

Telit Modules Software User Guide

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APPLICABILITY TABLE

NOTICE: *the information provided by the present document is concerning the products having a software version equal or less than the versions showed on the following table. The **software version** is indicated by the digits in bold style; the platform version is indicated by the first two digits. See chapter 2 to get more information about the rules used on this guide to describe features and AT Commands examples taking into account the different product families, platform and software versions.*

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

	Platform & Software Ver.	AT Ref. Guide	Standards	#SELINT=0	#SELINT=1	#SELINT=2
GM Family (Modem)						
GM862-GPS	07. 03 .xx3	[1]	GSM/GPRS	•	•	*
GC Family (Compact)						
GC864-QUAD	10. 00 .xx6	[1]	GSM/GPRS	•	•	*
GC864-QUAD-V2	10. 00 .xx6	[1]	GSM/GPRS	•	•	*
GC864-DUAL-V2	10. 00 .xx6	[1]	GSM/GPRS	–	–	•
GE/GL Family (Embedded)						
GE863-GPS	07. 03 .xx3	[1]	GSM/GPRS	•	•	*
GE863-PRO3	07. 03 .xx3	[1]	GSM/GPRS	–	–	•
GE864-QUAD	10. 00 .xx6	[1]	GSM/GPRS	•	•	*
GE864-QUAD-V2	10. 00 .xx6	[1]	GSM/GPRS	–	–	•
GE864-QUAD-Automotive-V2	10. 00 .xx6	[1]	GSM/GPRS	–	–	•
GE864-QUAD-ATEX	10. 00 .xx6	[1]	GSM/GPRS	–	–	•
GE864-DUAL-V2	10. 00 .xx6	[1]	GSM/GPRS	•	•	*
GE864-GPS	10. 00 .xx6	[1]	GSM/GPRS	–	–	•
GE865-QUAD	10. 00 .xx6	[1]	GSM/GPRS	–	–	•
GL865-DUAL	10. 00 .xx6	[1]	GSM/GPRS	–	–	•
GL865-QUAD	10. 00 .xx6	[1]	GSM/GPRS	–	–	•
GL868-DUAL	10. 00 .xx6	[1]	GSM/GPRS	–	–	•
GE910-QUAD	13. 00 .xx2	[1]	GSM/GPRS	–	–	•
GT Family (Terminal)						
GT863-PY	10. 00 .xx6	[1]	GSM/GPRS	–	–	•
GT864-QUAD	10. 00 .xx6	[1]	GSM/GPRS	–	–	•
GT864-PY	10. 00 .xx6	[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-NAR	12. 00 .xx3	[17]	HSPA-GSM/GPRS	–	–	•
HE910-NAD / HE910-NAG	12. 00 .xx3	[17]	HSPA-GSM/GPRS	–	–	•

Tab. 1: Products, Platform, Software Version 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.

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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

For reader convenience Tab. 1 summarizes the Telit Modules and the relating Platform/Software Versions covered by the present document. In addition, the AT commands described in this guide refer to the #SELINT=2 AT Interface Style. All detailed information concerning the complete AT commands set supported by Telit Modules and their features can be found in the documents [1], [17] and [2] in accordance with the used Telit Module.

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: 1v0300704
- [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: 1v0200903.
- [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: 1v0300972



2. Basic Operations

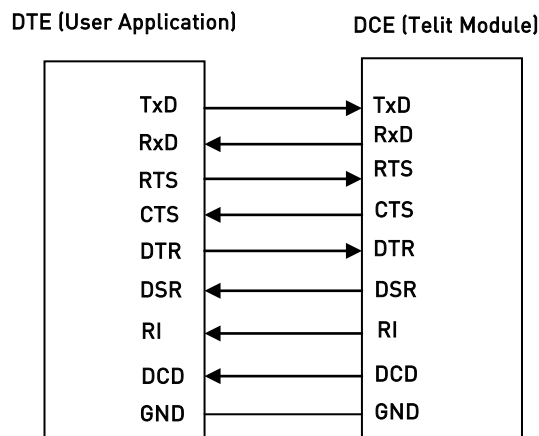
Before dealing with the description of the AT commands examples, it is advisable to define a way to underline the differences, if any, among modules belonging to different families, platforms and software versions. The rules listed below will be used:

- Under the label **GSM/GPRS Standards** will be reported features and AT commands examples concerning the modules supporting the said standards. In some cases platform and software versions will be specify.
- Under the label **HSPA-GSM/GPRS Standards** will be reported features AT commands examples concerning the modules supporting the said standards. In some cases platform and software versions will be specify.
- If features and AT command examples are the same for both standards no labels are indicated.
- AT commands syntax can be found in the documents [1] and [17] in accordance with the used module.



