bit/sec |

GSM/GPRS Standards

Use the following AT command to specify the Main Serial Port speed:

AT+IPR=<rate>

Examples

Check the current Main Serial Port speed (factory setting: autobauding = 0):

AT+IPR?
+IPR: 0
OK

Check the Main Serial Port speed range:



Software versions: 10.xx.xxx, 16.xx.xxx

AT+IPR=?

+IPR:

(0,300,1200,2400,4800,9600,19200,38400,57600,115200),(0,300,1200,2400,4800,9600,19200,38400,57600,115200)

OK

Software version 13.xx.xxx

AT+IPR=?

+IPR: (300,1200,2400,4800,9600,19200,38400,57600,115200,230400,460800,921600)

OK

Set up the Main Serial Port speed to 38400 bps:

AT+IPR=38400

OK

Before entering the following AT commands set up the DTE serial port speed to 38400 bps

AT&W0 ← store the setting on profile 0

OK

AT&P0 ← at power on use profile 0

OK

Check the current Main Serial Port speed.

AT+IPR?

+IPR: 38400

OK



HSPA-GSM/GPRS Standards

Use the following AT command to specify the Main Serial Port:

AT+IPR=<rate>

Examples

Check the current Main Serial Port speed (factory setting = 115200 bit/sec):

AT+IPR?

+IPR: 115200

OK

Check the Main Serial Port speed range:

AT+IPR=?

+IPR: (300,1200,2400,4800,9600,19200,38400,57600,115200)

OK

Set up the Main Serial Port speed of to 38400 bps:

AT+IPR=38400

OK

Before entering the following AT commands set up the DTE serial port to 38400 bps

AT&W0

← store the setting on profile 0

OK

AT&P0

← at power on use profile 0

OK

Check the current Main Serial Port speed.

AT+IPR?

+IPR: 38400

OK



2.6. Auxiliary Serial Port Arrangement

GSM/GPRS Standards

Use the following AT command to connect/disconnect the Auxiliary Serial Port to/from one of the three Services:

- AT1 Parser (Instance # 2)
- AT2 Parser (Instance # 3)
- Trace Service

AT#SII = <inst>

Examples

AT#SII?

#SII: 0 ← the Auxiliary Serial Port is connected to Trace Service; see the table below
OK

AT#SII=1 ← Auxiliary Serial Port is disconnected from Trace Service and connected to AT1
OK parser. Main Serial Port is still connected to AT0 Parser as showed on the table.

| Power on / AT#SII | | | | |
|-------------------|--------------------|--------------------|--------------------|------------------|
| | AT0 Instance #1 | AT1 Instance #2 | AT2 Instance #3 | Trace Service |
| Power on | Main Serial Port | X | X | Aux. Serial Port |
| AT#SII=1 | Main Serial Port | Aux. Serial Port | X | X |
| AT#SII=2 | Main Serial Port | X | Aux. Serial Port | X |
| AT#SII=0 | Main Serial Port | X | X | Aux. Serial Port |

Refer to [3], in accordance with the module under test, to know detailed information concerning the Main Serial Port and Auxiliary Serial Port provided by Telit Modules .



2.7.

GSM/GPRS Standards

The following AT command selects the Cellular Network: the only valid value is 12. It selects the single supported technology: GSM digital cellular (GERAN):

AT+WS46=12

OK

HSPA-GSM/GPRS Standards

The following AT command selects the Cellular Network:

AT+WS46=[<n>]

Examples

Select GSM digital cellular (GERAN)

AT+WS46=12

OK

Select UTRAN only

AT+WS46=22

OK

Select 3GPP System (both GERAN and UTRAN)

AT+WS46=25

OK



NOTE: the <n> parameter is stored on NVM and the command will take effect on the next power on. If on the air are present both technologies GERAN and UTRAN, the second one is preferred.



2.8. Band Configuration

GSM/GPRS Standards

The following AT command enables the automatic band selection:

AT#AUTOBND=2
OK

The following AT command disables the automatic band selection (manual band selection):

AT#AUTOBND=0
OK

In manual band selection the following AT command selects the current band:

AT#BND=[<band>]

Examples

AT#BND=0 ← selected band: GSM 900MHz + DCS 1800MHz
OK

HSPA-GSM/GPRS Standards

The following AT command enables the automatic band selection:

AT#AUTOBND=2
OK

The following AT command disables the automatic band selection (manual band selection):

AT#AUTOBND=0
OK

In manual band selection the following AT command selects the current band for both technologies GERAN and UTRAN:

AT#BND=[<band>][,<UMTS band>]

Examples

AT#BND=0,0 ← selected band: GSM 900MHz + DCS 1800MHz 2100 MHz (FDD I)
OK





NOTE: the module uses a band out of the two entered with the previous command. The selected band will be in accordance with the +WS46 command and the technologies available on the air.

Check the bands supported by the module

AT#BND=?

#BND: (0-3),(0-6)

OK

2.9. Software Shutdown

Enter the following AT command:

AT#SHDN

OK

During shutdown the module executes the following actions:

- Detachment from the network
- Module Power off

To get more information about procedure and timing refer to [3] in accordance with the module under test.



2.10.1. SIM Presence and PIN Request

AT+CPIN?

Assume that the SIM is inserted into the module and the PIN code is needed.

AT+CPIN?

AT+CPIN?

AT+CPIN?

AT+CPIN?

AT+CPIN=<pin>



Examples

Assume to enter a wrong PIN code, and Extended Error result is not enabled.

AT+CPIN=1235
ERROR

Now, enter the right PIN code:

AT+CPIN=1234
OK

Enable Verbose Extended error result code:

AT+CMEE=2
OK

Enter a wrong PIN code:

AT+CPIN=1235
+CME ERROR: incorrect password.



NOTE: after 3 PIN code failed attempts, the PIN code is no longer requested and the SIM is locked. Use SIM PUK to enter a new PIN code and unlock the SIM.

2.10.3. Enter PUK code

Enter the following AT command if PUK or PUK2 code is required:

AT+CPIN=<pin>[,<newpin>]



NOTE: after 10 PUK code failed attempts, the SIM Card is locked and no longer available.

2.10.4. SIM Status

Use the following AT command to enable/disable the SIM Status Unsolicited Indication.

AT#QSS = <mode>

Example 1

Enable the unsolicited indication concerning the SIM status change.

AT#QSS=1 ← enable URCs: #QSS:0/1
OK



#QSS: 1 ← unsolicited indication: the SIM is inserted.

AT#QSS=2 ← enable URCs: #QSS:0/1/2/3
OK

AT+IPR=19200 ← select the Main Serial Port speed = DTE speed
OK

AT&W0 ← store the setting on profile 0
OK

AT&P0 ← at Power on use profile 0
OK

Now, power off the module:

#QSS:1 ← unsolicited indication: SIM inserted

Now, power on the module:

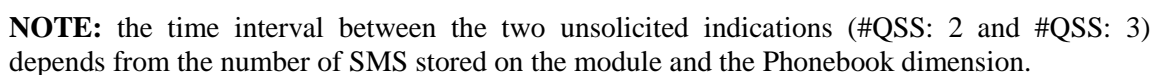
#QSS:1 ← unsolicited indication: SIM inserted

AT+CPIN?
+CPIN: SIM PIN ← SIM is locked
OK

AT+CPIN=<PIN> ← enter PIN
OK

#QSS: 2 ← unsolicited indication: SIM is unlocked

#QSS: 3 ← unsolicited indication: SMS and Phonebook are accessible



2.10.5. SIM Detection Mode

Use the following AT command to manage the SIM Detection Mode:

AT#SIMDET=<mode>

Example

AT#SIMDET?
#SIMDET: 2,1
OK

2 = automatic SIM detection through SIMIN pin (Factory Setting)
1 = SIM inserted

Enable the unsolicited indication concerning the SIM status change.
AT#QSS=1

Now, extract the SIM

#QSS: 0 ← unsolicited indication: SIM is extracted

Now, insert the SIM

#QSS: 1 ← unsolicited indication: SIM is inserted

AT#SIMDET=0 ← simulate SIM not inserted, but it is still physically inserted
OK

#QSS: 0 ← unsolicited indication, but SIM is **NOT** physically extracted

AT#SIMDET?
#SIMDET: 0,1 ← 0 = simulate the status SIM not inserted, 1 = SIM is physically inserted
OK

Now, extract/insert the SIM, no unsolicited indication appears on DTE!

Extract the SIM again

AT#SIMDET=1 ← simulate SIM inserted, but it is still physically extracted
OK



AT#SIMDET?

#SIMDET: 1,0 ← 1 = simulate the status SIM inserted, 0 = SIM is physically not inserted
OK

Now, insert/extract the SIM, no unsolicited indication appears on DTE!

Extract the SIM and set automatic SIM detection

AT#SIMDET=2

OK

AT#SIMDET?

#SIMDET: 2,0 ← 2 = automatic SIM detection through SIMIN pin (Factory Setting),
0 = SIM not inserted

Now, insert/extract the SIM, unsolicited indication appears again on DTE!

#QSS: 1 ← unsolicited indication: SIM is physically inserted

#QSS: 0 ← unsolicited indication: SIM is physically extracted

2.10.6. SIM/USIM Access File

SIM and USIM devices are accessible using two different protocols. A generic device can support one or both protocols. Telit Modules, in accordance with the installed software version, can access only SIM or both SIM/USIM cards; refer to the table showed below:

| Standards (refer to Tab. 1) | Software Version equal/greater than: | Cards supported | Support mode |
|--------------------------------|---|-----------------|--|
| GSM/GPRS | 10.00.xx5, 13.00.xx3, 16.00.xx2 | SIM/USIM | AT#ENASIM ² |
| HSPA-GSM/GPRS | 12.00.xx.2 | SIM/USIM | Automatic detection: if the used card provides both protocols, the module selects the USIM protocol (it is the preferred). |

Tab. 2: SIM/USIM

² AT#ENASIM=0 enables SIM protocol (factory setting) , AT#ENASIM=1 enables USIM protocol.



AT+CSIM=<length>,<command>

AT+CSIM=1
OK

● ● ● ●

• • • •

← Unlock SIM interface

2.10.7.

GSM/GPRS Standards

AT+CRSM=<command>[,<file id>[,<P1>,<P2>,<P3>[,<data>]]]

The **#SNUM** is an AT command more “user friendly”. In addition, it is valid also for USIM card, see the following example:

Before entering the MSISDN in international phone number format, it is mandatory to enter the command **#ENS=1**. It is worth to remind that the following command enable the functionalities described on paragraph 2.11.7.

AT#ENS=1
OK

Write phone number and memo string

AT#SNUM=1,"+393X912Y45Z7","MY NUMBER"
OK

If the functionalities activated with **#ENS=1** are not needed enter the command **#ENS=0**.

AT#ENS=0
OK

Read phone number and memo string

AT+CNUM
+CNUM: "MY NUMBER", "+393X912Y45Z7", 145
OK

HSPA-GSM/GPRS Standards

Example

Select the "ON" storage:

AT+CPBS="ON"
OK

Write a new record on the selected storage:

AT+CPBW=1,"+393X912Y45Z7",145,"MyNumber"
OK

Read the just entered number:

AT+CPBF="MyNumber"
+CPBF: 1, "+393X912Y45Z7", 145, " MyNumber "
OK



2.10.8. Preferred Operator List

Use the following AT command to manage the Preferred Operator List stored on SIM.

GSM/GPRS Standards

AT+CPOL=[<index>][,<format>[,<oper>]]

Examples

Check the supported number of operators in the SIM Preferred Operator List and the format:

AT+CPOL=?

+CPOL: (1-20),(2) ← The used SIM supports 20 positions; the supported format (2) is
OK numeric

Reading the entire list:

AT+CPOL?

+CPOL: 1,2,"20801"

+CPOL: 2,2,"20810"

+CPOL: 3,2,"23205"

+CPOL: 4,2,"22802"

+CPOL: 5,2,"29341"

.

+CPOL: 19,2,"23802"

+CPOL: 20,2,"24201"

OK

The meaning of the string "XXXYY" is: - XXX = Mobile Country Code

- YY = Mobile Network Code

Delete the first entry using a non-existent <format> value just to see the response when the Extended Error result code is enabled:

AT+CPOL=1,3

+CME ERROR: operation not supported

Now, delete the first entry using the right <format> value:

AT+CPOL=1,2

OK



Check if the first entry is deleted:

AT+CPOL?

+CPOL: 2,2,"20810"

+CPOL: 3,2,"23205"

.

+CPOL: 19,2,"23802"

+CPOL: 20,2,"24201"

OK

The entry on first position is deleted

AT+CPOL=1,2,20801

← Write a new entry in the first position

OK

Check if the new entry is written on first position:

AT+CPOL?

+CPOL: 1,2,"20801"

← The new entry is written on first position

+CPOL: 2,2,"20810"

.

+CPOL: 20,2,"24201"

OK

HSPA-GSM/GPRS Standards

AT+CPOL=[<index>][,<format>[,<oper>[,<GSM_Act>,<GSM_Compact_Act>,<UTRAN_Act>]]]

Examples

Check the supported number of operators in the SIM preferred operator list and the format:

AT+CPOL=?

+CPOL: (1-35),(2)

← The used SIM supports 35 positions; the supported format (2) is numeric

OK

AT+CPOL?

+CPOL: 1,2,"20801",1,0,1

+CPOL: 2,2,"21407",1,0,1

.

+CPOL: 35,2,"73001",1,0,1

OK



2.11. Network Information

2.11.1. Network Status

Enter the following AT command to verify if the module is registered on a Network:

AT+CREG?

GSM/GPRS Standards

Examples:

AT+CREG? ← Check if the module is registered
+CREG: 0,1 ← Yes, it is.
OK

Now, disconnect the antenna from the module and enter again the command:

AT+CREG?
+CREG: 0,3
OK

Connect again the antenna to the module and select the Network Registration Report format: Local Area Code and Cell Id:

AT+CREG=2
OK

AT+CREG?
+CREG: 2,1,55FA,12EB
OK

Now, enter a wrong parameter just to see the result format when Verbose Extended Error result is enabled:

AT+CREG=9
+CME ERROR: operation not supported

HSPA-GSM/GPRS Standards

Let's suppose that GERAN and UTRAN technologies are present on the air.

Example

Force the module in GSM/GPRS mode.

AT+WS46=12
OK



Select the Network Registration Report format: Local Area Code and Cell Id:

AT+CREG=2
OK

AT+CREG?
+CREG: 2,1,"D5BD","520F",0
OK

Example

Use the command AT+WS46=22 or AT+WS46=25 to force the module in HSPA mode.

AT+WS46=25
OK

Select the Network Registration Report format: Local Area Code and Cell Id:

AT+CREG=2
OK

AT+CREG?
+CREG: 2,1,"EF8D","52D2388",2
OK

2.11.2. Network Operator Identification

Use the following AT command to query the mobile for Network Operators Identifications Codes and Names:

AT+COPS=?

GSM/GPRS Standards

Examples

Assume that the module is registered on some Network:

AT+COPS=?
+COPS: (2,"I WIND",,"22288"),(3,"vodafone IT",,"22210"),(1,"SI.MOBIL",,"29340"),,(0-4),(0,2)
OK

Now, disconnect the antenna and assume that Verbose Extended Error result is enabled. Enter again the previous AT command:

AT+COPS=?
+CME ERROR: no network service



HSPA-GSM/GPRS Standards

Let's suppose that GERAN and UTRAN technologies are present on the air.

Example

Force the module in GSM/GPRS mode.

AT+WS46=12

OK

Check if the module is in GSM/GPRS mode

AT+COPS?

+COPS: 0,0,"I TIM",0

OK

Yes, it is.

Collect information about GERAN Networks:

AT+COPS=?

+COPS: (2,"I TIM",,"22201",0),(1,"SI MOBITELE GSM",,"29341",0),(3,"I WIND",,"22288",0),(3,"vodafone IT",,"22210",0),(1,"SI VEGA 070",,"29370",0),(1,"SI.MOBIL",,"29340",0),,(0-4),(0,2)

OK

Example

Use the command AT+WS46=22 or AT+WS46=25 to force the module in HSPA mode.

AT+WS46=25

OK

Check if the module is in HSPA mode

AT+COPS?

+COPS: 0,0,"I TIM",2

OK

Yes, it is.

Collect information about UTRAN and GERAN Networks:

AT+COPS=?

+COPS: (2,"I TIM",,"22201",2),(2,"I TIM",,"22201",0),(1,"SI MOBITELE GSM",,"29341",0),(3,"I WIND",,"22288",2),(1,"SI.MOBIL",,"29340",0),(1,"3 ITA",,"22299",2),(3,"vodafone IT",,"22210",2),(3,"I WIND",,"22288",0),(3,"vodafone IT",,"22210",0),(1,"SI VEGA 070",,"29370",0),,(0-4),(0,2)

OK



2.11.3. Signal Strength & Quality

Assume that the mobile is registered on a Network that can be: GERAN or UTRAN. The following AT command can be useful to know the received signal strength & quality to have an indication about the radio link reliability.

AT+CSQ

Examples

Assume that the antenna is not connected to the Telit Module or Network coverage is not present at all.

AT+CSQ

+CSQ: 99,99

OK

Now, the antenna is connected to the Telit Module and Network coverage is present. Enter again the previous AT command:

AT+CSQ

+CSQ: 17,0

OK

17 = <rssi> = Received Signal Strength Indication

0 = <ber> = Bit Error Rate

Now, a wrong parameter is entered just to see the result format when Verbose Extended Error result is enabled

AT+CSQ?

+CME ERROR: operation not supported

2.11.4. Fast Network Status Check

Once the Telit Module is registered on a Network, doesn't matter about the technology (GERAN or UTRAN), it could be useful to know the received signal strength and the Network on which the Telit Module is registered. This information can be gathered by means of the following standard AT commands: +CREG, +COPS and +CSQ. These commands are not fast in the response due to Network response time, especially the +COPS command.

If the User objective is to keep its Software Application as general as possible, he can use the standard AT commands above mentioned and described on the previous paragraphs.



In addition, Telit Modules provide the user with proprietary AT commands to gather all the information needed in a faster and simpler way, they are:

- #MONI
- #SERVINFO

Use the following AT command to select cells and collect their information:

AT#MONI[=[<number>]]

GSM/GPRS Standards

The following examples are valid also for *HSPA-GSM/GPRS Standards* when the module is forced in GSM mode by means of the command AT+WS46=12.

Examples

Assume that the antenna is connected to the module and only serving cell information is needed.

Check if the module is using GSM/GPRS standard:

AT+COPS?
+COPS: 0,0,"I TIM",0
OK

Yes, it is using GSM standard. The last parameter displayed by the command response is reported only by the *HSPA-GSM/GPRS Standards*, it gives information concerning access technology.

Select the Serving Cell:

AT#MONI=0
OK

Collect information:

AT#MONI
#MONI: I WIND BSIC:70 RxQual:0 LAC:55FA Id:12EB ARFCN:979 PWR:-75dbm TA:0
OK

The module is registered on "I WIND" Network, the signal strength is -75dBm.

Now, disconnect the antenna from the module and trying to collect cell information just to see the format response:

AT#MONI
ERROR
OK



The antenna is again connected to the module and Serving Cell and Neighboring Cells information is needed.