2.1. RTS/CTS handshaking

For reader convenience hereafter is showed the V.24 link supported 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. For reader convenience hereafter are illustrated the RTS/CTS handshaking of the Main Serial Port:

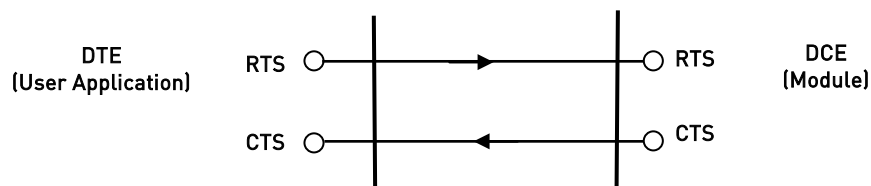


fig. 1: RTS/CTS control lines



GSM/GPRS Standards

RTS control line

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

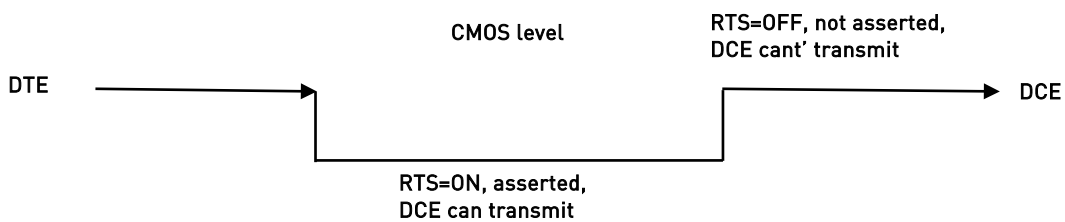


fig. 2: RTS control line

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.



GSM/GPRS Standards

CTS control line

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

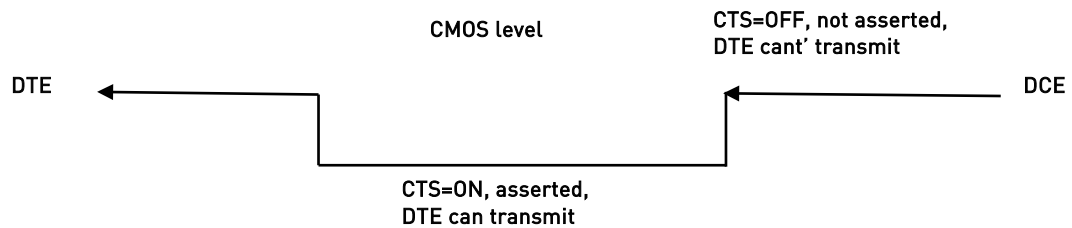


fig. 3: CTS control line



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 Platform/Software Versions and Telit Module Identification:

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

Examples

Check the Platform/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

GSM/GPRS Standards

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

AT#SELINT?

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 unique AT Command Interface supported:

AT#SELINT=?

#SELINT: (2)

OK



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

GSM/GPRS Standards

- Platform Versions 7.xx.xxx, and 10.xx.xxx provide autobauding,
- Platform Version 13.xx.xxx does not provide autobauding, use 115200 bit/sec.

HSPA-GSM/GPRS Standards

- Platform Version 12.xx.xxx does not provide 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:

AT+IPR=?
+IPR:
(0,300,1200,2400,4800,9600,19200,38400,57600,115200),(0,300,1200,2400,4800,9600,19200,3



8400,57600,115200)
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: (300,1200,2400,4800,9600,19200,38400,57600,115200,230400,460800,921600)
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

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
OK

The Auxiliary Serial Port is connected to Trace Service; see the table below.

AT#SII=1
OK

Auxiliary Serial Port is disconnected from Trace Service and connected to AT1 parser. Serial Port is still connected to AT0 Parser as showed on the table.



Power on / AT#SII	GSM/GPRS and HSPA-GSM/GPRS families			
	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. Select Cellular Network

GSM/GPRS Standards

The following AT command selects the Cellular Network: the only valid value is 12. It selects the unique 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  
OK
```

Selected band: GSM 900MHz + DCS 1800MHz.

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



2.10. SIM

2.10.1. SIM Presence and PIN Request

The following AT command checks if the SIM device needs the PIN code:

AT+CPIN?

Examples

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

AT+CPIN?

+CPIN: SIM PIN

OK

Assume that the SIM is not inserted and Extended Error result code is not enabled. Check if PIN code is needed, just to see the response command:

AT+CPIN?

ERROR

Assume that the SIM is not inserted and Verbose Extended error result code is enabled. Check if PIN code is needed, just to see the response command:

AT+CPIN?

+CME ERROR: SIM not inserted

Assume that the SIM is not inserted and Numerical Extended error result code is enabled. Check if PIN code is needed, just to see the response command:

AT+CPIN?

+CME ERROR: 10

2.10.2. Enter PIN code

Use the following AT command to enter the PIN code:

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  
OK
```



#QSS: 0 unsolicited indication: the SIM is extracted.

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

Example 2

AT#QSS=2
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



NOTE: the interval time between the two unsolicited indications (#QSS: 2 and #QSS: 3) depends from the number of SMS stored on the module and the Phonebook dimension.



OK

AT#SIMDET?

#SIMDET: 1,0

OK

1 = simulate the status SIM inserted

0 = SIM is physically not inserted

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

OK

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 only one or both protocols. Telit Modules, in accordance with the platform and the installed software version, can access only SIM or both SIM/USIM cards; refer to the table showed below:

Platform & Software Versions The Software Version is indicated by the digits in bold style		
7. 03 .xx.3	SIM	/
10. 00 .xx5	SIM/USIM	AT#ENASIM ²
13. 00 .xx2	SIM/USIM	AT#ENASIM ³
12. 00 .xx2	SIM/USIM	Automatic detection

Tab. 2: SIM/USIM

Use the +CSIM command to read/write SIM/USIM files. The format of the +CSIM parameters and the sequence of the +CSIM commands must be in accordance with the required protocol device: SIM or USIM protocol. This distinction between SIM and USIM is needed because the +CSIM command works directly on the device (card), consequently it must use the suitable protocol. AT commands working at higher level don't need protocol distinction at "user interface"; in this case the present guide uses SIM to indicate both: SIM and USIM.

AT+CSIM=<length>,<command>

Example

AT+CSIM=1
OK

Lock SIM interface

....

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

³ AT#ENASIM=0 enables SIM protocol (factory setting) , AT#ENASIM=1 enables USIM protocol.



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)
OK

The used SIM supports 20 positions; the supported format (2) is 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: 14,2,"20610"
+CPOL: 15,2,"23002"
+CPOL: 16,2,"26803"
+CPOL: 17,2,"27202"
+CPOL: 18,2,"24001"
+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

Write a new entry on first position:

```
AT+CPOL=1,2,20801
```

OK

Check if the new entry is written on first position:

```
AT+CPOL?
```

```
+CPOL: 1,2,"20801"  
+CPOL: 2,2,"20810"
```

.

```
+CPOL: 19,2,"23802"  
+CPOL: 20,2,"24201"
```

OK

The new entry is written on first position.

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)
```

OK

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

```
AT+CPOL?
```

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



+CPOL: 2,2,"21407",1,0,1
+CPOL: 3,2,"22803",1,0,1
+CPOL: 4,2,"28603",1,0,1
+CPOL: 5,2,"22610",1,0,1
+CPOL: 6,2,"29341",1,0,1
+CPOL: 7,2,"21630",1,0,1
.
.
+CPOL: 29,2,"71610",1,0,1
+CPOL: 30,2,"72402",1,0,1
+CPOL: 31,2,"72403",1,0,1
+CPOL: 32,2,"72404",1,0,1
+CPOL: 33,2,"72234",1,0,1
+CPOL: 34,2,"73602",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 some Network:

AT+CREG?

GSM/GPRS Standards

Examples:

Check if the module is registered:

AT+CREG?

+CREG: 0,1

OK

Yes, it is.

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 MOBITEL 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 MOBITEL 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 some Network (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,"222017002413217","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



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

After module power on, enter the AT command:

AT#ENS=1

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 (platform/software version, refer to Tab. 1).

2.11.7.1. Modules: 07.03.xx3, 10.00.xx5, 10.00.xx6

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 (ATDxxxxxPyyyyy), refer to [9] <CDR-CON-3074>, <CDR-CON-3342>;
- **07.03.xx3**: if #AUTOBND=0 (factory setting) then, automatically, #AUTOBND is forced to 1. If #AUTOBND=2 (suggested setting) no action is taken.
- **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**: 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:

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

	BCD format	conversion	ASCII format
#ENS=0	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. Modules: 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:

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

	BCD format	conversion	ASCII format
#ENS=0	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. Modules: 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. Modules: 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 (ATDxxxxxPyyyyy), 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:

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

	BCD format	conversion	ASCII format
#ENS=0	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].

GSM/GPRS Standards

- Platform Versions 7.xx.xxx and 10.xx.xxx provide two physical audio paths: HS and HF. In this configuration there are two ways to switch between the audio paths: software and hardware.
- Platform Version 13.xx.xxx provides only one physical audio path: HS.

HSPA-GSM/GPRS Standards

- Platform Version 12.xx.xxx provides only one audio path: HS.

Use the following AT command to switch between the audio paths (when the used module is able to provide more than one).