Select all available cells:

AT#MONI=7
OK

Collect information:

AT#MONI

| #MONI: | Cell | BSIC | LAC | CellId | ARFCN | Power | C1 | C2 | TA | |
|--------|------|------|--------|--------|-------|----------|----|----|-----|--------|
| | | | RxQual | PLMN | | | | | | |
| #MONI: | S | 70 | 55FA | 12EB | 979 | -75 dbm | 29 | 29 | 0 0 | I WIND |
| #MONI: | N1 | 75 | 55FA | 1297 | 983 | -86 dbm | 18 | 18 | | |
| #MONI: | N2 | 70 | 55FA | 12EA | 985 | -87 dbm | 17 | 17 | | |
| #MONI: | N3 | 73 | 55FA | 1D23 | 754 | -100 dbm | 2 | 16 | | |
| #MONI: | N4 | 72 | 55FA | 12EC | 977 | -101 dbm | 3 | 3 | | |
| #MONI: | N5 | 72 | 55FA | 1D0D | 751 | -107 dbm | -5 | -5 | | |
| #MONI: | N6 | FF | FFFF | 0000 | 1007 | -107 dbm | -1 | -1 | | |

OK

HSPA-GSM/GPRS Standards

Let's suppose that the UTRAN technology is present on the air. Use the command AT+WS46=22 or AT+WS46=25 to force the module in HSPA mode.

Examples

Check if the module is using HSPA standard:

AT+COPS?
+COPS: 0,0,"I TIM",2
OK

Yes, it is using HPSA standard.

Select the Serving Cell:

AT#MONI=0
OK

Collect information:



AT#MONI

```
#MONI: I TIM PSC:49 RSCP:-102 LAC:EF8D Id:52D2388 EcIo:-2.5 UARFCN:10638 PWR:-97 dbm DRX:64 SCR:784  
OK
```

Use the following AT command to collect only the Serving Cell Information:

AT#SERVINFO

This Modules Family provides also this command to get the current network status:

AT#RFSTS

```
#RFSTS: "222 01",10638,49,-5.0,-95,-85,EF8D,00,-128,128,19,4,2,,52D2388,"2220170  
02413217","I TIM",3,0  
OK
```

GSM/GPRS Standards

The following examples are valid also for ***HSPA-GSM/GPRS Standards*** when the module is forced in GSM mode by means of the command AT+WS46=12.

Examples

Collect only the Serving Cell Network Information:

AT#SERVINFO

```
#SERVINFO: 979,-75,"I WIND","22288",70,55FA,00,1,,"II",01,6
```

HSPA-GSM/GPRS Standards

Let's suppose that the UTRAN technology is present on the air. Use the command AT+WS46=22 or AT+WS46=25 to force the module in HSPA mode.

Examples

Collect only the Serving Cell Network Information:

AT#SERVINFO

```
#SERVINFO: 10638,-94,"I TIM","22201",49,EF8D,64,3,-101,"II",00  
OK
```





NOTE: #MONI and #SERVINFO commands should be used only to collect Network Name and Signal Strength information. To check if mobile is registered or is looking for a suitable network to register on, use +CREG command. In fact, if the network signal is too weak and mobile loses the registration, until a new network is found the two commands report the last measured valid values and not the real ones. The TA (timing advance parameter) is valid only during a call. Check network registration with +CREG command. When mobile is registered, query the mobile for network operator name and signal strength with #MONI command.

2.11.5. Network Survey

Use the following AT command to perform a quick survey through channels belonging to the current band (it is not supported by *HSPA-GSM/GPRS Standards*), refer to [20]:

AT#CSURV [=<s>,<e>]

Examples

AT#BND?

#BND: 0

OK

AT#CSURV=4,8

Network survey started ...

arfcn: 7 bsic: 18 rxLev: -78 ber: 0.00 mcc: 222 mnc: 01 lac: 54717 cellId: 21007 cellStatus:
CELL_SUITABLE numArfcn: 3 arfcn: 7 13 27

arfcn: 4 bsic: 16 rxLev: -85 ber: 0.00 mcc: 222 mnc: 01 lac: 54717 cellId: 21094 cellStatus:
CELL_SUITABLE numArfcn: 2 arfcn: 4 1021

arfcn: 8 rxLev: -92

arfcn: 6 rxLev: -93

arfcn: 5 rxLev: -98

Network survey ended

OK



2.11.6. BCCH Survey

Use the following AT command to perform a quick survey of the channels belonging to the current band. The survey stops as soon as <n> BCCH carriers are found. It is not supported by *HSPA-GSM/GPRS Standards*.

AT#CSURVB = [<n>]

Examples

AT#CSURVB=2

Network survey started ...

arfcn: 104 bsic: 63 rxLev: -68 ber: 0.00 mcc: 222 mnc: 88 lac: 22010 cellId: 4737 cellStatus: CELL_FORBIDDEN numArfcn: 3 arfcn: 114 989 995

arfcn: 761 bsic: 57 rxLev: -72 ber: 0.00 mcc: 222 mnc: 88 lac: 22010 cellId: 7437 cellStatus: CELL_FORBIDDEN numArfcn: 4 arfcn: 776 785 794 803

Network survey ended

OK

2.11.7. Enhanced Network Selection and AT&T functions

Use the following AT command to enable/disable the Enhanced Network Selection and the AT&T functions.

AT#ENS=[<mode>]

The features concerning this command are conditioned by the SIM card type used on the module. It is worth to remind that the factory setting is:

AT#ENS=0

OK

Using this setting, the module follows the European Standard R98/R4/R7, in accordance with the module under test.

Example

AT#ENS=1

← After module power on, enter the AT command

OK

After entering the command, it is needed to power OFF/ON the module to activate the new entered command. The following chapters describe the functionalities enabled via the AT#ENS command for each module, refer to Tab. 1.



2.11.7.1. Software Versions: greater than or equal 10.00.xx5/16.00.xx2

Configuration 1: module with no AT&T SIM cards

Assume that #ENS is set to 1. The module supports:

- EONS features (refer to [9], § 15)
- ENS features for Network selection (refer to [9], §13)
- special requirements for USSD strings (refer to [9], <CDR-GSM-255>)
- special ATD dial string format (ATDxxxxxPyyyyyy), refer to [9] <CDR-CON-3074>, <CDR-CON-3342>;
- **10.00.xx5**: if #AUTOBND=0 then, automatically, #AUTOBND is forced to 1. If #AUTOBND=2 (factory setting) no action is taken.
- **>= 10.00.xx6/16.00.xx2**: if #AUTOBND=0 then, automatically, #AUTOBND is forced to 2. If #AUTOBND=2 (factory setting) no action is taken.
- +PACSP AT command to display the PLMN Mode Bit read from CPHS file on SIM (refer to [9])
- AT#STIA=2,1 as default
- the max length of the telephone number that can be stored in SIM phonebooks is greater than the default value (20)
- AT#PLMNMODE=1 as default
- different coding and encoding for MCC and MNC for SAT functions (refer to [9])
- MWI messages (refer to [9], §16)

Configuration 2: module with an AT&T SIM card

Assume that #ENS is set to 1. The module supports the features indicated in *Configuration 1*, plus the following:

- Acting Home PLMN (refer to [9], § 12)

When **AT#ENS=1**, it is recommended to use the following setting:

AT#AUTOBND=2

AT#NITZ=7,X (X if the user wants the URC)

AT#SMSMODE=1



Regardless the SIM card used, the module supports the following features in accordance with the #ENS setting:

- Concerning Phonebook string management:

| #ENS=1 | BCD format | conversion | ASCII format |
|--------|------------------|------------|------------------|
| | 0x0D (wild char) | → | ? |
| | ? | ← | 0x0D (wild char) |
| | 0x0C | ← | P |
| | 0x0C | ← | p |

| #ENS=0 | BCD format | conversion | ASCII format |
|--------|------------------|------------|------------------|
| | 0x0D (wild char) | → | @ |
| | @ | ← | 0x0D (wild char) |
| | 0x0C | ← | P |

- #ENS=1: USSD MT event is notified via the tone associated to an SMS MT. If #ENS=0, the event is not notified via the tone, but is notified via an unsolicited message (if it is enabled).
- #ENS=1: the default GSM band parameter of #BND AT command is 3. If #ENS=0, the default GSM band parameter is 0.
- #ENS=1: #BND=1 or #BND=2 are not permitted. If #ENS=0, they are permitted.
- #ENS=1: ATD 0; and ATD 00; AT commands execute a call to the phone number 0 and 00 respectively. If #ENS=0, 0 and 00 are interpreted as USSD strings and sent to the network.
- #ENS=1: enter AT+CLCK="FD",1,PIN2 AT command to select the FD phonebook as current phonebook. If #ENS=0, enter the following commands:

AT+CPBS="FD"
ERROR

AT+CPIN=PIN2
OK

AT+CPBS="FD"



OK

In alternative of the three above listed AT commands the following one can be used:

AT+CLCK="FD",1,PIN2

- #ENS=1: after activating the context via AT+CGACT=1,<cid> AT commands, the DNS information is not received. Enter ATD*99***1# to execute the dial up. If #ENS=0, after activating the context via AT+CGACT=1,<cid> AT commands, the DNS information is received. Enter ATD*99***1# to execute the dial up.

2.11.7.2. Software Version: greater than or equal 13.00.xx2

Configuration 1: module with no AT&T SIM cards

The module supports the following features independently from the #ENS setting:

- EONS features (refer to [9], § 15)
- special requirements for USSD strings (refer to [9], <CDR-GSM-255>
- special ATD dial string format (ATDxxxxxPyyyyyy), refer to [9] <CDR-CON-3074>, <CDR-CON-3342>;
- +PACSP AT command to display the PLMN Mode Bit read from CPHS file on SIM (refer to [9])
- the max length of the telephone number that can be stored in SIM phonebooks is greater than the default value (20)

The module supports the following features when #ENS is set to 1:

- If #AUTOBND=0 then, automatically, #AUTOBND is forced to 2. If #AUTOBND=2 (factory setting) no action is taken.
- AT#BND supports only values 0 and 3
- AT#STIA=2,1 as default
- different coding and encoding for MCC and MNC for SAT functions (refer to [9])
- MWI messages (refer to [9], §16)
- ENS features for Network selection (refer to [9], §13)
- AT#PLMNMODE=1 as default



Configuration 2: module with an AT&T SIM card

Assume that #ENS is set to 1. The module supports the features indicated in **Configuration 1**, plus the following:

- Acting Home PLMN (refer to [9], § 12)

When **AT#ENS=1**, it is recommended to use the following setting:

AT#AUTOBND=2

AT#NITZ=7,X (X if the user wants the URC)

AT#SMSMODE=1

Regardless the SIM card used, the module supports the following features in accordance with the #ENS setting:

- Concerning Phonebook string management:

| #ENS=1 | BCD format | conversion | ASCII format |
|--------|------------------|------------|------------------|
| | 0x0D (wild char) | → | ? |
| | ? | ← | 0x0D (wild char) |
| | 0x0C | ← | P |
| | 0x0C | ← | p |

| #ENS=0 | BCD format | conversion | ASCII format |
|--------|------------------|------------|------------------|
| | 0x0D (wild char) | → | @ |
| | @ | ← | 0x0D (wild char) |
| | 0x0C | ← | P |

- #ENS=1: USSD MT event is notified via the tone associated to an SMS MT. If #ENS=0, the event is not notified via the tone, but is notified via an unsolicited message (if it is enabled).
- #ENS=1: the default GSM band parameter of #BND AT command is 3. If #ENS=0, the default GSM band parameter is 0.
- #ENS=1: #BND=1 or #BND=2 are not permitted. If #ENS=0, they are permitted.



- #ENS=1: ATD 0; and ATD 00; AT commands execute a call to the phone number 0 and 00 respectively. If #ENS=0, 0 and 00 are interpreted as USSD strings and sent to the network.
- #ENS=1: after activating the context via AT+CGACT=1,<cid> commands, the DNS information is not received. Enter ATD*99***1# to execute the dial up. If #ENS=0, after activating the context via AT+CGACT=1,<cid> commands, the DNS information is received. Enter ATD*99***1# to execute the dial up

2.11.7.3. Software Version: 12.00.xx2

Configuration 1: module with no AT&T SIM cards

Assume that #ENS is set to 1. The module supports:

- EONS features (refer to [9], § 15)
- special requirements for USSD strings (refer to [9], <CDR-GSM-255>
- special ATD dial string format (ATDxxxxxPyyyyyy), refer to [9] <CDR-CON-3074>, <CDR-CON-3342>;
- If #AUTOBND=0 then, automatically, #AUTOBND is forced to 2. If #AUTOBND=2 (factory setting) no action is taken.
- AT#BND supports only values 0 and 3, no restriction on second parameter
- +PACSP AT command to display the PLMN Mode Bit read from CPHS file on SIM (refer to [9])
- AT#STIA=2,1 as default
- the max length of the telephone number that can be stored in SIM phonebooks is greater than the default value (20)
- different coding and encoding for MCC and MNC for SAT functions (refer to [9])
- MWI messages (refer to [9], §16)

Configuration 2: module with an AT&T SIM card

Assume that #ENS is set to 1. The module supports the features indicated in **Configuration 1**, plus the following:

- Acting Home PLMN (refer to [9], § 12)

When **AT#ENS=1**, it is recommended to use the following setting:

AT#AUTOBND=2



AT#NITZ=7,X (X if the user wants the URC)

Regardless the SIM card used, the module supports the following features in accordance with the #ENS setting:

- Concerning Phonebook string management:

| #ENS=1 | BCD format | conversion | ASCII format |
|--------|------------------|------------|------------------|
| | 0x0D (wild char) | → | ? |
| | ? | ← | 0x0D (wild char) |
| | 0x0C | ← | P |
| | 0x0C | ← | p |

| #ENS=0 | BCD format | conversion | ASCII format |
|--------|------------------|------------|------------------|
| | 0x0D (wild char) | → | @ |
| | @ | ← | 0x0D (wild char) |
| | 0x0C | ← | P |

- #ENS=1: USSD MT event is notified via the tone associated to an SMS MT. If #ENS=0 the event is not notified via the tone, but is notified via an unsolicited message (if it is enabled).
- #ENS=1: the default GSM band parameter of #BND AT command is 3. If #ENS=0, the default GSM band parameter is 0.
- #ENS=1: #BND=1 or #BND=2 are not permitted. If #ENS=0, they are permitted.
- #ENS=1: ATD 0; and ATD 00; AT commands execute a call to the phone number 0 and 00 respectively. If #ENS=0, 0 and 00 are interpreted as USSD strings and sent to the network.
- #ENS=1: after activating the context via AT+CGACT=1,<cid> commands, the DNS information is not received. Enter ATD*99***1# to execute the dial up. If #ENS=0, after activating the context via AT+CGACT=1,<cid> commands, the DNS information is received. Enter ATD*99***1# to execute the dial up



2.11.7.4. Software Version: greater than or equal 12.00.xx3

Configuration 1: module with no AT&T SIM cards

The module supports the following features independently from the #ENS setting:

- EONS features (refer to [9], § 15)
- special requirements for USSD strings (refer to [9], <CDR-GSM-255>
- special ATD dial string format (ATDxxxxxPyyyyyy), refer to [9] <CDR-CON-3074>, <CDR-CON-3342>;
- +PACSP AT command to display the PLMN Mode Bit read from CPHS file on SIM (refer to [9])
- the max length of the telephone number that can be stored in SIM phonebooks is greater than the default value (20)

The module supports the following features when #ENS is set to 1:

- If #AUTOBND=0 then, automatically, #AUTOBND is forced to 2. If #AUTOBND=2 (factory setting) no action is taken.
- AT#BND supports only values 0 and 3, no restriction on second parameter
- AT#STIA=2,1 as default
- different coding and encoding for MCC and MNC for SAT functions (refer to [9])
- MWI messages (refer to [9], §16)

Configuration 2: module with an AT&T SIM card

Assume that #ENS is set to 1. The module supports the features indicated in **Configuration 1**, plus the following:

- Acting Home PLMN (refer to [9], § 12)

When **AT#ENS=1**, it is recommended to use the following setting:

AT#AUTOBND=2

AT#NITZ=7,X (X if the user wants the URC)



Regardless the SIM card used, the module supports the following features in accordance with the #ENS setting:

- Concerning Phonebook string management:

| #ENS=1 | BCD format | conversion | ASCII format |
|--------|------------------|------------|------------------|
| | 0x0D (wild char) | → | ? |
| | ? | ← | 0x0D (wild char) |
| | 0x0C | ← | P |
| | 0x0C | ← | p |

| #ENS=0 | BCD format | conversion | ASCII format |
|--------|------------------|------------|------------------|
| | 0x0D (wild char) | → | @ |
| | @ | ← | 0x0D (wild char) |
| | 0x0C | ← | P |

- #ENS=1: USSD MT event is notified via the tone associated to an SMS MT. If #ENS=0, the event is not notified via the tone, but is notified via an unsolicited message (if it is enabled).
- #ENS=1: the default GSM band parameter of #BND AT command is 3. If #ENS=0, the default GSM band parameter is 0.
- #ENS=1: #BND=1 or #BND=2 are not permitted. If #ENS=0, they are permitted.
- #ENS=1: ATD 0; and ATD 00; AT commands execute a call to the phone number 0 and 00 respectively. If #ENS=0, 0 and 00 are interpreted as USSD strings and sent to the network.
- #ENS=1: AT+CFUN=0 is the same of AT+CFUN=4. If #ENS=0, +CFUN=0 and +CFUN=4 have the standard behavior.
- #ENS=1: the Radio Policy Management (RPM) is supported. If #ENS=0, RPM is not supported.
- #ENS=1: the default class parameter is 12 (AT#MSCLASS=12). If #ENS=0, the default class parameter is 33.



- #ENS=1: the following CPC features are disabled:

- HSPA and HSPA+ 7.4 HSPA+ <CDR-HSD-491> UL DPCCH Gating (Uplink DTX)
- HSPA and HSPA+ 7.4 HSPA+ <CDR-HSD-492> E-DCH Tx Start Timer Restriction (Uplink DRX)
- HSPA and HSPA+ 7.4 HSPA+ <CDR-HSD-493> Downlink DRX
- HSPA and HSPA+ 7.4 HSPA+ <CDR-HSD-494> New UL DPCCH Slot Format
- HSPA and HSPA+ 7.4 HSPA+ <CDR-HSD-496> CQI Reporting Reduction

If #ENS=0, the features are enabled.

- #ENS=1: after power on the module executes the SIM reading and the network registration in sequential way. The call establishment is immediately available after the network registration. If #ENS=0, the module executes the SIM reading and the network registration in parallel. It can happen that the module is registered, but the reading SIM is not ended, for this reason wait for some seconds after network registration before calling.
- #ENS=1: after activating the context via AT+CGACT=1,<cid> commands, the DNS information is not received. Enter ATD*99***1# to execute the dial up. If #ENS=0, after activating the context via AT+CGACT=1,<cid> commands, the DNS information is received. Enter ATD*99***1# to execute the dial up



2.12. Voice Call Establishment - Originate

Before setting up the Voice Call, it is assumed that Telit Module is registered on a network and the signal strength is enough to carry on a reliable radio link.