```
AT#CAP=<n>  
OK
```

Examples1

Use software way to select HS audio path:



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



AT#SHSSD?

#SHSSD: 0

OK

Enable sidetone

AT#SHSSD=1

OK

2.12.5.3. 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

AT#SHSEC =?

#SHSEC: (0-1)

OK

Check the current value

AT#SHSEC?

#SHSEC: 0

OK

Enable echo canceller function

AT#SHSEC=1

OK

2.12.5.4. 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





NOTE: this example is valid for both Standards: *GSM/GPRS and HSPA-GSM/GPRS*. Usually, even if the mobile is registered on UTRAN technology, the Operator assigns to the mobile a GSM channel to carry on a voice call.

2.12.9. Audio Codec

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"
```



NOTE: this example is valid for both Standards: *GSM/GPRS and HSPA-GSM/GPRS*. Usually, even if the mobile is registered on UTRAN technology, the Operator assigns to the mobile a GSM channel to carry on a voice call.



2.12.10. Teletype Writer

Use the following AT command to enable/disable the TTY functionality. It is not supported by *HSPA-GSM/GPRS Standards*.

AT#TTY=<support>

Examples

Check the available values

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

Check the current value

AT# TTY?
TTY: 0
OK

Enable TTY functionality

AT# TTY =1
OK

2.12.11. Disconnect a Call

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

ATH
OK



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

Platform Version 13.xx.xxx does not support AT+CBST command.

Examples

Check the supported range:

```
AT+CBST=?
+CBST: (0-4,6,7,14,65,66,68,70,71,75),(0),(0,1)
OK
```

Read current values:

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



Setting new speed:

```
AT+CBST=1,0,1
OK
```

Check if new speed value is set:

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



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

HSPA-GSM/GPRS Standards

Check the supported range

```
AT+CBST=?
+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), the Escape Sequence (+++) must entered before entering ATH commands to close the call.

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



Disable automatic gain control on HF audio path:

AT#SHFAGC=0
OK

Disable noise reduction on HF audio path:

AT#SHFNR=0
OK

Enable data transmission on the speech channel:

AT#TTY=1
OK

Now, the Voice Call will be 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

Read the supported range of Phonebook Storages:

AT+CPBS=?

+CPBS: ("SM","FD","LD","MC","RC")

OK

“MB” is not supported by the inserted SIM.

Read the current Phonebook Storage:

AT+CPBS?

+CPBS: "SM",10,250

OK

Select “FD” phonebook storage:

AT+CPBS="FD"

ERROR

AT+CMEE=2

OK

AT+CPBS="FD"

+CME ERROR: SIM PIN2 required

Enter PIN2

AT+CPIN=PIN2

OK

Select “FD” phonebook storage:

AT+CPBS="FD"

OK

It is worth noting that the last two commands can be substituted by the following one:



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=9999999999

+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 enable or disable 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, Platform/Software Versions 7.03.xx3

AT#ENCALG=?
#ENCALG: (0-7,255),(0,1,255)
OK

GSM/GPRS Standards, Platform/Software Versions 10.00.xx5 and 13.00.xx2

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=15⁴,1 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

AT#CCLK?

#CCLK: "10/11/30, 14:36:52+04,0" date/time and time zone + daylight saving time

OK

⁴ Also enable the automatic Full Network Name updating if it is supported by the Network.



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.

Check the range value.

```
AT+CRC=?
+CRC: (0,1)
OK
```

Disable extended format reporting.

```
AT+CRC?
+CRC: 0
OK
```

The module detects a call; ring indications are displayed on TE:

```
RING
RING
.
.
.
```

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

Enable extended format reporting.

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

Check if extended format reporting is enabled.

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

The module detects a call; ring indications in extended format are displayed on TE:



+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
```



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 4x4 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. DTMF decoder is supported by the following module types:

GSM/GPRS Standards

- Platform Versions 10.xx.xxx, and 13.xx.xxx.

HSPA-GSM/GPRS Standards

- Platform Version 12.xx.xxx.

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 type as hereafter indicated:

GSM/GPRS Standards

- Platform Version 10.xx.xxx, it is mandatory to enter the AT#CPUMODE=1 command.
- Platform Version 13.xx.xxx, do not use the AT#CPUMODE command.

HSPA-GSM/GPRS family

- Platform Version 12.xx.xxx, 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 on 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 your Telit Module.

```
AT+CFUN=?  
+CFUN: (0,1,2,4,5,7,9),(0)  
OK
```

You have a previous Telit Module (Platform 07, see Tab. 1)

```
AT+CFUN=?  
+CFUN: (0,1,2,4,5,7,9),(0, 1)  
OK
```

You have a Telit Module supporting all modes

```
AT+CFUN=?  
+CFUN: (0,1,4,5,7),(0, 1)  
OK
```

You have a Telit Module belonging to the HE910 Family having platform/software version = 12.00.xx2, see Tab. 1.

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  
OK
```

CFUN = 1, module with full functionality and power saving disabled (factory setting)



Tab. 4, showed on next pages, summarizes the transitions between CFUN modes when an event is occurred. The “Event” column lists the events that can happen, the columns on the right side show the entered mode of the module after the completion of the transition starting from the “CFUN=X” mode showed on the top of each column. In other words: the cell on the crossing of the selected column (CFUN mode) and row (Event) shows the final module mode.

Let’s suppose to enter the command AT+CFUN=0 or AT+CFUN=9. These commands force 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.



Event	Module is in CFUN MODE when the event (first column) happens					
	<CFUN>=0	<CFUN>=2	<CFUN>=4	<CFUN>=5	<CFUN>=7	<CFUN>=9
RTS ⁵ = OFF(high) → RTS=ON(low)	Refer to para. 2.1 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 AT+CNMI is set to 0,0	CFUN=0	N/A	N/A	CFUN=5	CFUN=7	CFUN=9
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

⁵ 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
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



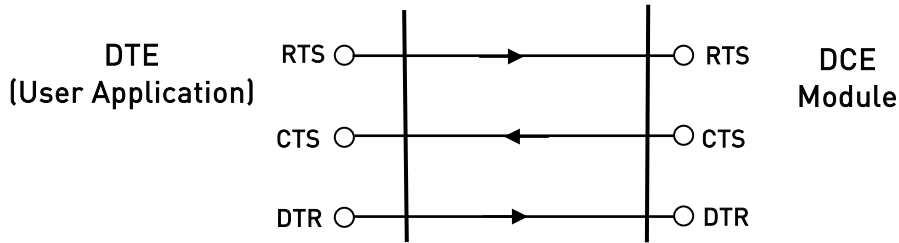


fig. 5: Control Serial lines

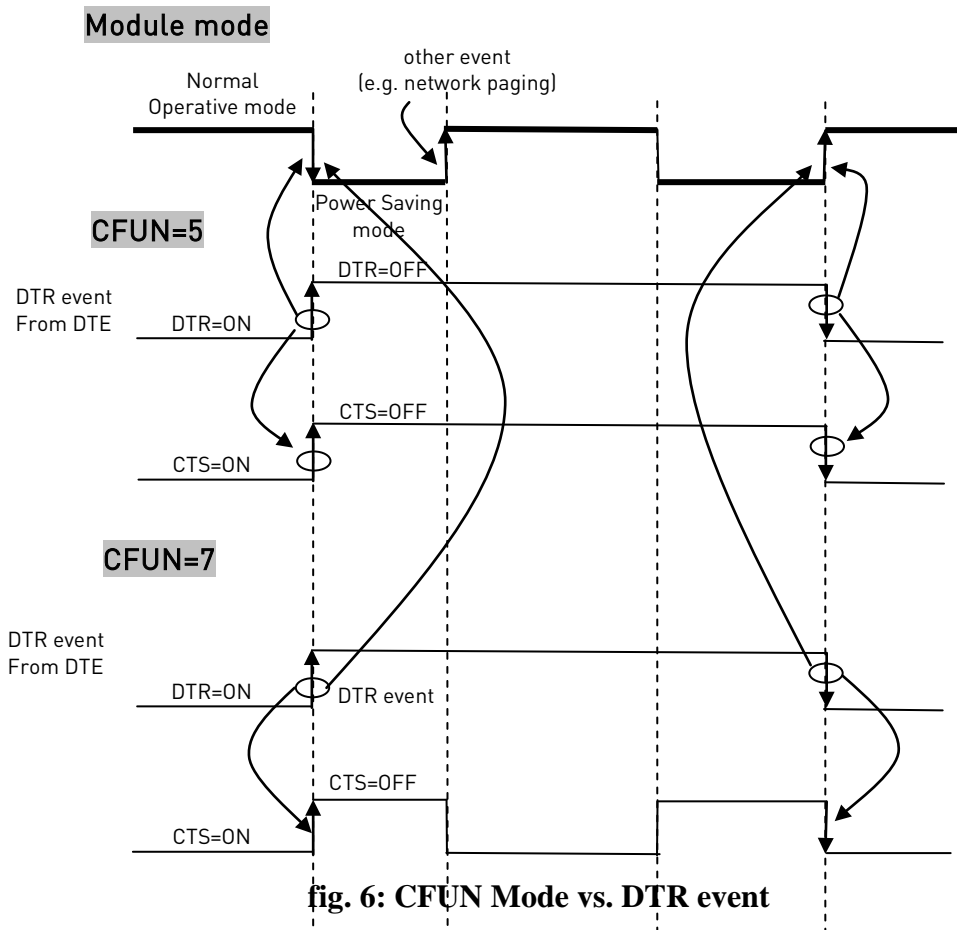


fig. 6: CFUN Mode vs. DTR event



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 provide two types of SMS storage:

- "SM" - SIM Card memory
- "ME" - mobile equipment memory. It is applicable only to modules supporting #SMSMODE command; in this case modules have two storage types: "SM" and "ME". The "ME" storage type resolves retro compatibility issues.

An SMS (sent or received) is usually stored in the "SM" storage.

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".



In general, modules provide the user with only one types of storage: “SM”.

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

Example 1

In **GSM/GPRS** modules family (in particular: SW 10.00.xx5) #SMSMODE=1 is Factory setting, it means that the improved SMS functionality (ETSI Standard compliant) is enabled.

Check the SMS mode.

AT#SMSMODE?

#SMSMODE: 1

OK

In this configuration, **GSM/GPRS** family has the same behavior of the **HSPA-GSM/GPRS** family that doesn't support #SMSMODE command, because the improved SMS functionality is always active. The following command result is valid for both families:

Check the supported SMS storage types:

AT+CPMS=?

+CPMS: ("SM"),("SM"),("SM")

OK

Only “SM” storage type is supported.

Example 2

For retro compatibility reasons the **GSM/GPRS** modules provide the #SMSMODE command to enable/disable the improved SMS functionality (ETSI Standard compliant).

Disable improved SMS functionality.

AT#SMSMODE=0

#SMSMODE: 0

OK

Check SMS mode:

AT#SMSMODE?

#SMSMODE: 0

OK

Check the supported SMS storage types:



AT+CPMS=?

+CPMS: ("ME","SM"), ("SM"), ("SM")
OK

Check the current active storage type