2.12.1. Set Module in Voice Mode

Use the following AT command to set up the module for a Voice Call:

AT+FCLASS=8
OK



NOTE: +FCLASS=8 command may be omitted if the ";" modifier is added at the end of the ATD command, after the entered phone number.

2.12.2. Set Audio Path Active

The present section is applicable to the Telit Modules supporting one or two connections to audio devices, refer to [2], [3].

| Standards (refer to Tab. 1) | Software Version equal/greater than: | Physical audio paths supported |
|--------------------------------|---|-----------------------------------|
| GSM/GPRS | 10.00.xx5, 16.00.xx2 | HS, HF |
| GSM/GPRS | 13.00.xx2 | HS |
| HSPA-GSM/GPRS | 12.00.xx.2 | HS |

The modules that provide two audio paths, feature the capability to switch between them using two modes: software and hardware.

Use the following AT command to switch between the audio paths (when the used module provides two physical audio paths).

AT#CAP=<n>
OK



Examples 1:**AT#CAP=2**
OK

← Use software mode to select HS audio path

Examples 2**AT#CAP=1**
OK

← Use software mode to select HF audio path

Examples 3**AT#CAP=0**
OK

← Use hardware mode to select audio path

After entering the previous command, select the audio path by means of the pin AXE, refer to [3]:

- pin AXE = HIGH to select HS audio path.
- pin AXE = LOW to select HF audio path.



NOTE: the audio paths can be switched also during a call in both ways. When hardware control is not used, AXE pin can be left unconnected.

GSM/GPRS Standards having Software Version 13.xx.xxx

HSPA-GSM/GPRS Standards

AT#CAP=<n> is a dummy command, returns OK response and no actions are performed by the module. It was introduced for backward compatibility reasons.



2.12.3. Set Volume on Speaker

Use the following AT command to set up the output volume level on the active audio path:

AT+CLVL=<vol>
OK

If the used module provides two audio paths (HS and HF), when moving from one path to the new one, the volume level does not change.

2.12.4. Set Microphone Mute

The microphone of the active path can be muted with the following AT command:

AT+CMUT=1
OK

Check the microphone mute setting:

AT+CMUT?
+CMUT: 1
OK



2.12.5. Hand Set Path Commands

Refer to chapter 2.12.2.

2.12.5.1. HS Microphone Gain

Use the following AT command to set up microphone input gain:

AT#HSMICG=<n>

Examples

Check the available gain levels

AT#HSMICG=?

#HSMICG: (0-7)

OK

Check the current gain level

AT#HSMICG?

#HSMICG: 0

OK

Set up a new gain level

AT#HSMICG=1

OK

2.12.5.2. HS Sidetone

Use the following AT command to enable/disable the sidetone on HS audio path.

AT#SHSSD=<mode>

Examples

Check the available values

AT#SHSSD =?

#SHSSD: (0-1)

OK

Check the current value



OK

HS Echo Canceller

Use the following AT command to enable/disable the echo canceller function on HS audio path.

AT#SHSEC=<mode>

Examples

Check the available values

OK

HS Automatic Gain

Use the following AT command to enable/disable the automatic gain control function on HS audio path.

AT#SHSAGC=<mode>

Examples

Check the available values



AT# SHSAGC =?

#SHSAGC: (0-1)

OK

Check the current value

AT# SHSAGC?

SHSAGC: 0

OK

Enable automatic gain control function

AT# SHSAGC =1

OK

2.12.5.5. HS Noise Reduction

Use the following AT command to enable/disable the noise reduction function on HS audio path.

AT#SHSNR=<mode>

Examples

Check the available values

AT# SHSNR =?

#SHSNR: (0-1)

OK

Check the current value

AT# SHSNR?

SHSNR: 0

OK

Enable the noise reduction function

AT# SHSNR =1

OK



2.12.6. Hands Free Path Commands

The Hands Free (HF) Path Commands showed on the following sub-chapters are dummy commands for the Modules that do not provide the HF audio path, refer to chapter 2.12.2. The commands return OK response and no actions are performed by the Modules. This solution was adopted for backward compatibility reasons.

2.12.6.1. HF Microphone Gain

Use the following AT command to set up the microphone input gain:

AT#HFMICG=<n>

Examples

Check the available gain levels

AT#HFMICG=?
#HFMICG: (0-7)
OK

Check the current gain level

AT#HFMICG?
#HFMICG: 0
OK

Set up a new gain level

AT#HFMICG=1
OK



2.12.6.2. HF Sidetone

Use the following AT command to enable/disable the sidetone on HF audio path.

AT#SHFSD=<mode>

Examples

Check the available values

AT#SHFSD =?

#SHFSD: (0-1)

OK

Check the current value

AT#SHFSD?

#SHFSD: 0

OK

Enable sidetone

AT#SHFSD=1

OK

2.12.6.3. HF Echo Canceller

Use the following AT command to enable/disable the echo canceller function on HF audio path.

AT#SHFEC=<mode>

Examples

Check the available values

AT#SHFEC =?

#SHFEC: (0-1)

OK

Check the current value

AT#SHFEC?

#SHFEC: 0

OK

Enable echo canceller function



AT#SHFEC=1
OK

2.12.6.4. HF Automatic Gain

Use the following AT command to enable/disable the automatic gain control function on HF audio path.

AT#SHFAGC=<mode>

Examples

Check the available values

AT# SHFAGC =?
#SHFAGC: (0-1)
OK

Check the current value

AT# SHFAGC?
SHFAGC: 0
OK

Enable automatic gain control function

AT# SHFAGC =1
OK

2.12.6.5. HF Noise Reduction

Use the following AT command to enable/disable the noise reduction function on HF audio path.

AT#SHFNRR=<mode>

Examples

Check the available values

AT# SHFNRR =?
#SHFNRR: (0-1)
OK

Check the current value



AT# SHFNR?

SHFNR: 0

OK

Enable the noise reduction function

AT# SHFNR =1

OK



2.12.7. Dialing a Phone Number

Use the following AT command to dial up a phone number.

ATD<number>[;]

Examples

Assume that the module is set in voice mode: AT+FCLASS=8 has been executed. After that, call the national number 040-4X92XYX.

ATD 0404X92XYX

OK

Now, call the national number 040-4X92XYX in international format +39-040-4X92XYX.

ATD +390404X92XYX

OK

Call the national number 040-4X92XYX in international format +39-040-4X92XYX. The module is not set in voice mode (AT+FCLASS=8 has not been executed). In this case to perform the Voice Call the User must use the “;” character at the end of the command.

ATD +390404X92XYX;

OK

2.12.8. Audio Codec Information

This example is valid for both Standards: **GSM/GPRS** and **HSPA-GSM/GPRS**. Even if the mobile is registered on UTRAN network, usually the Operator assigns to the mobile a GSM channel to carry on a voice call. Use the following AT command to get codec information about a call.

AT#CODECINFO = <format>,<mode>

OK

Example

AT#CODECINFO=1,1

← enable codec information

OK

ATD<phone number>;

#CODECINFO: "HAMR","FR","EFR","HR","FAMR","HAMR"

OK

NO CARRIER

← remote hang up

#CODECINFO: "None","FR","EFR","HR","FAMR","HAMR"



2.12.9. Setting Audio Codec

This example is valid for both Standards: **GSM/GPRS** and **HSPA-GSM/GPRS**. Even if the mobile is registered on UTRAN network, usually the Operator assigns to the mobile a GSM channel to carry on a voice call. Use the following AT command to select a codec during a call.

AT#CODEC = <codec>
OK

Example

AT#CODEC?
#CODEC: 0 ← all the codec are enabled
OK

AT#CODECINFO=1,1 ← enable codec information
OK

ATD<phone number>; ← establish the call
#CODECINFO: "HAMR", "FR", "EFR", "HR", "FAMR", "HAMR"
OK

NO CARRIER ← remote hang up
#CODECINFO: "None", "FR", "EFR", "HR", "FAMR", "HAMR"

AT#CODEC=1 ← select FR mode
OK

ATD<phone number>; ← establish the call
#CODECINFO: "FR", "FR"
OK

NO CARRIER ← remote hang up
#CODECINFO: "None", "FR"

2.12.10. Disconnect a Call

Use the following AT command to hang up the current Voice Call:

ATH
OK



2.12.11. Modules: HE910-D/DG/EUD/EUG/NAD

These modules don't feature the capability to manage Mobile Originated and Mobile Terminated Voice calls, they provide Data only.

ATD<phone number>; ← the voice call is not supported
NO CARRIER

ATA ← answer to an incoming call is not supported
ERROR

ATS0=<number of rings> ← the command is supported, but it doesn't work for OK
OK the incoming voice calls: the automatic answer is not performed.

The URC RING: even though the incoming voice call is not supported, when one is active the RING message is displayed on the DTE. The RING message persists until the call is active. Remember that: the ATA command is not available and ATS0 command doesn't work with the incoming voice call. Use the ATH command to drop down the call.

2.13. CSD Data Call Establishing - Originate

Before setting up the CSD Data Call (not GPRS), it is assumed that Telit Module is registered on a network and the signal strength is enough to carry on a reliable radio link.

2.13.1. Set Module in Data Mode

Use the following AT command to set up the module for a Data Call:

AT+FCLASS=0
OK



NOTE: +FCLASS setting is stored in NVM, so there is no need to repeat this command if +FCLASS setting is not required to change.



2.13.2. Set Modulation and Speed

The Data Connection can be established using different speeds, bearer services, connection element. The connection mode can be selected with the following AT command:

AT+CBST[=<speed>[,<name>[,<ce>]]]
OK

GSM/GPRS Standards

Examples

AT+CBST=? ← Check the supported range
+CBST: (0-4,6,7,14,65,66,68,70,71,75),(0),(0,1)
OK

AT+CBST? ← Read current values
+CBST: 0,0,1
OK

AT+CBST=1,0,1 ← Setting new speed
OK

AT+CBST? ← Check if new speed value is set
+CBST: 1,0,1
OK



NOTE: it is recommended to use the Non Transparent mode to avoid the reception of noise characters.

HSPA-GSM/GPRS Standards

AT+CBST=? ← Check the supported range
+CBST: (0-4-7,12,14-17,68,70,71,75,79-84,115,116,120,121,130-134),(0),(0,1)
OK



2.13.3. Dialing a Phone Number

Use the following AT command to dial a phone number:

ATD<number>

Examples

Call the national number 040-4X92XYX. The module is set in data mode (**AT+FCLASS=0** has been executed).

ATD0404X92XYX
CONNECT 9600

Call the national number 040-4X92XYX in international format +39-40-4X92XYX. The module is set in data mode (**AT+FCLASS=0** has been executed).

ATD+39404X92XYX
CONNECT 9600



The ATD response is returned when the modem handshake is over; it takes an interval of time depending from several factors (Network Operator, communication speed, etc.). Wait for this time before doing anything: when the module is doing the handshake, entering any character closes the handshake and aborts the call.

2.13.4. Exit Data Mode and Enter Command Mode

Assume that a CSD Data Call is in progress: to exit the Data Mode, do the following actions:

1. Enter the Escape Sequence: +++
2. Wait for the Escape Sequence pause time (see **ATS12** command, refer to [1]).
3. Wait for the response OK.



NOTE: only Data and Escape Sequence are accepted during the call, all other commands are discarded. Use Escape Sequence to exit Data Mode and enter Command Mode. No characters must be entered between two consecutive “+” characters forming the Escape Sequence.

2.13.5. Disconnect Data Call

Use the following AT command to hang up the current data connection:

ATH
NO CARRIER





NOTE: during the data call the module is in Data Mode (ON LINE) and if any AT command is entered, it is discarded and not executed. Before entering the ATH command to close the call, the Escape Sequence (+++) must be used.

2.14. Answering an Incoming Call

When an Incoming Call is recognized, the module sends an Unsolicited Code to DTE. Use the following AT command to answer to the call:

ATA

2.15. GSM Single Numbering Scheme

GSM/GPRS Standard

Most Network Operators use a primary phone number associated to the voice service and a secondary phone number to data and fax. If the Operator employs a GSM Single Numbering Scheme, the voice and data number is the same. To select the bearer to be used when a mobile terminated Single Numbering Scheme call is established, use the following AT command.

AT+CSNS=<mode>

Example 1

AT+CSNS=0 ← voice (factory default)

OK

RING

RING

ATA

voice channel is ON

Example 2

AT+CSNS=2 ← data

OK

RING

RING

ATA

data channel is ON



2.16. TTY Feature

The characters entered through the TTY device, connected to the Telit Module (see fig. 4), are coded using the following two tones: 1400 Hz and 1800 Hz. These tones are not supported by the GSM speech coder; they must be transformed to be compatible with it. This activity is performed by CTM modem that in the Telit Module solution is internal to the module. The internal CTM modem transforms the two unsupported tones into the following four tones: 400Hz, 600Hz, 800Hz, and 1000Hz that can be managed by the speech coder. The TTY device can be connected to the Telit Module using one of the two audio paths provided by the module (HS, HF). This feature enables the transmission of the TTY data and voice jointly on the speech channel of the module.

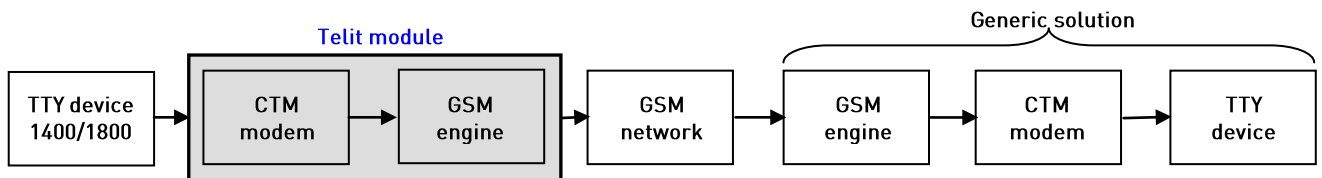


fig. 4: TTY device – module connection

Examples

Connect the TTY device (1400/1800) to the selected audio line of the module. In accordance with the selected physical audio connection, configure the audio path as indicated below.

Assume to use software way to select HF audio path, refer to paragraph 2.12.2.

AT#CAP=1
OK

AT+CLVL=5 ← Set the volume of the active audio path
OK

AT#HFMICG=4 ← Set the HF microphone input gain
OK

AT#SHFSD=0 ← Disable the side tone on HF audio output
OK

AT#SHFEC=0 ← Disable echo canceller function on HF audio path
OK

AT#SHFAGC=0 ← Disable automatic gain control on HF audio path
OK

AT#SHFNR=0 ← Disable noise reduction on HF audio path
OK



AT# TTY =?
#TTY: (0-1)
OK

← Check the available values

AT# TTY?
TTY: 0
OK

← Check the current value

AT# TTY =1
OK

← Enable TTY functionality

Now, the Voice Call is able to support jointly voice and TTY data.



3. Advanced Operations

3.1. Access to the Phonebook

The user can access, by means of dedicated AT commands, the Phonebooks stored on the SIM card or on the module itself (NVM).

The Telit Modules support the following Phonebooks:

GSM/GPRS Standards

- **"SM" - SIM Phonebook:** is used to store and recall phone numbers.
- **"FD" - SIM Fixed Dialing-Phonebook:** it is accessible by means of the PIN2 code. E.g.: if the "FD" storage holds the following string numbers: 0432, 040, the module can calls only phone numbers starting with one of the two string numbers.
- **"LD" – SIM/NVM Last-Dialing-Phonebook:** is the list of the last dialed phone numbers, it is updated automatically. +CPBW command can be only used to delete phone numbers.
- **"MC" – NVM Missed-Calls-Phonebook:** is the list of the received calls not answered. It is updated automatically. +CPBW command can be only used to delete phone numbers.
- **"RC" – NVM Received-Calls- Phonebook:** is the list of the received and answered calls. It is updated automatically. +CPBW command can be only used to delete phone numbers.
- **"MB" – SIM Mail-Box- Phonebook:** is a read only list of the phone mailbox numbers. The MB must be supported by SIM.



HSPA-GSM/GPRS Standards

- **"SM" - SIM Phonebook:** is used to store and recall phone numbers.
- **"FD" - SIM Fixed Dialing-Phonebook:** It is accessible by means of the PIN2 code. E.g.: if the "FD" storage holds the following string numbers: 0432, 040, the module can calls only phone numbers starting with one of the two string numbers.
- **"LD" - SIM Last-Dialing-Phonebook:** is the list of the last dialed phone numbers; it is updated automatically in SIM. +CPBW command can be only used to delete phone numbers.
- **"MC" - NVM Missed-Calls-Phonebook:** is the list of the received calls not answered. It is updated automatically. +CPBW command can be only used to delete phone numbers.
- **"RC" - NVM Received-Calls-List:** is the list of the received and answered calls. It is updated automatically. +CPBW command can be only used to delete phone numbers.
- **"MB" - SIM Mail-Box-List:** is a read only list of the phone mailbox numbers. The MB must be supported by SIM.
- **"DC" - NVM Last-Dialing-Phonebook:** is the list of the last dialed phone numbers stored on the module (NVM); it is updated automatically. +CPBW command can be only used to delete phone numbers.
- **"ME" - NVM Module Phonebook:** is used to store and recall phone numbers.
- **"EN" - SIM Emergency List:** is a read only list of the emergency phone numbers stored on SIM
- **"ON" - SIM Own Number:** is the list of the SIM numbers, e.g.: SIM number for voice call and SIM number for data call.

To access the storage the user has to choose one. This must be the first Phonebook operation. Once storage is selected, it is no longer needed to select it again until the desired storage remains the same and the module is not turned off.



3.1.1. Select Phonebook Memory Storage

Use the following AT command to select the Phonebook Memory Storage:

AT+CPBS=<storage>

GSM/GPRS Standards

Examples

| | |
|---|---|
| AT+CPBS=? +CPBS: ("SM","FD","LD","MC","RC") OK | ← Read the supported range of Phonebook Storages ← "MB" is not supported by the inserted SIM |
| AT+CPBS? +CPBS: "SM",10,250 OK | ← Read the current Phonebook Storage |
| AT+CPBS="FD" ERROR | ← Select "FD" phonebook storage |
| AT+CMEE=2 OK | |
| AT+CPBS="FD" +CME ERROR: SIM PIN2 required | |
| AT+CPIN=PIN2 OK | ← Enter PIN2 |
| AT+CPBS="FD" OK | ← Select "FD" phonebook storage |



NOTE: the last two commands can be substituted by the following one:

AT+CLCK="FD",1,PIN2
OK

| | |
|---------------------------|---------------------------------|
| AT+CPBS="MC" OK | ← Select "MC" Phonebook Storage |
|---------------------------|---------------------------------|

AT+CPBS?
+CPBS: "MC",0,20
OK



NOTE: after module power on and PIN authentication, the module reads the data records stored on the SIM. During this activity the phonebook access is inhibited for a time interval depending



on various factors. If Phonebook commands are entered during this interval the module returns an error message. In this case, retry the operations later.

HSPA-GSM/GPRS Standards

Examples

AT+CPBS=? ← Read the supported range of Phonebook Storages
+CPBS: ("SM","FD","LD","MC","RC","DC","ME","EN","ON")
OK

AT+CPBS? ← Read the current phonebook storage
+CPBS: "SM",19,250
OK



3.1.2. Search Phonebook Entries

Use the following AT command to search a Phonebook entry.

AT+CPBF=<findtext>

Examples

Read the current Phonebook storage and select "SM" storage:

AT+CPBS?

+CPBS: "MC",0,20

OK

AT+CPBS="SM"

OK

AT+CPBS?

+CPBS: "SM",10,250

OK

Look for entries having name starting with: "FA" on the selected storage:

AT+CPBF="FA"

+CPBF: 7,"+39404192369",145,"Fabio"

+CPBF: 9,"0404X92XYX",129,"Fabrizio"

OK

Look for an entry not present on the selected storage. Before doing that verify if the Extended Error result code is enabled.

AT+CMEE?

+CMEE: 2

OK

AT+CPBF="FAUSTO"

+CME ERROR: not found



NOTE: the search for <name> string is not case sensitive and the string may or may not be included in double brackets



3.1.3. Read Phonebook Entries

Use the following AT command to read a Phonebook entry:

AT+CPBR=<index1>[,<index2>]

Examples

Select "SM" storage:

AT+CPBS="SM"
OK

Look for the entry at the position index = 7:

AT+CPBR=7
+CPBR: 7,"+39404192369",145,"Fabio"
OK

Look for the entries from position 7 up to position 9:

AT+CPBR=7,9
+CPBR: 7,"+39404192369",145,"Fabio"
+CPBR: 9,"0404X92XYX",129,"Fabrizio"
OK

The position 8 is empty.

3.1.4. Write Phonebook Entry

Use the following AT command to write a Phonebook entry:

AT+CPBW=[<index>][,<number>[,<type>[,<text>]]]

Examples

Select the "SM" phonebook:

AT+CPBS="SM"
OK

Write a new record on the first free position of the selected "SM" phonebook:

AT+CPBW=,"0404192123",129,"NewRecord"
OK

Check where the new record has been written:




```
AT+CPBF="NEW"  
+CPBF: 8,"0404192123",129,"NewRecord"  
OK
```

3.1.5. Delete Phonebook Entry

Use the following AT command with only <index> parameter to delete a Phonebook entry:

```
AT+CPBW=<index>
```

Examples

Select the "SM" phonebook:

```
AT+CPBS="SM"  
OK
```

Delete record 7 on the "SM" phonebook:

```
AT+CPBW= 7  
OK
```

Try to delete a non-existent record on the "SM" phonebook, just to see the format response:

```
AT+CPBF=999999999999  
+CME ERROR: not found
```



NOTE: the delete command overwrites the <index> record number with an empty record.



3.1.6. Dial Phonebook Entry

To dial a phone number stored in the Phonebook, the user must get the desired phone number index position using the +CPBF command. Once the <index> number is known, the user can establish the call.

ATD><n>[;]

Wait for command response in accordance with the call type entered.

Examples

Establish a Voice call, on HS audio path, to "Fabio" whose number is stored on the SIM Phonebook:

Select the "SM" as active storage.

AT+CPBS="SM"
OK

Find the index number where "Fabio" is recorded.

AT+CPBF="Fabio"
+CPBF: 7,"+390404X9YYYY",145,"Fabio"
OK

Set up Voice Call.

AT+FCLASS=8
OK

Use software way to select HS audio path.

AT#CAP=2
OK

Set the volume.

AT+CLVL=8
OK

Check the mute setting.

AT+CMUT?
+CMUT: 0

Establish the voice call using the index.

ATD>7
OK



3.2. Encryption Algorithm

Use the following AT command to enables or disables the GSM and/or GPRS encryption algorithms supported by the module.

AT#ENCALG=[<encGSM>][,<encGPRS>]

In accordance with the response of the **AT#ENCALG=?** command, you can know the features supported by the command and your Telit Module type.

GSM/GPRS Standards

AT#ENCALG=?

#ENCALG: (0,1,4,5,255),(0-3,255)

OK

HSPA-GSM/GPRS Standards

AT#ENCALG=?

#ENCALG: (0,1,4,5,255),(0-7,255)

OK

Examples

AT#ENCALG=?

← Get the supported parameters range

#ENCALG: (0,1,4,5,255),(0-3,255)

OK

AT#ENCALG?

← Get the current setting

#ENCALG: 5,3,1,0

OK

Selected: 5 = A5/1 or A5/3; 3 = GEA1 or GEA2

Last used: 1 = A5/1; 0 = no GPRS algorithm

AT#ENCALG=0,3

← no GSM algorithm

OK

AT#ENCALG?

← Setting is not changed

#ENCALG: 5,3,1,0

OK



Turn OFF/ON the module

AT#ENCALG? ← Setting is changed!
#ENCALG: 0,3,0,0
OK

3.3. Automatic Data/Time updating

Use the following AT command to enables or disables the data/time updating. Not all Operators support this feature.

AT#NITZ=<val>,<mode>

Examples

AT#NITZ?
#NITZ: 7,0
OK

AT#NITZ=15³,1 enable full data/time updating
OK

AT&W0
OK

AT&P0
OK

Power the module OFF/ON.

After GSM registration or GPRS attach, depending on the Network Provider configuration, on the DTE appears the following unsolicited indication:

#NITZ: 10/11/30,14:36:37+04,0 ← date/time and time zone + daylight saving time

Try the following commands just to make a comparison among the commands responses formats.

AT+CCLK?
+CCLK: "10/11/30, 14:36:42+04" ← date/time and time zone
OK

³ Also enable the automatic Full Network Name updating if it is supported by the Network.



AT#CCLK?

#CCLK: "10/11/30, 14:36:52+04,0"
OK

← date/time and time zone + daylight saving time

3.4. Call Management

3.4.1. Identifying the Call Type

The Telit Module can identify the call type before answering. To accomplish this feature, the module provides different ring indications (Unsolicited Codes) depending on the call type. It is up to the user to enable the extended format reporting of incoming calls using the following AT command.

AT+CRC=[<mode>]

OK

Examples

Disable extended format reporting, and then assume that the module receives a call.

AT+CRC=?

← Check the range value

+CRC: (0,1)

OK

AT+CRC=0

← Disable extended format reporting.

OK

AT+CRC?

+CRC: 0

OK

The module detects a call. Ring indications are displayed on DTE:

RING

RING

.

Now, enable extended format reporting, and then assume the module receives a call.

AT+CRC=1

← Enable extended format reporting

OK

AT+CRC?

← Check if extended format reporting is enabled

+CRC: 1

OK



The module detects a call. Ring indications in extended format are displayed on DTE:

```
+CRING: VOICE
+CRING: VOICE
.
.
```

3.4.2. Identify the Caller

The Telit Module can identify the caller number and give indication about it before the call is answered. The Calling Line Indication is shown on DTE after each RING or +CRING indication. The following AT command is used to enable/disable the Calling Line Indication.

```
AT+CLIP=[<n>]
OK
```

Examples

Enable extended format reporting and caller number identification, and then assume to receive a call.

Enable extended format reporting.

```
AT+CRC=1
OK
```

Check if extended format reporting is enabled.

```
AT+CRC?
+CRC: 1
OK
```

Check the values range.

```
AT+CLIP?
+CLIP: 0,1
OK
```

Enable caller number identification.

```
AT+CLIP=1
OK
```

```
AT+CLIP?
+CLIP: 1,1
OK
```

The module detects a call; ring indications and Calling Line Identification of the calling party are displayed on DTE:

```
+CRING: VOICE
+CLIP: "+390404X92XYX",145,"",128,"",0
```




```
+CRING: VOICE
+CLIP: "+390404X92XYX",145,"",128,"",0
.
.
```

3.4.3. Calling Line Indication

The Telit Module can send the Calling Line Indication (CLI) to the other party through the Network when an outgoing call is established. This indication can be restricted (CLIR) in various ways.

3.4.3.1. CLIR Service Status

Use the following AT command to query the CLIR Service status.

AT+CLIR?

Examples

Check the current CLIR settings:

AT+CLIR?

+CLIR: 0,4

OK

<n> = 0 = CLIR module facility in accordance with CLIR Network Service

<m>= 4 = CLIR temporary mode presentation allowed (it is the facility status on the Network)

The <m> parameter reports the status of the service at Network level. If the CLIR service is not provisioned by the Network, then it is not possible to use this service and changing the first parameter <n> will not change the CLI presentation to the other party behavior of the Network.

3.4.3.2. Restrict/Allow Caller Line ID Indication

Use the following AT command to enable or disable the presentation of the CLI to the called party.

AT+CLIR=<n>

OK

Examples

Disable the CLI presentation to the other party permanently.



Read the supported values.

AT+CLIR=?

+CLIR: (0-2)

OK

Read the current Module and Network status.

AT+CLIR?

+CLIR: 0,4

OK

Set to 1 Module status, CLI not sent.

AT+CLIR=1

OK

Read the current Module and Network status.

AT+CLIR?

+CLIR: 1,4

OK



3.4.4. Call Barring Control

The Call Barring Service enables the user to control the calls. The user can block all outgoing calls, or all outgoing international calls, or all outgoing international calls except those for its Country, or all incoming calls, or all incoming calls while roaming. User can activate or cancel Call Barring using the AT commands hereafter described. Moreover, the user needs to enter a special access code (Call Barring Access Code) to modify Call Barring options. The Call Barring Code is provided by Network Operator for every subscriber. Hereafter the Call Barring Code is indicated as "Network Password provided by Network Operator".

The Call Barring Service is handled by the Network, hence the mobile sends a network request and it may take several seconds to have the response from the network. Furthermore, all the Call Barring Service AT commands must be used when the mobile is registered on some Network, otherwise an error code is returned.

3.4.4.1. Lock/Unlock the Module

Use the following AT command to lock/unlock the Module or a Network facilities:

AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]

GSM/GPRS Standards

Examples

Read the supported facilities:

AT+CLCK=?

+CLCK: ("SC","FD","AO","OI","OX","AI","IR","AB","AG","AC","PN","PU","PP","PC","PS","PF")

OK

Query the status of SIM facility:

AT+CLCK="SC",2

+CLCK: 1

OK

Query the status of a wrong facility just to see the format response. Before doing that verify the Extended Error result code.

AT+CMEE?

+CMEE: 2

OK

AT+CLCK="S1",2

+CME ERROR: operation not supported



HSPA-GSM/GPRS Standards

Examples

Read the supported facilities:

AT+CLCK=?

+CLCK: ("SC","FD","AO","OI","OX","AI","IR","AB","AG","AC","PN","PU","PP","PC","PS","PF","MC")

OK

3.4.4.2. Call Barring Service Status

Use the following AT command to require the status of the selected network facility.

AT+CLCK=<fac>,2

Examples

Check “IR” network facility status (Bar Incoming Calls status when roaming outside the home country).

AT+CLCK=IR,2

+CLCK: 0,1

+CLCK: 0,2

+CLCK: 0,4

OK

“IR” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.

Check “OI” network facility status (Bar Outgoing (originated) International Calls).

AT+CLCK=OI,2

+CLCK: 0,1

+CLCK: 0,2

+CLCK: 0,4

OK

“OI” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.

Check the status of a non-existent network facility just to see the format response when Extended Error result code is enabled in verbose format.



AT+CMEE=2

OK

AT+CLCK=IX,2

+CME ERROR: operation not supported

Assume that the module is not registered: try to check “OI” network facility status just to see the format response when Extended Error result code is enabled in numeric format.

AT+CMEE=1

OK

AT+CLCK=OI,2

+CME ERROR: 100

3.4.4.3. Bar/Unbar All Incoming Calls

Use the following AT command to change the status of the AI network facility (All Incoming Calls):

AT+CLCK=AI,<mode>,<passwd>

Examples

Lock and unlock “AI” network facility. Assume that the Network Password provided by Network Operator is 2121.

Check “AI” network facility status:

AT+CLCK=AI,2

+CLCK: 0,1

+CLCK: 0,2

+CLCK: 0,4

OK

“AI” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.

Lock “AI” network facility:

AT+CLCK=AI,1,2121

OK

Check “AI” facilities status:

AT+CLCK=AI,2

+CLCK: 1,8

+CLCK: 1,4

+CLCK: 1,2

OK

“AI” network facility is locked (1): 8 = short message service, 4 = fax, 2 = data.



Unlock “AI” facilities:

AT+CLCK=AI,0,2121
OK

Check “AI” facilities status:

AT+CLCK=AI,2
+CLCK: 0,1
+CLCK: 0,2
+CLCK: 0,4
OK

“AI” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.

3.4.4.4. Bar/Unbar Incoming Calls in International Roaming

Use the following AT command to change the status of the “IR” network facility (Incoming Calls when Roaming outside the home country).

AT+CLCK=IR,<mode>,<passwd>

Examples

Lock and unlock “IR” network facility. Assume that the network password provided by Network Operator is 2121.

Check “IR” network facilities status:

AT+CLCK=IR,2
+CLCK: 0,1
+CLCK: 0,2
+CLCK: 0,4
OK

“IR” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.

Lock “IR” network facility:

AT+CLCK=IR,1,2121
OK

Check “IR” facilities status:

AT+CLCK=IR,2
+CLCK: 1,1
+CLCK: 1,8
+CLCK: 1,4
+CLCK: 1,2
OK



“IR” network facility is locked (1): 8 = short message service, 4 = fax, 2 = data.

Unlock “IR” network facility:

```
AT+CLCK=IR,0,2121  
OK
```

Read IR facilities status:

```
AT+CLCK=IR,2  
+CLCK: 0,1  
+CLCK: 0,2  
+CLCK: 0,4  
OK
```

“IR” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.

3.4.4.5. Bar/Unbar All Outgoing Calls

Use the following AT command to change the status of the “AO” network facility (All Outgoing Calls).

```
AT+CLCK=AO,<mode>,<passwd>
```

Examples

Lock and unlock “AO” network facility. Assume the network password provided by Network Operator is 2121.

Check “AO” network facility status:

```
AT+CLCK=AO,2  
+CLCK: 0,1  
+CLCK: 0,2  
+CLCK: 0,4  
OK
```

“AO” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.

Lock “AO” network facility:

```
AT+CLCK=AO,1,2121  
OK
```

Check “AO” network facility status:

```
AT+CLCK=AO,2  
+CLCK: 1,8  
+CLCK: 1,4
```



+CLCK: 1,2
OK

“AO” network facility is locked (1): 8 = short message service, 4 = fax, 2 = data.

Unlock “AO” network facility:

AT+CLCK=AO,0,2121
OK

Checking “AO” network facility status:

AT+CLCK=AO,2
+CLCK: 0,1
+CLCK: 0,2
+CLCK: 0,4
OK

“AO” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.

3.4.4.6. Bar/Unbar All Outgoing International Calls

Use the following AT command to change the status of the “OI” network facility (Outgoing International Calls).

AT+CLCK=OI,<mode>,<passwd>

Examples

Lock and unlock “OI” network facility. Assume the network password provided by Network Operator is 2121.

Checking “OI” network facility status:

AT+CLCK=OI,2
+CLCK: 0,1
+CLCK: 0,2
+CLCK: 0,4
OK

“OI” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.

Lock “OI” network facility:

AT+CLCK=OI,1,2121
OK

Check “OI” network facility status:

AT+CLCK=OI,2
+CLCK: 1,1



+CLCK: 1,8
+CLCK: 1,4
+CLCK: 1,2
OK

“OI” network facility is locked (1): 1 = voice, 8 = short message service, 4 = fax, 2 = data.

Unlock “OI” network facility:

AT+CLCK=OI,0,2121
OK

Check “OI” network facility status:

AT+CLCK=OI,2
+CLCK: 0,1
+CLCK: 0,2
+CLCK: 0,4
OK

“OI” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.

3.4.4.7. Bar/Unbar All Outgoing International Calls except to Home Country

Use the following AT command to change the status of the “OX” network facility (Outgoing International Calls except to Home Country).

AT+CLCK=OX,<mode>,<passwd>

Examples

Lock and unlock “OX” network facility. Assume the network password provided by Network Operator is 2121.

Check “OX” network facility status:

AT+CLCK=OX,2
+CLCK: 0,1
+CLCK: 0,2
+CLCK: 0,4
OK

“OX” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.

Lock “OX” network facility. It is a setting not supported by the network:

AT+CLCK=OX,1,2121
ERROR



Enable extended error result codes in verbose format:

AT+CMEE=2
OK

Try again to lock “OX” network facility:

AT+CLCK=OX,1,2121
+CME ERROR: unknown

Check “OX” network facility status:

AT+CLCK=OX,2
+CLCK: 0,1
+CLCK: 0,2
+CLCK: 0,4
OK

“OX” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.

3.4.4.8. Unbar All Calls

Use the following AT command to unlock “AB” network facility (All Barring services).

AT+CLCK=AB,0,<passwd>

Examples

Unlock “AB” network facility. Assume the Network Password provided by Network Operator is 2121.

AT+CLCK=AB,0,2121
OK

Check “IR” network facility status:

AT+CLCK=IR,2
+CLCK: 0,1
+CLCK: 0,2
+CLCK: 0,4
OK

“IR” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.

Check “OI” network facility status:

AT+CLCK=OI,2
+CLCK: 0,1
+CLCK: 0,2



+CLCK: 0,4

OK

“OI” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.

Check “AI” network facility status:

AT+CLCK=AI,2

+CLCK: 0,1

+CLCK: 0,2

+CLCK: 0,4

OK

“AI” network facility is unlocked (0): 1 = voice, 2 = data, 4 = fax.



3.5. DTMF Tones

DTMF tones are used to control telephone systems, a phone providing DTMF tones can manage these types of equipments. When a phone key is pressed during a phone call, the character associated to the key is sent using DTMF. The following characters can be sent using DTMF: 0,1,2,3,4,5,6,7,8,9,A,B,C,D,* and #. The DTMF keypad is laid out in a 4×4 matrix, with each row representing a low frequency, and each column representing a high frequency. Pressing a single key such as '1' will send a sinusoidal tone of the two frequencies 697 Hz and 1209 Hz, refer to table below.

| | 1209Hz | 1336Hz | 1477Hz | 1633Hz |
|-------|--------|--------|--------|--------|
| 697Hz | 1 | 2 | 3 | A |
| 770Hz | 4 | 5 | 6 | B |
| 852Hz | 7 | 8 | 9 | C |
| 941Hz | * | 0 | # | D |

Tab. 3: DTMF tones

Fixed line phone and cell-phone can send DTMF tones. Telit Modules provide the user with the following AT command to send DTMF tones during a phone connection.

AT+VTS=<dtmfstring>[,duration]

Examples

Check the value range supported:

AT+VTS=?
(0-9,#,*,A-D,P),(0-255)
OK

Check the tone duration of the single character:

AT+VTD?
1
OK

Dialing the number in voice mode:

ATD0404192400;
OK

Send the following sequence of tones:



AT+VTS=123456789

OK

Hang up the voice call:

ATH

OK

3.5.1. DTMF Decoder

Use the following AT command to perform the decoding of the DTMF tones coming from the network.

AT#DTMF=<mode>

Example 1

Check the range of the parameter values

AT#DTMF=?

#DTMF: (0-2)

OK

Check the current value

AT#DTMF?

#DTMF: 0

OK

Enable DTMF decoder

AT#DTMF=1

OK



Example 2

Let's suppose to have two modules: the remote one sends DTMF tones, the local one decodes the received DTMF tones.