AT+CPMS?

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

Select “ME” storage type

AT+CPMS="ME"

+CPMS: 1,1,1,50,1,50
OK

Check the current active storage types

AT+CPMS?

+CPMS: "ME",1,1,"SM",1,50,"SM",1,50
OK

Two SMS storage types are active: “ME” and “SM”

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>

Example

Send two consecutive SMS to the module itself to see the unsolicited indications on DTE and verify that “ME” provides one storage position: the new SMS overlaps the old one. Follow the AT commands sequence.

Select Text Mode.

AT+CMGF=1

OK

Assume to have under test a module belonging to GSM/GPRS family. #SMSMODE enables/disables the improved SMS functionality. The HSPA-GSM/GPRS modules family supports only the improved SMS functionality; consequently the #SMSMODE command is not supported.

Disable SMS improved functionality



AT#SMSMODE=0

OK

Set up the SMS message, that will be sent, as an SMS of Class 0

AT+CSMP=17,168,0,240

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

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 shown on DTE:

+CMTI: "ME",1

Select SMS storage type.

AT+CPMS="ME"

+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

Issue the following command:

AT+CPMS?

+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 overlaps the old one.

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>"

Example 1

Write a new SMS in the storage, send it to the module itself and read the message in the receiving storage. This example is valid for **HSPS-GSM/GPRS** family and **GSM/GPRS** family (it must have: #SMSMODE=1) regardless if SMS is belonging or not to Class 0.

Select Text Mode.

AT+CMGF=1
OK

Assume to send an SMS of Class 0

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

Example 2

Write a new SMS into the storage, send it to the module itself and read the message in the receiving storage. Follow the AT commands sequence. The #SMSMODE command and “ME” storage are supported only by GSM/GPRS family.

Select Text Mode.

AT+CMGF=1
OK



Disable the improved SMS functionality.

AT#SMSMODE=0
OK

Assume to send an SMS of Class 0

AT+CSMP=17,168,0,240
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

Set up PDU Mode.

AT+CMGF=0

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>

Example

This example is valid for **HSPS-GSM/GPRS** family and **GSM/GPRS** family (it must have: #SMSMODE=1) regardless if SMS is belonging or not to Class 0.



Send the stored SMS to the module itself:

Select Text Mode.

AT+CMGF=1
OK

Select "SM" storage to read SMS.

AT+CPMS="SM"
+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>"

Example

This example is valid for **HSPS-GSM/GPRS** family and **GSM/GPRS** family (it must have: #SMSMODE=1) regardless if SMS is belonging or not to Class 0.

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

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="+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
```