Local Module

AT#CPUMODE=1
OK

AT#DTMF=1
OK

AT#DTMF?
#DTMF: 1
OK

RING
RING

ATA

#DTMFEV: 1
#DTMFEV: 2
#DTMFEV: 3

Remote Module

.
.
.
.
.
.
.
ATD<module number>;
OK

AT+VTS=123
OK

Use the AT#CPUMODE command in accordance with the used local module and the table below.

| Standards (refer to Tab. 1) | Software Version equal/greater than: | AT#CPUMODE |
|--------------------------------|--------------------------------------|--|
| GSM/GPRS | 10.00.xx5, 16.00.xx2 | It is mandatory to enter the AT#CPUMODE=1 command. |
| GSM/GPRS | 13.00.xx2 | Do not use the AT#CPUMODE command. |
| HSPA-GSM/GPRS | 12.00.xx.2 | Do not use the AT#CPUMODE command. |

#DTMFEV: X is the unsolicited message that gives information concerning the received DTMF tones.



Let's suppose to have a local module and a remote fixed phone sending DTMF tones, the local module decodes the received DTMF tones.

Local Module

AT#CPUMODE=1
OK

AT#DTMF=1
OK

AT#DTMF?
#DTMF: 1
OK

RING
RING
ATA

#DTMFEV: 1
#DTMFEV: 2
#DTMFEV: 3

Remote Fixed Phone

.
.
.
.
.
.

Establish a call phone

.

Push button: 1 2 3

.
.

Use the AT#CPUMODE command in accordance with the used local module type as showed in the previous example.



3.6. GSM Power Saving Modes

The Telit Modules provide a function that reduces the power consumption during the period when they are in IDLE state (waiting for a call), allowing a longer activity with a given battery capacity. The power saving function can be configured in several modes in accordance with the user needs.

In accordance with the response of the **AT+CFUN=?** Command, you can know the Power Saving Modes supported by the version of your Telit Module, refer to the table below:

| Standards (refer to Tab. 1) | Software Version equal/greater than: | AT+CFUN=? |
|--------------------------------|--------------------------------------|--|
| GSM/GPRS | 10.00.xx5, 13.00.xx2, 16.00.xx2 | AT+CFUN=? +CFUN: (0,1,2,4,5,7,9),(0, 1) OK |
| HSPA-GSM/GPRS | 12.00.xx.2 | AT+CFUN=? +CFUN: (0,1,4,5,7,9),(0, 1) OK |

Use the following AT command to select the power saving mode in accordance with your Telit Module:

AT+CFUN=[<fun>[,<rst>]]

Examples

Check the current mode:

AT+CFUN?

+CFUN: 1 ← module with full functionality and power saving disabled (factory setting)
OK

The Tab. 4, showed on next pages, summarizes the transitions between CFUN modes and the events that cause the transition itself. The “Event” column lists the considered events; the shaded row lists the <CFUN> mode when the event happens. The remaining columns show the entered mode of the module after the completion of the transition. In other words: the cell on the crossing between the selected <CFUN>= mode column and row of the selected event shows the final CFUN mode.



Let's suppose to enter the command `AT+CFUN=0` or `AT+CFUN=9`. These commands cause the module in power saving mode, in addition they force the module to monitor the RTS control line indicating if the user application (DTE) is ready to receive data from the module (DCE):

- When DTE is not ready to receive data from DCE, it forces RTS control line OFF, refer to fig. 2. This condition causes the module (DCE) to power down its serial port and stays in CFUN=0 or CFUN=9 mode, in accordance with the entered command.
- When DTE is ready to receive data from DCE, it forces RTS control line ON, refer to fig. 2. This condition causes the module (DCE) to power up its serial port and enters CFUN=1 mode (Normal Operative Mode, factory setting).

In CFUN=5 mode, the module monitors the DTR line (see

fig. 6) indicating if the user application (running on the DTE) is ready to operate:

- When the DTR line is OFF, the user application is not ready to operate and the module enter power saving mode;
- When the user application becomes ready to operate, the DTR line is ON, the module detects this control line condition and exits power saving mode.

In CFUN=7 mode the module forces CTS=OFF (see

fig. 6) when enters power saving mode. After exiting power saving mode, it forces CTS=ON. As stated on paragraph 2.1, CTS control line indicates permission from the DCE for the DTE to send data to the DCE: when the module is not ready to receive data (e.g.: commands) it ties up the CTS line, when it is ready to receive data it ties down the CTS line. The user application can monitor the CTS control line to check if the module is ready for commands, in accordance with V.24 Standard.



NOTE: when the module is powered ON the power saving function is disabled (CFUN=1, factory setting) in order to guarantee the data exchange between the module and the user device; for this reason the CFUN mode command should be entered after every power up.

NOTE: the protocol implementation of the module requires a delay between consecutive activation of CFUN=1 and CFUN=4 (or vice versa) modes. It is suggested to use a delay of 10 sec.

NOTE: the power saving function does not affect the network activity of the module: during the power saving mode the module remains registered on the network and reachable for incoming



calls or SMS. If a call comes in during the power saving mode, the module will wake up and proceed normally with the unsolicited incoming call code.

NOTE: Assume that the module is in power saving mode. The paging time range is $0.5 \div 2.1$ sec, it depends upon DRX time set by network; when the module wakes up from the power saving mode, it takes a maximum of 150 ms before checking the DTR line coming from the DTE. If a command is received during the power saving, the module needs at least $0.5 \div 2.1$ sec +150 msec to be ready. Hence, use a delay of at least 2250 msec between the port opening (DTR=ON) and command sending.

HSPA-GSM/GPRS Standards

For HE910 family the functionality of the CFUN=0 is conditioned by the setting of the #ENS command, refer to chapters 2.11.7.3, and 2.11.7.4.

- #ENS=0 → CFUN=0 has the standard functionality
- #ENS=1 → CFUN=0 has the same functionality of CFUN=4



| Event | Module is in CFUN MODE when the event (first column) happens | | | | | |
|---|--|---|---|--|---|-------------------------------|
| | <CFUN>=0 | <CFUN>=2 | <CFUN>=4 | <CFUN>=5 | <CFUN>=7 | <CFUN>=9 |
| Refer to chapter. 2.1 RTS ⁴ = OFF(high) → RTS=ON(low) | CFUN=1 | CFUN=2 | CFUN=4 | CFUN=5 | CFUN=7 | CFUN=1 |
| DTR=OFF(high) or DTR=ON(low) | CFUN=0 | CFUN=2 | CFUN=4 | Refer to fig. 6: DTR=OFF (high) → enter power saving DTR=ON (low) → exit power saving | Refer to fig. 6: Module is in power saving even if DTR=ON (low) | CFUN=9 |
| Unsolicited Result Code | CFUN=1 | CFUN=2 | CFUN=4 | Module temporary exits power saving mode | Module temporary exits power saving mode | CFUN=1 |
| Incoming voice/data call | CFUN=1 | N/A | N/A | Module temporary exits power saving mode | Module temporary exits power saving mode | CFUN=1 |
| Any AT command | N/A, AT interface disabled | AT interface is working, module remains in CFUN=2 mode | AT interface is working, module remains in CFUN=4 mode | N/A, AT interface disabled | AT interface is enabled. Refer to fig. 6: CTS=OFF: module enters power saving; CTS=ON: module exit power saving. If user application uses HW flow control the incoming data are blocked when module is in power saving to avoid data losing. | N/A, AT interface disabled |
| Incoming SMS | CFUN=0 | N/A | N/A | CFUN=5 | CFUN=7 | CFUN=9 |

⁴ CMOS level: asserted = LOW; NOT asserted = HIGH



| Event | Module is in CFUN MODE when the event (first column) happens | | | | | |
|---------------------------------------|--|----------|----------|--|--|-------------------------------|
| | <CFUN>=0 | <CFUN>=2 | <CFUN>=4 | <CFUN>=5 | <CFUN>=7 | <CFUN>=9 |
| AT+CNMI is set to 0,0 | | | | | | |
| Incoming SMS AT+CNMI is set to 1,1 | CFUN=1 | N/A | N/A | Module temporary exits power saving mode | Module temporary exits power saving mode | CFUN=1 |
| Incoming GPRS packet | CFUN=0 | N/A | N/A | Module temporary exits power saving mode | Module temporary exits power saving mode | CFUN=1 |
| RTC alarm | CFUN=1 | CFUN=2 | CFUN=4 | Module temporary exits power saving mode | Module temporary exits power saving mode | CFUN=1 |
| AT+CFUN=1 | N/A, AT interface disabled | CFUN=1 | CFUN=1 | N/A, AT interface disabled | CFUN=1 | N/A, AT interface disabled |

Tab. 4: CFUN modes



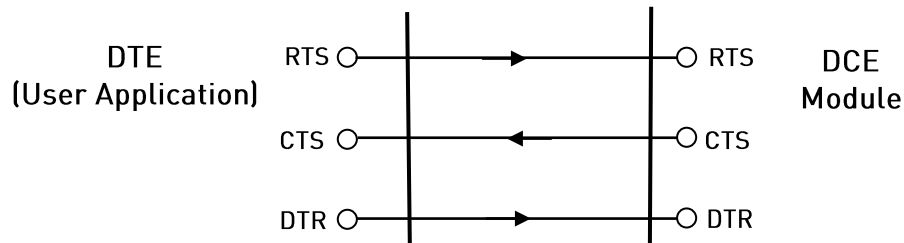


fig. 5: Control Serial lines

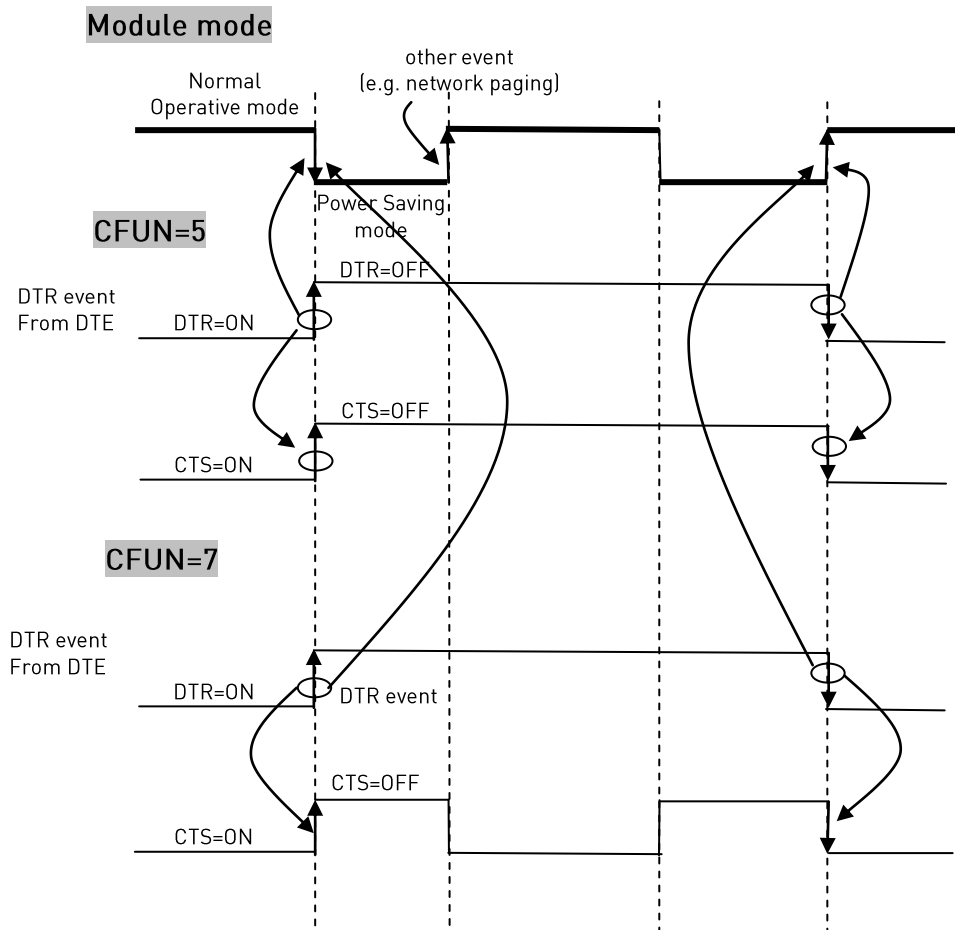


fig. 6: CFUN Mode vs. DTR event



3.7. SMS Management

The Telit Modules support the SMS Service to delete, write, send and receive an SMS, which is a short text message up to 160 characters long. Before using the service, the Short Message Service needs to be configured.

3.7.1. Select SMS Format Type

The Telit Module supports two SMS formats:

- PDU mode
- Text mode

PDU is the format used by the module to send a message on the air. The PDU mode enables the user to edit the message in that format. If the user is familiar with PDU encoding he can operate with PDU by selecting that mode and use the appropriate commands. The present document uses the TEXT mode to explain how to operate with SMS. Follow the AT command used to select the mode.

AT+CMGF=<mode>

Examples

Check the supported range of values:

AT+CMGF=?
+CMGF: (0,1)
OK

Set up Text Mode for the SMS:

AT+CMGF=1
OK

This setting is stored and remains active until the module is turned OFF.



3.7.1.1. Set Text Mode Parameters

When SMS format is Text mode, the SMS parameters that usually reside on the header of the PDU must be set apart with the +CSMP command.

AT+CSMP=<fo>,<vp>,<pid>,<dcs>

Example 1

Set the SMS parameters as follow:

- <fo> expressed in binary format:

| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
|--|----------|---------------------------|--|----------|------------|---|---|
| Module is not requesting a status report | Always 0 | Replay Path not requested | Validity period field present in relative format | Always 0 | SMS-SUBMIT | | |

The binary number expressed in decimal format: 17

- <vp> validity period (in relative format) = 24 hours is coded into 167 decimal format.
- <pid> protocol identifier.
- <dcs> data coding scheme, default value 0.

AT+CSMP= 17,167,0,0
OK

Example 2

Set the SMS parameters as follow:

- <fo> expressed in binary format:

| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
|--|----------|---------------------------|--|----------|------------|---|---|
| Module is not requesting a status report | Always 0 | Replay Path not requested | Validity period field present in absolute format | Always 0 | SMS-SUBMIT | | |

The binary number expressed in decimal format: 25

- <vp> validity period in absolute format represents the expiration date of the message, for example:
date: 29/06/02; time: 02:20; in the time zone of Italy (+1) is formatted as follows:
"29/06/02,02:20:00+1"
- <pid> protocol identifier.
- <dcs> data coding scheme:
 - Default Alphabet



- Class 0 (immediate display SMS)

Data coding scheme is coded in the following binary format: 11110000, corresponding to 240 in decimal format.

AT+CSMP= 25, 29/06/02,02:20:00+1,0,240
OK



NOTE: use dcs=0 if no particular data coding scheme is needed. Not all dcs combinations described in the [7] are jointly supported by Networks and Telit Modules: some features may be not implemented on Networks or on Telit Modules. This no matching is resulting in a +CMS ERROR: 303 result code (operation not supported), use different dcs.

3.7.1.2. Character Sets

Use the following AT command to select the character set:

AT+CSCS=<chset>

The supported character sets are the following:

- "GSM" (default alphabet, [7])
- "IRA" - ITU-T.50
- "8859-1" - ISO 8859 Latin 1
- "PCCP437" - PC character set Code Page 437.
- "UCS2" - 16-bit universal multiple-octet coded character set (ISO/IEC10646)

Examples

Check the supported character sets:

AT+CSCS=?
+CSCS: ("GSM","IRA","8859-1","PCCP437","UCS2")
OK

Check the current character set:



AT+CSCS?
+CSCS: "IRA"
OK

Select a non-existent character set, merely to see the response format:

AT+CSCS="GSA"
ERROR

Enabling the Error report in verbose format:

AT+CMEE=2
OK

Selecting a non-existent character set, just to see the response format:

AT+CSCS="GSA"
+CME ERROR: operation not supported



3.7.1.3. IRA Character Set

The IRA character set is used in Text mode. IRA set defines each character as a 7-bit value: from 0x00 to 0x7F. The table below lists all the supported characters and their hexadecimal code.

| | | Most Significant Nibble | | | | | | | |
|--------------------------|----|-------------------------|----|-----------------|----|----|----|----|----|
| | | 0x | 1x | 2x | 3x | 4x | 5x | 6x | 7x |
| Least Significant Nibble | x0 | | | SP ¹ | 0 | @ | P | | p |
| | x1 | | | ! | 1 | A | Q | a | q |
| | x2 | | | " | 2 | B | R | b | r |
| | x3 | | | # | 3 | C | S | c | s |
| | x4 | | | \$ | 4 | D | T | d | t |
| | x5 | | | % | 5 | E | U | e | u |
| | x6 | | | & | 6 | F | V | f | v |
| | x7 | | | ' | 7 | G | W | g | w |
| | x8 | | | (| 8 | H | X | h | x |
| | x9 | | |) | 9 | I | Y | i | y |
| | xA | LF ² | | * | : | J | Z | j | z |
| | xB | | | + | ; | K | | k | |
| | xC | | | , | < | L | | l | |
| | xD | CR ³ | | - | = | M | | m | |
| | xE | | | . | > | N | | n | |
| | xF | | | / | ? | O | £ | o | |

¹ - SP stands for space character

² - LF stands for Line Feed character

³ - CR stands for Carriage Return character

The following examples show how to use the IRA table:

Using the table, get the IRA code of the character '&': the most significant nibble is 2, the least significant nibble is 6, so the IRA code for the '&' character is the hexadecimal value: 0x26.

Using the table, translate IRA code 0x6B into the corresponding character: the most significant nibble is 6, the least significant nibble is B, the cell at the crossing of column 6 and row B holds the character: "k".



3.7.1.4. UCS2 Character Set

The UCS2 Character Set is used in Text mode.

Examples

Send an SMS to the module itself and do not store it before sending. Use the “UCS2” character set.

Select Text Mode.

AT+CMGF=1

OK

Disable improved SMS commands operation mode.

AT#SMSMODE=0

OK

The improved SMS functionality (ETSI Standard compliant) is not enabled. The HSPA-GSM/GPRS modules family supports only the improved SMS functionality, consequently the AT#SMSMODE command is not supported by this modules family.

Select the UCS2 character set.

AT+CSCS="UCS2"

OK

Set SMS parameters:

AT+CSMP=17,168,0,26

OK

Select how the new received message event is indicated by the DCE to the DTE

AT+CNMI=1,1,0,0,0

OK

Send the message to the module itself. The “UCS2” character set is used:

number phone 329 05 69 628 is converted into “UCS2” format: 3=0033, 2=0032, 9=0039, 0=0030, 5=0035, 6=0036, 9=0039, 6=0036, 2=0032, 8=0038

text CIAO is converted into “UCS2” format: C=0043, I=0049, A=0041, O=004F

AT+CMGS=0033003200390030003500360039003600320038

> 004300490041004F

+CMGS: 81

OK

The SMS is received by the module itself, the following unsolicited indication is shown on DTE:

+CMTI: "SM",3





NOTE: the SMS was successfully sent to the SMSC and its Network reference number is 81. Do not confuse message reference with message index position: the first one indicates the Network reference for identifying the sent message, the second one - reported by the unsolicited indication - indicates that the message is received by the module and it is stored on the position 3 of the “SM” storage.

Select the “SMS” storage as indicated by the unsolicited indication.

```
AT+CPMS="SM"
+CPMS: 3,50,3,50,3,50
OK
```

Read the message from the storage position indicated by the unsolicited indication.

```
AT+CMGR=3
+CMGR: "REC
UNREAD","002B003300390033003200390030003500360039003600320038","0057
0049004E0044002000530049004D","08/05/13,12:22:08+08"
004300490041004F
OK
```

3.7.2. Read SMSC Number

An SMS is sent by the Telit Module to the SMSC where the message is dispatched towards its final destination or is kept until the delivery is possible. To ensure the correct operation of this service the number of the SMSC needs to be configured on the module in accordance with the Network Operator used. To know the SMSC number stored on the module, use the following AT command.

AT+CSCA?

Example

Check the stored SMSC number:

```
AT+CSCA?
+CSCA: "+39X20XX58XX0",145
OK
```

SMSC number is compliant with the international numbering scheme.

3.7.3. Set SMSC Number

Use the following AT command to store a new SMSC number. The old number is overwritten.



AT+CSCA=<number>,<type>

Examples

Set up the desired SMSC number in international format:

AT+CSCA=+39X20XX58XX0,145
OK

This setting remains stored in the SIM card until it is changed or deleted, so this operation may be done only once if the SIM Card is not changed.

Enter the command with no SMSC number:

AT+CSCA=,145
OK

Check the stored SMSC number:

AT+CSCA?
+CSCA: "+",145
OK

Enable Extended result code in verbose format:

AT+CMEE=2
OK

Enter the command with no parameters:

AT+CSCA=
ERROR

3.7.4. Select/Check SMS Memory

Telit Modules can provide two type of SMS storage, in agreement with the family of belonging:

- "SM" - SIM Card Memory
- "ME" - Mobile Equipment Memory.

Use the following AT command to select memory storage:

AT+CPMS=<memr>,<memw>,<mems>



GSM/GPRS Standards

These modules have two storage types: “SM” and “ME”. The modules provide the #SMSMODE command to enable/disable the improved SMS functionalities that are ETSI Standard compliant. #SMSMODE command resolves retro compatibility issues.

Example 1

AT#SMSMODE? ← Check the SMS mode
#SMSMODE: 1 ← Improved SMS functionality are enabled
 OK

AT+CPMS=? ← Check the supported SMS storage types
+CPMS: ("SM"),("SM"),("SM") ← Only “SM” storage type is supported
 OK

Example 2

AT#SMSMODE=0 ← Disable improved SMS functionality
#SMSMODE: 0
 OK

AT#SMSMODE? ← Check SMS mode
#SMSMODE: 0
 OK

AT+CPMS=? ← Check the supported SMS storage types
+CPMS: ("ME","SM"), ("SM"), ("SM")
 OK

AT+CPMS? ← Check the current active storage type
+CPMS: "SM",1,50,"SM",1,50,"SM",1,50
 OK

AT+CPMS="ME" ← Select “ME” storage type
+CPMS: 1,1,1,50,1,50
 OK

AT+CPMS? ← Check the current active storage types
+CPMS: "ME",1,1,"SM",1,50,"SM",1,50 ← Two SMS storage types are active: “ME” and “SM”
 OK

The "ME" storage is a volatile read only memory, where only one received message of Class 0 can be stored regardless of the selected storage, which could be "SM".



HSPA-GSM/GPRS Standards

These modules provide only the improved SMS functionality, therefore the #SMSMODE command is not supported;

AT+CPMS=? ← Check the supported SMS storage types
+CPMS: ("SM"),("SM"),("SM") ← Only "SM" storage type is supported
OK

3.7.5. Select Message Indication

When the Module receives a new SMS, an unsolicited indication is generated. This indication may be: sent to the DTE, buffered if the DTE is busy (for example, during a data call), or discarded. To set the desired behavior, use the following command:

AT+CNMI=<mode>,<mt>,<bm>,<ds>,<bfr>

GSM/GPRS Standards

Example

It is assumed that the module sends two consecutive SMS to the module itself to see the unsolicited indications on DTE and verify that "ME" provides a single storage position: the second SMS overlaps the first one. Follow the AT commands sequence.

AT+CMGF=1 ← Select Text Mode
OK

AT#SMSMODE=0 ← Disable SMS improved functionality
OK

AT+CSMP=17,168,0,240 ← Set up the SMS message, that will be sent, as an SMS of Class 0
OK

Select how the module notifies to the DTE the receiving of a new message from the network.

AT+CNMI=1,1,0,0,0
OK

AT+CMGS="+39329X569YYY" ← Send the message to the module itself
> SEND THE SMS #1 TO IT ITSELF (close the message with Ctrl Z)
+CMGS: 76
OK

The SMS #1 is received by the module itself, the following unsolicited indication is shown on DTE:

+CMTI: "ME",1



AT+CPMS="ME" ← Select SMS storage type
+CPMS: 1,1,13,50,13,50
OK

Use unsolicited indication parameter to read for the first time the SMS #1.

AT+CMGR=1
+CMGR: "REC UNREAD", "+39329X569YYY", "WIND SIM", "08/04/18,13:58:04+08"
SEND THE SMS #1 TO MODULE ITSELF
OK

Read again the SMS # 1 to see the "REC READ" indication.

AT+CMGR=1
+CMGR: "REC READ", "+39329X569YYY", "WIND SIM", "08/04/18,13:58:04+08"
SEND THE SMS #1 TO MODULE ITSELF
OK

AT+CPMS? ← Check the current active storage types
+CPMS: "ME",1,1,"SM",13,50,"SM",13,50
OK

Send the second message to the module itself:

AT+CMGS="+39329X569YYY"
> **SEND THE SMS #2 TO THE MODULE ITSELF** (close the message with Ctrl Z)
+CMGS: 77
OK

The SMS #2 is received by the module itself, the following unsolicited indication is shown on DTE:

+CMTI: "ME",1

Use unsolicited indication parameter to read the just received SMS.

AT+CMGR=1
+CMGR: "REC UNREAD", "+39329X569YYY", "WIND SIM", "08/04/18,14:47:23+08"
SEND THE SMS #2 TO MODULE ITSELF
OK

The new SMS has overlapped the old one.

HSPA-GSM/GPRS Standards

These modules provide only the improved SMS functionality, therefore the #SMSMODE command is not supported;



3.7.6. Write a new SMS

A new SMS can be written into the "SM" storage type and then can be sent to the desired destination. Use the following AT command to write a new SMS:

AT+CMGW="<da>"

GSM/GPRS Standards, HSPA-GSM/GPRS Standards

Example 1

Write a new SMS in the storage, send it to the module itself and read the message in the receiving storage. It is assumed that the module belonging to one of the GSM/GPRS families uses #SMSMODE=1.

AT+CMGF=1
OK

← Select Text Mode

AT+CSMP=17,168,0,240
OK

← Assume to send an SMS of Class 0

Select how the new received message event is indicated by the DCE to the DTE

AT+CNMI=1,1,0,0,0
OK

Store into "SM" the SMS message to be sent to the module itself.

AT+CMGW="+39329X569YYY"

> SEND THE STORED SMS #1 TO THE MODULE ITSELF (close the message with Ctrl Z or ESC to abort)

+CMGW: 5
OK

Use index 5 to read SMS #1 from "SM" storage type.

AT+CMGR=5

+CMGR: "STO SENT", "+39329X569YYY", "WIND SIM"
SEND THE STORED SMS # 1 TO MODULE ITSELF
OK

Send the stored SMS #1 using the storage position 5 returned by the previous command.

AT+CMSS=5
+CMSS: 78
OK



The SMS #1 is received by the module itself, the following unsolicited indication is shown on DTE:

+CMTI: "SM",6

Check the current SMS storage type.

AT+CPMS?

+CPMS: "SM",6,30,"SM",6,30,"SM",6,30

OK

Use index 6 to read received SMS #1 from "SM" storage memory.

AT+CMGR=6

+CMGR: "REC UNREAD", "+39329X569YYY", "WIND SIM", "08/04/21,09:56:38+08"

SEND THE STORED SMS # 1 TO THE MODULE ITSELF

OK

Use index 6 to read again received SMS #1 from "SM" storage memory.

AT+CMGR=6

+CMGR: "REC READ", "+39329X569YYY", "WIND SIM", "08/04/21,09:56:38+08"

SEND THE STORED SMS # 1 TO THE MODULE ITSELF

OK



GSM/GPRS Standards

Example 2

Write a new SMS into the storage, send it to the module itself and read the message in the receiving storage.

AT+CMGF=1 ← Select Text Mode
OK

AT#SMSMODE=0 ← Disable the improved SMS functionality
OK

AT+CSMP=17,168,0,240 ← Assume to send an SMS of Class 0
OK

Select how the new received message event is indicated by the DCE to the DTE

AT+CNMI=1,1,0,0,0
OK

Store into "SM" the SMS message to be sent to the module itself.

AT+CMGW="+39329X569YYY"
> **SEND THE STORED SMS #1 TO THE MODULE ITSELF** (close the message with Ctrl Z or ESC to abort)
+CMGW: 1
OK

Send the stored SMS #1 using the storage position returned by the previous command.

AT+CMSS=1
+CMSS: 78
OK

The SMS #1 is received by the module itself, the following unsolicited indication is shown on DTE:

+CMTI: "ME",1

Check the current storage memory for SMS reading.

AT+CPMS?
+CPMS: "SM",1,50,"SM",1,50,"SM",1,50
OK

Use index 1 to read SMS #1 from "SM" storage memory, where the SMS was stored before sending.

AT+CMGR=1
+CMGR: "STO SENT","+39329X569YYY","WIND SIM"
SEND THE STORED SMS # 1 TO MODULE ITSELF
OK



Select “ME” storage type.

AT+CPMS="ME"
+CPMS: 1,1,1,50,1,50
OK

Use index 1 to read received SMS #1 from “ME” storage type.

AT+CMGR=1
+CMGR: "REC UNREAD", "+39329X569YYY", "WIND SIM", "08/04/21,09:56:38+08"
SEND THE STORED SMS # 1 TO THE MODULE ITSELF
OK

Use index 1 to read again received SMS #1 from “ME”.

AT+CMGR=1
+CMGR: "REC READ", "+39329X569YYY", "WIND SIM", "08/04/21,09:56:38+08"
SEND THE STORED SMS # 1 TO THE MODULE ITSELF
OK

Example 3

AT+CMGF=0 ← Set up PDU Mode
OK

Store into “SM” the SMS message to be sent to module itself.

AT+CMGW="+39329X569YYY"
+CMS ERROR: 304

The command does not work when the module is in PDU Mode.

Set up Text Mode.

AT+CMGF=1
OK

Store into “SM” the SMS message to be sent to module itself.

AT+CMGW="+39329X569YYY"
> **EDIT NEW SMS ...**(use ESC to abort the command.)
OK

3.7.7. Send a Stored SMS

An SMS stored into the “SM” storage type can be sent to the desired destination using the following AT command. To send the stored SMS its storage location index is needed.

AT+CMSS=<index>



GSM/GPRS Standards⁵, HSPA-GSM/GPRS Standards

Example

Send the stored SMS to the module itself:

AT+CMGF=1 ← Select Text Mode
OK

AT+CPMS="SM" ← Select "SM" storage to read SMS
+CPMS: 1,50,1,50,1,50
OK

Read the SMS stored on position 1.

AT+CMGR=1
+CMGR: "STO SENT","+39329X569YYY","WIND SIM"
SEND THE STORED SMS # 1 TO MODULE ITSELF
OK

Select how the new received message event is indicated by the DCE to the DTE.

AT+CNMI=1,1,0,0,0
OK

Send the stored SMS # 1 message to module itself.

AT+CMSS=1
+CMSS: 79
OK

The SMS #1 is received by the module itself, the following unsolicited indication is shown on DTE:

+CMTI: "SM",2

3.7.8. Send a New SMS without Storing It

A new SMS can be sent directly to the desired destination without storing it.

AT+CMGS="<da>"

⁵ Use AT#SMSMODE=1.



GSM/GPRS Standards⁶, HSPA-GSM/GPRS Standards

Example

Send the SMS message to the module itself and not store it before transmitting.

AT+CMGF=1 ← Select Text Mode.
OK

Select how the new received message event is indicated by the DCE to the DTE.

AT+CNMI=1,1,0,0,0
OK

Send the message to the module itself.

AT+CMGS="+39329X569YYY"
> **SEND THE SMS #1 TO IT ITSELF** (close the message with Ctrl Z)
+CMGS: 76
OK

The SMS #1 is received by the module itself, the following unsolicited indication is showed on DTE:

+CMTI: "SM",1

The SMS was successfully sent to the SMSC and its Network reference number is 76. Do not confuse message reference with message index position: the first one indicates the Network reference for identifying the sent message, the second one - reported by the unsolicited indication - indicates that the message is received by the module and it is stored on the position 1 of the "SM" storage.

Use unsolicited indication parameter to read the SMS #1 for the first time.

AT+CMGR=1
+CMGR: "REC UNREAD", "+39329X569YYY", "WIND SIM", "08/04/18,13:58:04+08"
SEND THE SMS #1 TO THE MODULE ITSELF
OK

3.7.9. Send a New SMS using GPRS service

An SMS can be sent by means of the GPRS service [4]. It is worth to remind that not all Network Operators support this features.

AT+CGSMS=2

⁶ Use AT#SMSMODE=1.



GSM/GPRS Standards⁷, HSPA-GSM/GPRS Standards

Examples

Send the SMS message to the module itself, not store it before transmitting and use the GPRS service

AT#SELINT=2 ← Select AT command interface style
OK

AT+CGSMS=2 ← Select the GPRS service
OK

Check if the module is attached to GPRS service

AT+CGATT?
+CGATT: 1
OK

Select Text Mode.

AT+CMGF=1
OK

Select how the new received message event is indicated by the DCE to the DTE.

AT+CNMI=1,1,0,0,0
OK

Send the message to the module itself.

AT+CMGS="+386X18X19X4"
> **SEND THE SMS BY MEANS OF THE GPRS SERVICE TO ITSELF** (close the message with Ctrl Z)
+CMGS: 14
OK

The SMS is received by the module itself, the following unsolicited indication is showed on DTE:

+CMTI: "SM",11

AT+CPMS="SM"
+CPMS: 11,50,11,50,11,50
OK

Use unsolicited indication parameter to read the SMS for the first time.

⁷ Use AT#SMSMODE=1.



AT+CMGR=11

+CMGR: "REC UNREAD", "+386X18X19X4", "", "09/08/03,14:14:04+08"
SEND THE SMS BY MEANS OF THE GPRS SERVICE TO ITSELF
OK

3.7.10. Delete an SMS

Use the following AT command to delete an SMS stored on the “SM” storage type.

AT+CMGD=<index>

GSM/GPRS Standards, HSPA-GSM/GPRS Standards

Example 1

Deleting an SMS stored in “SM” storage type:

AT+CPMS="SM" ← Select memory storage
+CPMS: 13,50,13,50,13,50
OK

AT+CMGD=? ← Check the SMS
+CMGD: (1,2,3,4,5,6,7,8,9,10,11,12,13),(0-4)
OK

Delete SMS in memory position 1.

AT+CMGD=1
OK

Check if the SMS is deleted:

AT+CMGD=?
+CMGD: (2,3,4,5,6,7,8,9,10,11,12,13),(0-4)
OK

Delete all SMS. Disregard the first parameter of the +CMGD.

AT+CMGD=1,4
OK

AT+CMGD=?
+CMGD: (), (0-4)
OK



GSM/GPRS Standards

Example 2

AT#SMSMODE=0
OK

AT+CPMS="ME" ← Select "ME" storage type
+CPMS: 1,1,6,30,6,30
OK

AT+CMGD=? ← Check the SMS.
+CMGD: (1),(0-4)
OK

AT+CMGD=1 ← Delete SMS in storage position 1
OK

Check if the SMS is deleted.

AT+CMGD=?
+CMGD: (), (0-4)
OK

3.7.11. Read an SMS

An SMS is read with the following command:

AT+CMGR=<index>

GSM/GPRS Standards⁸, HSPA-GSM/GPRS Standards

Example

AT+CPMS?
+CPMS: "SM",1,50,"SM",1,50,"SM",1,50
OK

Read the SMS #1, for the first time, in storage memory "SM", position 1:

AT+CMGR=1
+CMGR: "STO SENT", "+39329X569YYY", "WIND SIM"
SEND THE STORED SMS # 1 TO MODULE ITSELF
OK

⁸ Use AT#SMSMODE=1.



3.7.12. SMS Status

SMSs can be gathered into 5 different groups depending on their Status:

- REC UNREAD: received messages still not read
- REC READ: received messages already read
- STO UNSENT: written messages not yet sent
- STO SENT: written messages already sent
- ALL: all types of messages

Use the following AT command to query the SMS status:

AT+CMGL=<stat>

GSM/GPRS Standards⁹, HSPA-GSM/GPRS Standards

Example 1

AT+CMGF? ← Check if Text Mode is active
+CMGF: 1 ← Text Mode is active
OK

AT+CMGL=? ← Check the supported SMS status
+CMGL: ("REC UNREAD","REC READ","STO UNSENT","STO SENT","ALL")
OK

Check the available SMS storage type

AT+CPMS?
+CPMS: "SM",6,30,"SM",6,30,"SM",6,30
OK

List all the SMSs stored on "SM" storage with their Status.

AT+CMGL="ALL"
+CMGL: 1,"REC READ", SMS body
+CMGL: 2,"REC READ", SMS body
+CMGL: 3,"REC READ", SMS body
+CMGL: 4,"STO SENT", SMS body
+CMGL: 5,"STO SENT", SMS body
+CMGL: 6,"REC READ", SMS body
OK

List the SMSs stored on "SM" storage with their Status=STO SENT

⁹ Use AT#SMSMODE=1.




```
AT+CMGL="STO SENT"  
+CMGL: 4,"STO SENT", .... SMS body ....  
+CMGL: 5,"STO SENT", .... SMS body ....  
OK
```

GSM/GPRS Standards

Example 2

```
AT#SMSMODE=0  
OK
```

Check the supported storage types

```
AT+CPMS=?  
+CPMS:("ME","SM"),("SM"),("SM")  
OK
```

Check if Text Mode is active.

```
AT+CMGF?  
+CMGF: 1  
OK
```

Check the supported SMS status.

```
AT+CMGL=?  
+CMGL: ("REC UNREAD","REC READ","STO UNSENT","STO SENT","ALL")  
OK
```

Select "ME" storage type.

```
AT+CPMS="ME"  
+CPMS: 1,1,1,50,1,50  
OK
```

List SMSs stored in the "ME" storage type.

```
AT+CMGL="ALL"  
+CMGL: 1,"REC READ", .... SMS body ....  
OK
```

```
AT+CMGL="REC UNREAD"  
OK
```



3.7.13. Cell Broadcast Service

GSM Standard specifies two different types of SMS:

- SMS Point to Point (SMS/PP),
- SMS Cell Broadcast (SMS/CB).