Examples

This example is valid for **HSPS-GSM/GPRS** family and **GSM/GPRS** family (it must have: #SMSMODE=1) regardless if SMS is belonging or not to Class 0.

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

Select suitable AT command interface style. As stated on paragraph 1.1, this guide assumes that the user are using #SELINT=2.

```
AT#SELINT=2  
OK
```



Select the GPRS service

```
AT+CGSMS=2  
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.

```
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
```




```
AT+CPMS="ME"  
+CPMS: 1,1,6,30,6,30  
OK
```

Check the SMS.

```
AT+CMGD=?  
+CMGD: (1),(0-4)  
OK
```

Delete SMS in storage position 1.

```
AT+CMGD=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>
```

Example

Read the selected SMS in “SM” storage type. This example is valid for **HSPS-GSM/GPRS** family and **GSM/GPRS** family (it must have: #SMSMODE=1).

```
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
```

3.7.12. SMS Status

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

- REC UNREAD: received messages still not read



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"
>123456789012345678901234567890123456789012345678901234567890123456
7890123456789012345678901234567890123456789012345678901234567890123
456789098765432109876543210→
+CMGW: 8
OK
```

Check the number of SMSs stored on the "SM" storage type

```
AT+CPMS?
```



+CPMS: "SM",8,30,"SM",8,30,"SM",8,30
OK

Check the concatenated SMSs presence

AT#CMGLCONCINDEX

#CMGLCONCINDEX: 2,7,8

OK

2 SMSs are concatenated. Their storage positions are: 7, 8.

Read the SMS with index=7. The following visualization is valid for **HSPS-GSM/GPRS** family and **GSM/GPRS** family (it must have: #SMSMODE=1). To get info concerning the used coding refer to [19]

AT+CMGR=7

+CMGR: "STO UNSENT", "+3932X056Y6X8", ""

0608040005020131D98C56B3DD7039584C36A3D56C375C0E1693CD6835DB0D9783C5643
35ACD76C3E56031D98C56B3DD7039584C36A3D56C375C0E1693CD6835DB0D9783C564
335ACD76C3E56031D98C56B3DD7039584C36A3D56C375C0E1693CD6835DB0D9783C56
4335ACD76C3E56031D98C56B3DD7039584C36A3D56C375C0E1693CD6835DB0D9783C5
64

OK

Read the SMS with index=8. To get info concerning the used coding refer to [19].

AT+CMGR=8

+CMGR: "STO UNSENT", "+3932X056Y6X8", ""

06080400050202335ACD76C3E56039DCCD56A3CD6431580E77B3D56833590C06

OK

For completeness, note that the following visualization, of the same concatenated SMSs, is valid only for GSM/GPRS family with #SMSMODE=0.

AT+CMGR=7

+CMGR: "STO UNSENT", "+3932X056Y6X8", ""

1234567890123456789012345678901234567890123456789012345678901234567
89012345678901234567890123456789012345678901234567890123456789012

OK

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, Products, Platforms and Software Versions The software version is indicated by the digits in bold style		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
GM Family (Modem)	Plat. & SW Ver.											
GM862-GPS	7.03.xx3	1 - 13	1	2	3; 8 - 13	4,5,6,7	4	N/A	6	7	N/A	2
GC Family (Compact)												
GC864-QUAD	10.00.xx5	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.xx5	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.xx5	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)												
GE863-GPS	7.03.xx3	1 - 18	N/A	N/A	1 - 5; 8 - 18	4,5,6,7	4	5	6	7	N/A	2
GE863-PRO3	7.03.xx3	1 - 9	N/A	N/A	1 - 5; 8 - 9	4,5,6,7	4	5	6	7	N/A	2
GE864-QUAD	10.00.xx5	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.xx5	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.xx5	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.xx5	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.xx5	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.xx5	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.xx5	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.xx5	1 - 8	N/A	N/A	1 - 3; 8	4,5,6,7	4	5	6	7	8	2
GL865-QUAD	10.00.xx5	1 - 8	N/A	N/A	1 - 3; 8	4,5,6,7	4	5	6	7	8	2
GL868-DUAL	10.00.xx5	1 - 8	N/A	N/A	1 - 3; 8	4,5,6,7	4	5	6	7	8	2
GE910-QUAD	13.00.xx2	1 - 10	N/A	N/A	1 - 10	4,5,6,7	4	5	6	7	1	2
GT Family (Terminal)												
GT863-PY	10.00.xx5	4 - 7	N/A	N/A	-	4,5,6,7	4	5	6	7	N/A	N/A



Families, Products, Platforms and Software Versions The software version is indicated by the digits in bold style		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
GT864-QUAD	10.00.xx5	4 - 7	N/A	N/A	-	4,5,6,7	4	5	6	7	N/A	N/A
GT864-PY	10.00.xx5	4 - 7	N/A	N/A	-	4,5,6,7	4	5	6	7	N/A	N/A
HE910 Family												
HE910	12.00.xx2	1 - 10	N/A	N/A	1 - 10	N/A	4	5	6	7	1	2
HE910-D	12.00.xx2	1 - 10	N/A	N/A	1 - 10	N/A	4	5	6	7	1	2
HE910-DG	12.00.xx2	1 - 10	N/A	N/A	1 - 10	N/A	4	5	6	7	1	2
HE910-GA	12.00.xx2	1 - 10	N/A	N/A	1 - 10	N/A	4	5	6	7	1	2
HE910-EUD / HE910-EUR	12.00.xx2	1 - 10	N/A	N/A	1 - 10	N/A	4	5	6	7	1	2
HE910-EUG / HE910-NAG	12.00.xx2	1 - 10	N/A	N/A	1 - 10	N/A	4	5	6	7	1	2
HE910-NAD / HE910-NAR	12.00.xx2	1 - 10	N/A	N/A	1 - 10	N/A	4	5	6	7	1	2

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

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 supported only by products equipped with software version 10.00.xx5, refer to Tab. 1.