The first type can send a text message long up to 160 characters from a module to the another (as stated on the previous paragraphs), the second type allows the Network to send, at the same time, a message to all modules contained in the defined area including one or more radio cells. The availability and the implementation of the Cell Broadcast Service are strictly connected with the Network Operator of the subscriber.

Use the following AT command to enable the Cell Broadcast Service:

AT+CSCB=[<mode>[,<mids>[,<dcss>]]]

Example

Select Text Mode.

AT+CMGF=1
OK

Select the District service.

AT+CSCB=0,50,0
OK

Select how the new received message event is indicated by the DCE to the DTE.

AT+CNMI=2,0,2,0,0
OK

After a while the “District” broadcast message is displayed on the DTE.

+CBM: 24,50,1,1,1
TRIESTE

+CBM: 4120,50,2,1,1
TRIESTE

+CBM: 8216,50,1,1,1
TRIESTE

+CBM: 12312,50,2,1,1
TRIESTE

The following list of Services can be provided by the Network Operator, it is not mandatory:

| <mids> | Service name |
|--------|--------------|
| 000 | Index |
| 010 | Flashes |



| | |
|-----|-------------------------------------|
| 020 | Hospitals |
| 022 | Doctors |
| 024 | Pharmacy |
| 030 | Long Distant Road Reports |
| 032 | Local Road Reports |
| 034 | Taxis |
| 040 | Weather |
| 050 | District |
| 052 | Network Information |
| 054 | Operator Services |
| 056 | Directory Inquiries (national) |
| 057 | Directory Inquiries (international) |
| 058 | Customer Care (national) |
| 059 | Customer Care (international) |

3.7.14. Read concatenated SMS

Use the following AT command to read concatenated SMSs:

AT#CMGLCONCINDEX

Example

Check the number of stored SMSs

AT+CPMS?

+CPMS: "SM",6,30,"SM",6,30,"SM",6,30

OK

6 SMSs are stored.

Check if concatenated SMSs are stored

AT#CMGLCONCINDEX

OK

No concatenated SMSs are stored

Set up Text Mode

AT+CMGF=1

OK

Set SMS parameters

AT+CSMP=17,167,0,242

OK

Store two concatenated SMSs (they are indicated with two colors):

AT+CMGW= "+3932X056Y6X8"





```
AT+CMGR=8
+CMGR: "STO UNSENT", "+3932X056Y6X8", ""
3456789098765432109876543210
OK
```

3.8. GPIO Pins

Telit Modules provide various GPIO pins, which can be configured, by means of the AT commands, as showed hereafter:

- Inputs,
- Outputs,
- "Alternate Functions".

User applications, running on DTE or on the module itself, through GPIO AT commands, can control external user equipments connected to GPIO pins. Few or no circuitries are needed to perform the required hardware interface. For detailed GPIO pins descriptions from the circuitry point of view refer to [3] in accordance with the used module. Tab. 5 summarizes the Telit Modules covered by this guide and their GPIO pins.

3.8.1. Set GPIO Pin as OUTPUT

Use the following AT command to set a GPIO as output with Low or High status value.

AT#GPIO=<pin>,<value>,1

Examples

Set GPIO8 pin as Output with Low status:

AT#GPIO=8,0,1

OK

GPIO8 pin is successfully put in output direction and its status has been set to Low.

Set GPIO8 pin as Output with High status:

AT#GPIO=8,1,1

OK

GPIO8 pin is successfully put in output direction and its status has been set to High.



NOTE: in general, GPIO setting is not saved on module power off. At power on, repeat pin setting commands. For more details refer to [3] in accordance with the used module.



| Families and Products For Software Versions refer to Tab. 1 | | GPIO < PIN > description | | | | | | | | | | |
|--|------------|--------------------------|---------------------------|----------------------------|---|---|---------------------------------|----------------------------|---------------------------------|---------------------------------|-------------------------|------------------------|
| | | GPIO < pin > range | GPI Only Input pins | GPO Only Output pins | At Power on GPIO are configured as input. User settings are not saved and will be lost on Power off. | The user settings of GPIO are maintained even after a Power off to permit “Alternate Functions” to be always properly set. | Alternate Functions | | | | | |
| | | | | | | | RF TX Contr., See 3.8.4.1 | RF TX Mon., See 3.8.4.2 | ALARM Output, See 3.8.4.3 | BUZZER Output See 3.8.4.4 | Stat Led See 3.8.4.5 | Jamming See 3.8.4.6 |
| GC Family (Compact) | SW Version | | | | | | | | | | | |
| GC864-QUAD | 10.00.xxx | 1 - 22 | N/A | N/A | 1 – 3; 8 - 22 | 4,5,6,7 | 4 | 5 | 6 | 7 | N/A | 2 |
| GC864-QUAD V2 | 10.00.xxx | 1 - 10 | N/A | N/A | 1 - 3; 8 - 10 | 4,5,6,7 | 4 | 5 | 6 | 7 | N/A | 2 |
| GC864-DUAL V2 | 10.00.xxx | 1 - 10 | N/A | N/A | 1 - 3; 8 - 10 | 4,5,6,7 | 4 | 5 | 6 | 7 | N/A | 2 |
| GE/GL Family (Embedded) | | | | | | | | | | | | |
| GE864-QUAD | 10.00.xxx | 1 - 22 | N/A | N/A | 1 - 3; 8 - 22 | 4,5,6,7 | 4 | 5 | 6 | 7 | N/A | 2 |
| GE864-QUAD V2 | 10.00.xxx | 1 - 9 | N/A | N/A | 1 - 3; 8 – 9 | 4,5,6,7 | 4 | 5 | 6 | 7 | N/A | 2 |
| GE864-QUAD Automotive V2 | 10.00.xxx | 1 - 9 | N/A | N/A | 1 - 3; 8 - 9 | 4,5,6,7 | 4 | 5 | 6 | 7 | N/A | 2 |
| GE864-QUAD ATEX | 10.00.xxx | 1 - 10 | N/A | N/A | 1 - 3; 8 - 10 | 4,5,6,7 | 4 | 5 | 6 | 7 | N/A | 2 |
| GE864-DUAL V2 | 10.00.xxx | 1 - 10 | N/A | N/A | 1 - 3; 8 - 10 | 4,5,6,7 | 4 | 5 | 6 | 7 | N/A | 2 |
| GE864-GPS | 10.00.xxx | 1 - 10 | N/A | N/A | 1 - 3; 8 - 10 | 4,5,6,7 | 4 | 5 | 6 | 7 | N/A | 2 |
| GE865-QUAD | 10.00.xxx | 1 - 10 | N/A | N/A | 1 - 3; 8 - 10 | 4,5,6,7 | 4 | 5 | 6 | 7 | N/A | 2 |
| GL865-DUAL | 10.00.xxx | 1 - 8 | N/A | N/A | 1 - 3; 8 | 4,5,6,7 | 4 | 5 | 6 | 7 | 8 | 2 |
| GL865-QUAD | 10.00.xxx | 1 - 8 | N/A | N/A | 1 - 3; 8 | 4,5,6,7 | 4 | 5 | 6 | 7 | 8 | 2 |
| GL868-DUAL | 10.00.xxx | 1 - 8 | N/A | N/A | 1 - 3; 8 | 4,5,6,7 | 4 | 5 | 6 | 7 | 8 | 2 |
| GE910-QUAD | 13.00.xxx | 1 - 10 | N/A | N/A | 1 - 10 | 4,5,6,7 | 4 | 5 | 6 | 7 | 1 | 2 |
| GL865-DUAL V3 | 16.00.xxx | 1 - 8 | N/A | N/A | 1 – 3; 8 | 4,5,6,7 | 4 | 5 | 6 | 7 | 8 | 2 |
| GL868-DUAL V3 | 16.00.xxx | 1 - 8 | N/A | N/A | 1 – 3; 8 | 4,5,6,7 | 4 | 5 | 6 | 7 | 8 | 2 |
| GT Family (Terminal) | | | | | | | | | | | | |
| GT863-PY | 10.00.xxx | 4 - 7 | N/A | N/A | - | 4,5,6,7 | 4 | 5 | 6 | 7 | N/A | N/A |
| GT864-QUAD | 10.00.xxx | 4 - 7 | N/A | N/A | - | 4,5,6,7 | 4 | 5 | 6 | 7 | N/A | N/A |
| GT864-PY | 10.00.xxx | 4 - 7 | N/A | N/A | - | 4,5,6,7 | 4 | 5 | 6 | 7 | N/A | N/A |



| Families and Products For Software Versions refer to Tab. 1 | | GPIO < PIN > description | | | | | | | | | | |
|--|-----------|--------------------------|---------------------------|----------------------------|---|---|---------------------------------|----------------------------|---------------------------------|---------------------------------|-------------------------|------------------------|
| | | GPIO < pin > range | GPI Only Input pins | GPO Only Output pins | At Power on GPIO are configured as input. User settings are not saved and will be lost on Power off. | The user settings of GPIO are maintained even after a Power off to permit “Alternate Functions” to be always properly set. | Alternate Functions | | | | | |
| | | | | | | | RF TX Contr., See 3.8.4.1 | RF TX Mon., See 3.8.4.2 | ALARM Output, See 3.8.4.3 | BUZZER Output See 3.8.4.4 | Stat Led See 3.8.4.5 | Jamming See 3.8.4.6 |
| HE910 Family | | | | | | | | | | | | |
| HE910 | 12.00.xxx | 1 - 10 | N/A | N/A | 1 - 10 | N/A | N/A | N/A | [17] | N/A | [17] | N/A |
| HE910-GA | 12.00.xxx | 1 - 10 | N/A | N/A | 1 - 10 | N/A | N/A | N/A | [17] | N/A | [17] | N/A |
| HE910-D | 12.00.xxx | 1 - 10 | N/A | N/A | 1 - 10 | N/A | N/A | N/A | [17] | N/A | [17] | N/A |
| HE910-EUR / HE910-EUD | 12.00.xxx | 1 - 10 | N/A | N/A | 1 - 10 | N/A | N/A | N/A | [17] | N/A | [17] | N/A |
| HE910-EUG / HE910-NAG | 12.00.xxx | 1 - 10 | N/A | N/A | 1 - 10 | N/A | N/A | N/A | [17] | N/A | [17] | N/A |
| HE910-NAR / HE910-NAD | 12.00.xxx | 1 - 10 | N/A | N/A | 1 - 10 | N/A | N/A | N/A | [17] | N/A | [17] | N/A |

Tab. 5: GPIO pins description



3.8.2. Set GPIO Pin as INPUT

Use the following AT command to set a GPIO as input. A dummy value must be specified for pin status value.

AT#GPIO=<pin>,<dummy_value>,0

Example

Set GPIO9 pin as Input:

AT#GPIO=9,0,0

OK

GPIO9 pin is successfully put in Input direction.



NOTE: in general, the GPIO setting is not saved on Power off. At Power on, repeat pin setting commands. For more details refer to [3] in accordance with used module.

3.8.3. GPIO Pin Status

Use the following AT command to query the pin status:

AT#GPIO=<pin>,2

Examples

Set GPIO8 pin as Output with Low status.

AT#GPIO=8,0,1

OK

Set GPIO9 pin as Input.

AT#GPIO=9,0,0

OK

Now, physically connect GPIO8 with GPIO9.

Check the GPIO9 status.

AT#GPIO=9,2

#GPIO: 0,0

GPIO9 pin is set in Input direction and its status is Low, as commanded by GPIO8.

Set GPIO8 pin as Output with High status.

AT#GPIO=8,1,1

OK

Check the GPIO9 status.



AT#GPIO=9,2

#GPIO: 0,1

GPIO9 pin is set in Input direction and its status is High, as commanded by GPIO8.

Check the GPIO8 status.

AT#GPIO=8,2

#GPIO: 1,1

GPIO8 pin is set in Output direction and its status is High.

Check the supported range of pin, mode and direction. The command response depends on the module under test.

AT#GPIO=?

#GPIO: (1-13),(0-2),(0-2)

OK



NOTE: the command response is function of the pin direction:

- input: the command response indicates the current input status;
- output: the command response indicates the last pin set status;

If GPIO pin is set to Alternate Function mode, the reported status is not valid.

3.8.4. GPIO & Alternate Function

The following paragraphs describe the GPIO dedicated to support the “Alternate Function” configuration and the AT commands used to perform the setting. For a detailed documentation about the Alternate Functions and GPIO circuitry refer to [3].

3.8.4.1. GPIO4 Pin as RF Transmission Control

The GPIO4 pin is provided with circuitry to manage the “RF Transmission Control”. The user application by means of the GPIO4 can control the transmitter of the module. Use the following AT command to set the GPIO4 in “RF Transmission Control” Alternate Function mode.

AT#GPIO=4,<dummy_value>,2



NOTE: the GPIO4 pin is set in input direction; the setting is saved at module power off. In accordance with the module under test, refer to [3] for details on circuitry pin topic.

3.8.4.2. GPIO5 Pin as RFTXMON OUTPUT

The GPIO5 pin is provided with circuitry in order to be connected to the “RFTXMON OUTPUT”. The user application by means of the GPIO5 can monitor the transmitter module status. Use the following AT command to set the GPIO5 in “RFTXMON OUTPUT” Alternate Function mode.



AT#GPIO=5,<dummy_value>,2

Example

Set GPIO5 pin as RFTXMON OUTPUT:

AT#GPIO=5,0,2

OK

GPIO5 pin is successfully set in RFTXMON OUTPUT Alternate Function mode.



NOTE: the GPIO5 pin is set in output direction; the setting is saved at module power off.

3.8.4.3. GPIO6 Pin as ALARM OUTPUT

The GPIO6 pin is provided with circuitry in order to be used as “ALARM OUTPUT”. The pin reports the ALARM state following the ALARM settings previously performed by means of the +CALA command. The user application through the GPIO6 can monitor the ALARM status. Use the following AT command to set the GPIO6 pin in “ALARM OUTPUT” Alternate Function mode.

AT#GPIO=6,<dummy_value>,2

Example

Set GPIO6 pin as ALARM OUTPUT:

AT#GPIO=6,0,2

OK

GPIO6 pin is successfully set in ALARM OUTPUT Alternate Function mode.



NOTE: the GPIO6 pin is set in output direction, the setting is saved after module power off. Use +CALA command to setup the needed ALARM setting working with GPIO6.

3.8.4.4. GPIO7 Pin as BUZZER OUTPUT

The GPIO7 pin is provided with circuitry in order to be used as “BUZZER OUTPUT”. Use the following AT command to set the GPIO7 pin in “BUZZER OUTPUT” Alternate Function mode.

AT#GPIO=7,<dummy_value>,2

Example

Set GPIO7 pin as BUZZER OUTPUT:

AT#GPIO=7,0,2

OK

GPIO7 pin is successfully set in BUZZER OUTPUT Alternate Function mode.





NOTE: the GPIO7 pin is set in output direction, the setting is saved at module power off. Use #SRP command to setup the needed BUZZER configuration.

3.8.4.5. Set STAT_LED GPIO

The Network Service availability and Call status can be indicated through the blinking light of a led connected to a GPIO by means of a simple circuitry. The GPIO used for this function depends from the product as showed on Tab. 5. This GPIO is called STAT_LED pin and can be configured using the following AT command.

Enable the function

AT#SLED=2

OK

Save the setting

AT#SLEDSAV

OK

Disable the function

AT#SLED=0

OK

Now, the used GPIO is free to be used for other functions.

3.8.4.6. Set “Jam” GPIO

GC, GE/GL families

Jamming devices interfere with GSM communications corrupting signals belonging to a GSM band. GPIO2 can be used to give information concerning the presence/absence of jamming activity in that area. It can be configured using the following AT command.

Enable GPIO2 as jamming activity indicator and select the Method 1 to evaluate the presence/absence of jamming.

AT#JDRENH=1,1

OK

Disable GPIO2 as jamming activity indicator.

AT#JDRENH=0

OK



Enable GPIO2 as jamming activity indicator and select the Method 2 to evaluate the presence/absence of jamming. To perform the evaluation using Method 2, the module must be powered on when jamming activity is not present.

AT#JDRENH=1,2

OK

Disable GPIO2 as jamming activity indicator.

AT#JDRENH=0

OK

In general, the quickness of the evaluation response depends on the number of GSM frequencies that are analyzed.



3.8.5. Clock and Alarm Functions

Telit Modules provide Real Time Clock and Alarm features to implement the following functions:

- Set up the right time
- Check the actual time
- Set up an alarm time

Use +CALA command to perform the alarm setting. In general, update the Telit Module clock before using the Alarm feature.

On alarm trigger the Telit Module can do the following:

- Automatically wakes up from shutdown and becomes fully operative.
- Automatically wakes up from shutdown and enters dedicated "Alarm Status". The module does not look for or try to register on any network; it performs only previously programmed "alarm actions". It can receive AT commands to become fully operative or shutdown immediately.
- If already ON at alarm trigger time, it simply performs the "alarm actions".

Once woken up, the Telit Module can perform one of the following actions:

- Send an unsolicited code "+CALA: <user_text>" on the serial port until the 90s timeout expires or a special wake up command is received.
- Play an Alarm tone until the 90s timeout expires or a special wake up command is received.
- Rise the pin GPIO6 until the 90s timeout expires or a special wake up command is received.
- Any combination of the above actions.

Example of actions that Telit Module can perform using above stated features:

- Wake up itself and its controlled hardware, through the GPIO6 pin, at the desired time: a timely survey can be programmed without the need to power on any hardware; the objective is to minimize the power consumption.
- Activate some user devices on a time trigger event by means of the GPIO6 pin.
- Alert the user application that the "alarm time" is expired through the previously programmed unsolicited code "+CALA:<user_text>".
- Alert the user playing the alarm tone.



3.8.5.1. Set Module Clock

Use the following AT command to update the module clock.

AT+CCLK="<time>"

Example

Set up the clock to 7 November 2002 at 12h 24m 30s for the time zone +01h central Europe:

AT+CCLK="02/11/07,12:24:30+04"

OK

The time is successfully set.



NOTE: the updated time starts immediately after the time setting command

3.8.5.2. Read the Current Date and Time

Use the following AT command to display the current module time.

AT+CCLK?

Examples

Read the current time:

AT+CCLK?

+CCLK="02/11/07,12:26:47"

OK

Current date/time is: 7 November 2002 12h 26m 47s

Enter the current time: year/month/day,hour:minute:seconds±time zone:

AT+CCLK="08/05/16,09:20:30+00"

OK

Reading the time:

AT+CCLK?

+CCLK: "08/05/16,09:20:52"

OK



NOTE: the three last characters of <time> are not returned by the command because the module under test does not support time zone information.



3.8.5.3. Set Alarm Time

Use the following AT command to set up the Alarm configuration:

AT+CALA="<time>",<0>,<type>,<text>"

Examples

Follow this commands sequence to set up an Alarm configuration.

Read the current time.

AT+CCLK?

+CCLK: "08/05/16,09:20:52"

OK

Set up an Alarm configuration.

AT+CALA="08/05/16,09:35:30+00",0,2,"ALARM, ALARM, ALARM"

OK

Read the current time.

AT+CCLK?

+CCLK: "08/05/16,09:33:15"

OK

Read the current time.

AT+CCLK?

+CCLK: "08/05/16,09:34:04"

OK

Read the current time, the Alarm time is close.

AT+CCLK?

+CCLK: "08/05/16,09:34:49"

OK

The Alarm time is reached, the module displays on the DTE the previously configured unsolicited code:

+CALA: ALARM, ALARM, ALARM

+CALA: ALARM, ALARM, ALARM

+CALA: ALARM, ALARM, ALARM

+CALA: ALARM, ALARM, ALARM

+CALA: ALARM, ALARM, ALARM

.

.

Follow this command sequence to set up and delete the new Alarm configuration.

Read the current time.



AT+CCLK?

+CCLK: "08/07/18,10:17:21"

OK

Set up the Alarm configuration

AT+CALA="08/07/18,10:22:00+00",0,2,"NEW ALARM"

OK

Read the current time

AT+CCLK?

+CCLK: "08/07/18,10:19:04"

OK

Read the current time

AT+CCLK?

+CCLK: "08/07/18,10:19:48"

OK

The Alarm time is not reached

Delete the Alarm configuration

AT+CALD=0

OK

Read the current time

AT+CCLK?

+CCLK: "08/07/18,10:22:37"

OK

The Alarm time is over, the unsolicited +CALA: NEW ALARM message is not appeared on the DTE in accordance with AT+CALD=0 command.

Follow this command sequence to set up and delete the new Alarm configuration.

Read the current time

AT+CCLK?

+CCLK: "08/07/18,10:42:31"

OK

Set up the Alarm configuration

AT+CALA="08/07/18,10:48:00+00",0,2,"NEW1 ALARM"

OK

Read the current time



AT+CCLK?

+CCLK: "08/07/18,10:44:25"

OK

The Alarm time is not reached

Delete the Alarm configuration

AT+CALA=""

OK

Read the current time

AT+CCLK?

+CCLK: "08/07/18,10:47:02"

OK

The Alarm time is still not reached

Read the current time

AT+CCLK?

+CCLK: "08/07/18,10:48:46"

OK

The Alarm time is over, the unsolicited +CALA: NEW1 ALARM message is not appeared on the DTE in accordance with AT+CALA="" command.

Follow this command sequence to set up the recurrent Alarm configuration.

Read the current time

AT+CCLK?

+CCLK: "08/07/18,10:42:31"

OK

Set up a recurrent Alarm configuration for all days in the week

AT+CALA="11:45:00+00",0,2,"NEW2 ALARM",0

OK

Read the current time

AT+CCLK?

+CCLK: "08/07/18,11:35:25"

OK



The response shows that the Alarm time is still not reached.

The Alarm time is reached, the module displays on the DTE the previously configured unsolicited code:

+CALA: NEW2 ALARM

+CALA: NEW2 ALARM

+CALA: NEW2 ALARM

+CALA: NEW2 ALARM

+CALA: NEW2 ALARM

.

.

Exit “Alarm Activity” and enter “Normal Operating Mode”

AT#WAKE=0

OK

Set up the new day to simulate the passing of time

AT+CCLK="08/07/19,11:42:00+00

OK

Read the current time

AT+CCLK?

+CCLK: "08/07/19,11:44:25"

OK

The response shows that the Alarm time is still not reached

The Alarm time is reached, the module displays on the DTE the configured unsolicited code set up yesterday! :

+CALA: NEW2 ALARM

+CALA: NEW2 ALARM

+CALA: NEW2 ALARM

+CALA: NEW2 ALARM

.



NOTE: the Alarm time refers to the local time, regardless the time zone set by +CCLK command.



If GPIO6 pin is used as ALARM OUTPUT, it must be configured in “Alternate Function” mode (see paragraph 3.8.4.3) or else the pin will not respond to the Alarm settings.

If the unsolicited code +CALA: <text> is used, the serial port speed must be configured as needed (see paragraph 2.5) and stored in the active profile (see AT&W command), in order to perform the Telit Module power on with the desired serial port speed. Differently, at the Alarm wakeup, the module will start with the default port speed that should differ from the speed set on DTE.

3.8.5.4. Postpone Alarm Time

Use the following AT command to postpone the Alarm configuration. It is not supported by modules equipped with Software Version 7.03.xx3, see Tab. 1.

AT+CAPD=<time>

Examples

Read the current time

AT+CCLK?

+CCLK: "09/08/05,09:24:46+04"

OK

Set up the Alarm configuration

AT+CALA="09/08/05,09:28:00+04",0,2,"NEW ALARM"

OK

Postpone of 60 seconds the just configured Alarm

AT+CAPD=60

OK

The Alarm time is reached, the module displays on the DTE the configured unsolicited code:

+CALA: NEW ALARM

+CALA: NEW ALARM

.

.

3.8.5.5. Stop Alarm Activity

When the “Alarm Time” is reached, the module starts the “Alarm Activity” according to the previous “Alarm Setting”. There are three ways to stop the “Alarm Activity”. The user can do the following:



- Shutdown the module
- Exit from “Alarm Activity” and enter the “Normal mode”
- Let the “Alarm Activity” continue until the 90 sec timeout is expired

Exit from the Alarm Status and Shutdown:

use the following AT command, the module exits “Alarm Activity” and shuts down.

AT#SHDN
OK

Exit from the Alarm Status and Enter the Normal mode:

Use the following AT command, the module exits “Alarm Activity” and enters “Normal mode”.

AT#WAKE=0
OK

3.8.5.6. Alarm Status

When the “Alarm Time” is reached, the module wakes up and starts the “Alarm Activity”, during this period no “Network Activity” is performed: the user application can perform some operations without register the module on the network. To check if the module is in the "Alarm" or in the “Normal mode” status, use the following AT command.

AT#WAKE?



NOTE: when the module is in the “Alarm” mode, no network activities are allowed: it is not possible to receive or send Calls, SMS and any GSM/GPRS services. The only commands that are accepted by the module are: #WAKE and #SHDN.

3.8.5.7. A simple Alarm Application

In this example, it is assumed that the user is developing a Meteorological Unit using a battery powered module. The Meteorological Unit requirement is to measure the weather conditions every hour and send an SMS message to the main server, indicating the weather status just measured. The user application should minimize the power consumption, because the Meteorological Unit will be installed in a remote location and its battery must last as long as possible. To minimize the power consumption, the user application should shut the module down as well the equipment that does not need to be powered up all the time. The module and the equipments will be woken up every hour for just the time needed to measure and send the required SMS message.



Set up the current time.

AT+CCLK="02/11/07,12:24:30+01"
OK

Set up the next alarm to program the GPIO6 pin which is responsible to power up the user equipment that does not need to be powered up all the time.

AT+CALA="02/11/07,13:24:30+01",0,6,"TIME TO MEASURE & SMS...!"
OK

Shut down the module and the equipment.

AT#SHDN
OK

The module and the equipment are powered OFF.

After an hour, when the programmed alarm time is reached, the module turns itself ON in "Alarm Mode", forces high the GPIO6 pin, which turns on the power supply of the equipment and sends the unsolicited code to DTE every three seconds:

+CALA: TIME TO MEASURE & SMS...!

The module recognizes the unsolicited code and forces itself in operating mode:

AT#WAKE=0
OK

The equipment performs the weather measurements and by means of the module sends the SMS with the weather data.

Read the current time.

AT+CCLK?
+CCLK="02/11/07,13:24:47"
OK

Calculate and set up the next alarm time to program the GPIO6 pin which is responsible to power up the user equipment that does not need to be powered up all the time.

AT+CALA="02/11/07,14:24:47+01",0,6,"TIME TO MEASURE & SMS...!"
OK

Shut down the module and the equipment.

AT#SHDN
OK

The module and the equipment are powered OFF. This sequence is repeated every hour.



4. Firmware Update Tool

The Telit Modules firmware is updated through the serial interface normally used to enter AT commands.

Generally speaking, it is suggested to provide an RS232 interface on the user printed circuit board (on which Telit Module is soldered) to perform the physical connection between Telit Module and Windows-based PC; that simple circuitry makes it easier to update firmware when the installation of a new firmware version is required.

During the user application development or evaluation phase of the Telit Module, the RS232 interface or the USB port implemented on the Telit Evaluation Kit (EVK2) [6] can be used to connect the Telit Module to the Windows-based PC on which a dedicated tool for firmware updating is running.

Telit provides the user with a suitable tool to update the firmware of the modules. The following paragraphs describe it.



NOTE: GT terminals are completely cased modems (refer to Tab. 1) and provide the standard RS232 port that can be used to perform firmware update.

4.1. Xfp Tool

The firmware update can be performed with the Xfp Tool running on Windows based PCs. It erases the flash memory content, and then downloads the new firmware on the flash memory.

4.1.1. Upgrade Procedure

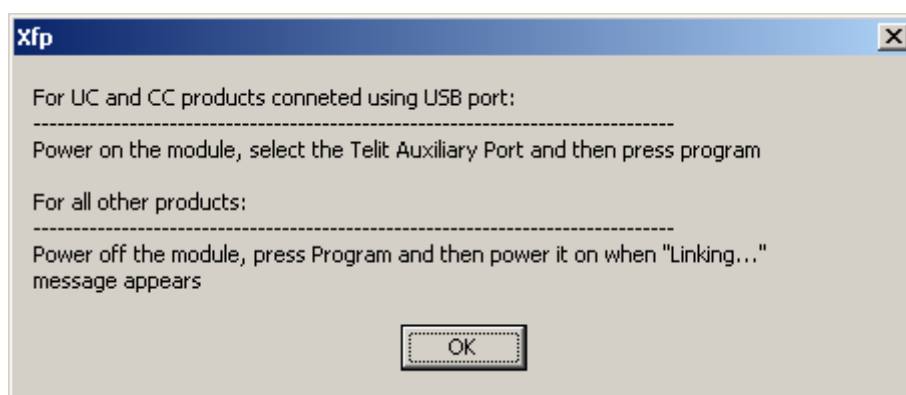
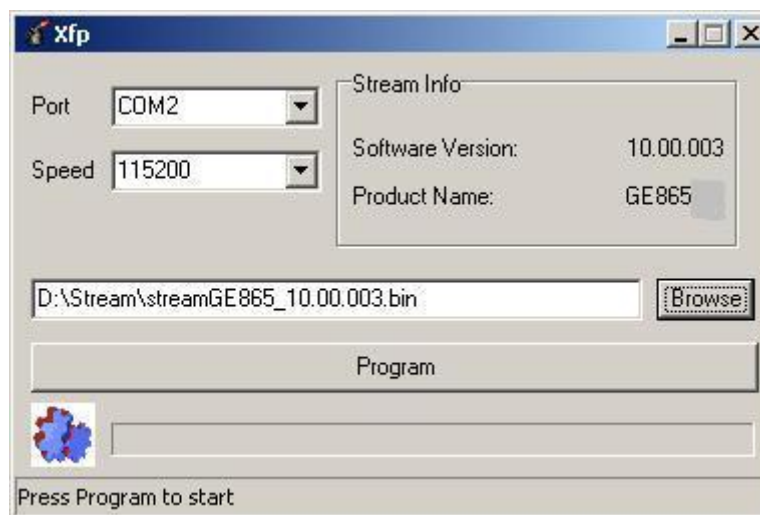
To update the firmware follow the showed procedure:

1. check the Telit Module and Software version using the listed AT commands:
 - **AT+CGMR<cr>**, returns the software version information;
 - **AT+CGMM<cr>**, returns the Telit Module identification.
2. Switch OFF the module.
3. Run the Xfp.exe tool, the following windows are displayed. Select COM port, speed¹⁰ and stream file (stream file holds new firmware). For UC and CC products use the Auxiliary Port, refer to [15]. UC and CC products are out of the scope of the present document, they

¹⁰ To use speed grater than 115200 Bps a dedicated hardware on PC is needed.

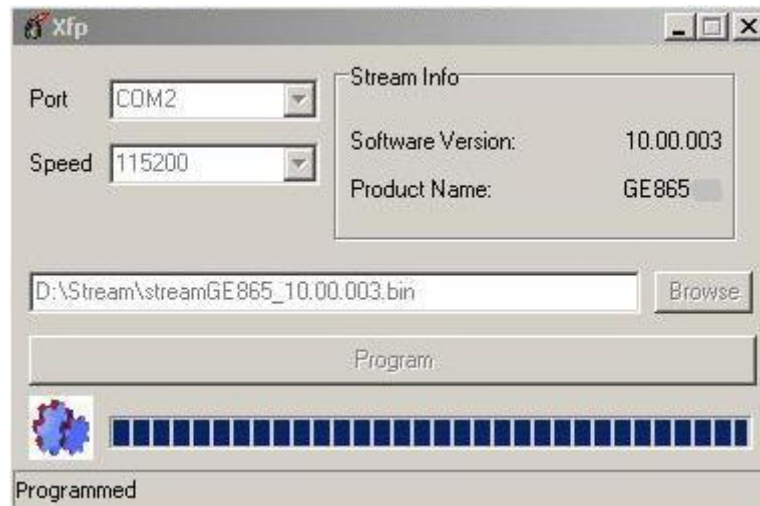


are mentioned here because Xfp tool supports them and also the modules covered by this guide.



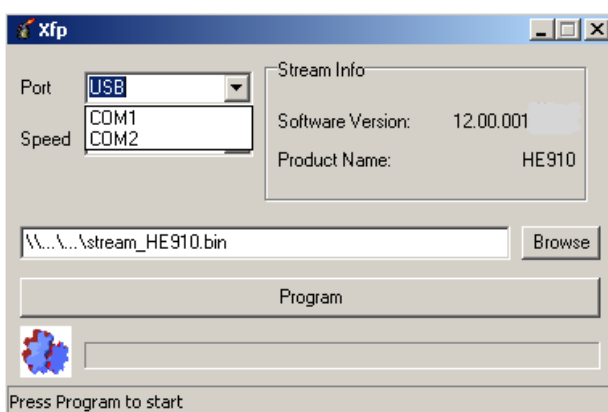
4. Read the instructions and follow them. The following windows are displayed on the screen when the module is successfully programmed.





- Now the Telit Module is programmed with the new firmware. Press OK button and exit the tool.

A trick to use with HE910 Family:



In order to use the USB port when is used a Module belonging to the HE910 Family it is mandatory to manually write “USB” into the Port Box. The COMx displayed by the tool are those provided by the Windows OS. Before starting the upgrade via USB, it is mandatory to install on the PC the Telit_HE910_FlashUSB_Driver_xxx available on the Telit Download Zone area.



4.1.1.1. Command Line running Xfp tool

The Telit Module Upgrade Procedure can be performed by means of a command line running the Xfp tool in MS-DOS environment.

The command line (use a space between two consecutive parameters) is:

Xfp stream_file port speed [autoterminate] [linktimeout]

Where:

Xfp is the tool described on paragraph 4.1.1;

stream_file file that must be downloaded (full path);

port COM1, COM2, ..., in accordance with the PC configuration;

speed 9600, ..., in accordance with the PC configuration;

autoterminate if 0: Xfp doesn't exit at the downloading end, regardless of the result of the just performed activity;

if 1: the Xfp exits at the downloading end, regardless of the result of the just performed activity;

Default value = 0.

linktimeout linktimeout value expressed in sec. Suggested range: 5 ÷ 60 [sec]. Default value = 60 [sec]. If linktimeout is used, must be used also autoterminate parameter.

Exit Codes:

| | |
|-----|------------------|
| 0 | OK |
| 4 | stream not found |
| 5 | can't open port |
| -4 | link failure |
| -9 | timeout / error |
| -11 | speed error |

Exit Codes are displayed on the screen when Xft tool is closed.



The following example of VBScript can be used in order to avoid the manual entry of the parameters above listed:

```
'=====
'
'      TELIT COMMUNICATIONS S.P.A
'
'      VBScript Source File Name: XfpDOS.VBS
'
'      14th June 2010
'=====

Dim WshShell
Dim oExec
Set WshShell = CreateObject("WScript.Shell")
Command = "c:\Program\Telit\xfp\Xfp.exe D:\Stream\streamGE865_10.00.003.bin COM2 115200 0 60"
WScript.Echo "Start: " & Now()
WScript.Echo "Executing: " & Command
Set oExec = WshShell.Exec(Command)
Do While oExec.Status = 0
    WScript.Sleep 100
Loop
WScript.Echo "ExitCode: " & oExec.ExitCode
WScript.Echo "Stop: " & Now()
WScript.Quit
'=====
```

Follow these steps to run the XfpDOS.VBS script:

- 1) Enter MS-DOS environment
- 2) Enter the command : CSCRIPT XfpDOS.VBS <CR>



5. Document History

| Revision | Date | Changes |
|----------|------------|--|
| ISSUE#7 | 2011-11-23 | The present release supersedes all previous releases. The document has been reorganized in several parts. |
| ISSUE#8 | 2012-02-14 | Modified chapter 4.1.1 |
| ISSUE#9 | 2012-03-12 | Updated: “Applicability table” and Tab. 5 Updated chapters: 3.6, 2.1, 2.16, 2.5, 3.2, 3.5.1, 2.10.5, 1.4, 2.11.5, 2.10.6 |
| ISSUE#10 | 2012-03-26 | Added GE910-QUAD to applicability table Added notes on the AT commands covered table at pag.3 |
| ISSUE#11 | 2012-07-03 | Updated notes about the GE910-QUAD (13.00.xx2). Rearrangement of the Hand Set and Hand Path Commands chapters. Updated Applicability Table Rearrangement of the chapter 2.11.7 |
| ISSUE#12 | 2013-02-07 | Updated Applicability Table: dropped out products having software version: 07.xx.xxx, added products GL865-DUAL V3 and GL868-DUAL V3 (16.xx.xxx); updated software versions of the products. Review of the chapters: 2, 2.1, 2.5, 2.6, 2.10.6, 2.11.7.1, 2.12.2, 2.16, 3.5.1, 3.6, 3.7.4, 3.8.1. Added chapter: 2.12.11. |
| ISSUE#13 | 2013-02-14 | Added a note about GE910-QUAD in chapter 2.1. |



6. Abbreviation and acronyms

| | |
|--------|--|
| BCCH | Broadcast Control Channel |
| CSD | Circuit Switched Data |
| CTM | Cellular Text Telephone Modems |
| CTS | Clear To Send |
| DCE | Data Circuit-Terminating Equipment (refer to [14]) |
| DRX | Discontinuous Reception |
| DTE | Data Terminal Equipment (refer to [14]) |
| DTMF | Dual Tone Multiple Frequency |
| DTR | Data Terminal Ready |
| GERAN | GSM EDGE Radio Access Network |
| GPIO | General Purpose Input/Output |
| HF | Hands Free (old terminology) |
| HS | Hand Set (old terminology) |
| HSPA | High Speed Packet Access |
| IRA | International Reference Alphabet |
| ME | Mobile Equipment |
| MSISDN | Mobile Station International Subscriber Directory Number |
| NMEA | National Marine Electronics Association |
| NVM | Non Volatile Memory |
| PDU | Protocol Data Unit |
| PIN | Personal Identification Number |
| SIM | Subscriber Identification Module |
| SMS | Short Message Service |
| SMSC | Short Message Service Center |
| TTY | Text Telephone Typewriter |
| UART | Universal Asynchronous Receiver Transmitter |
| URC | Unsolicited Result Code |
| USIM | Universal Subscriber Identification Module |
| UTRAN | Universal Terrestrial Radio Access Network |