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 from the number of GSM frequencies that are analyzed.



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



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:



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

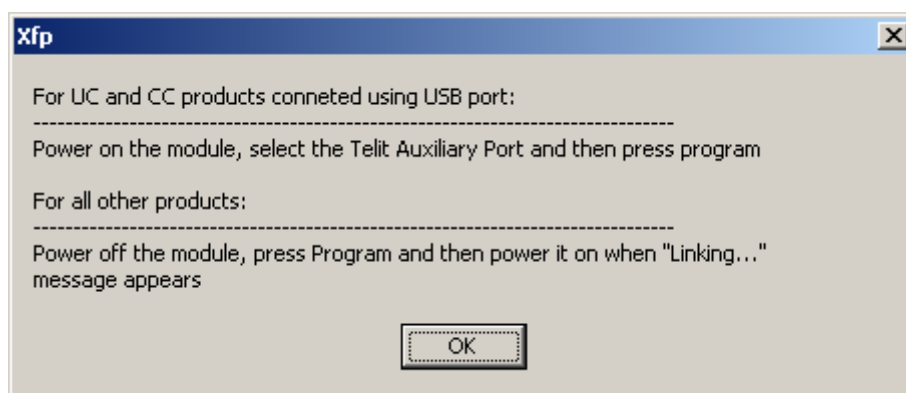
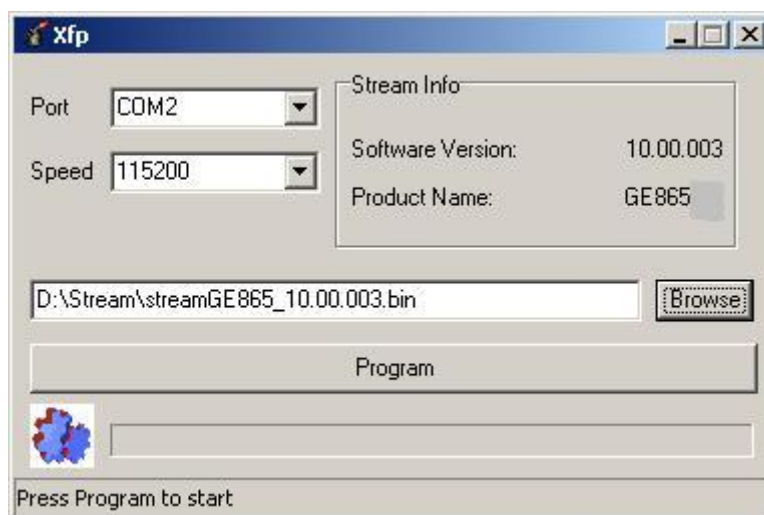
To update the firmware follow the showed procedure:

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, speed⁶ 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

⁶ To use speed grater than 115200 Bps a dedicated hardware on PC is needed.

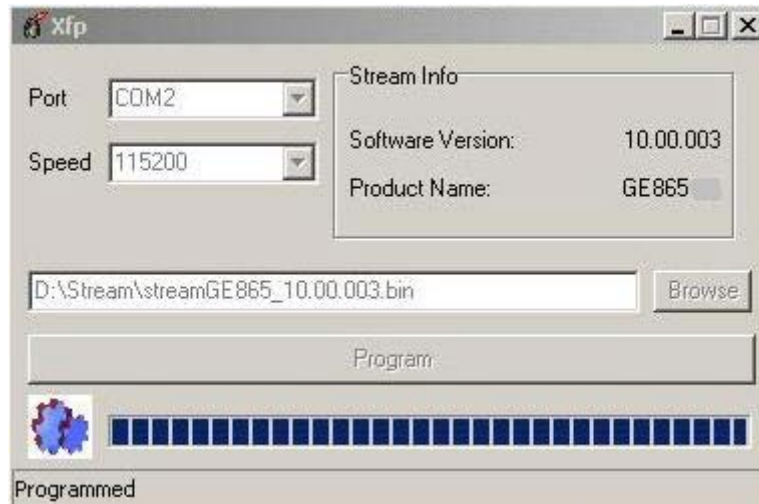


are mentioned here because Xfp tool supports them and also the modules covered by this guide.



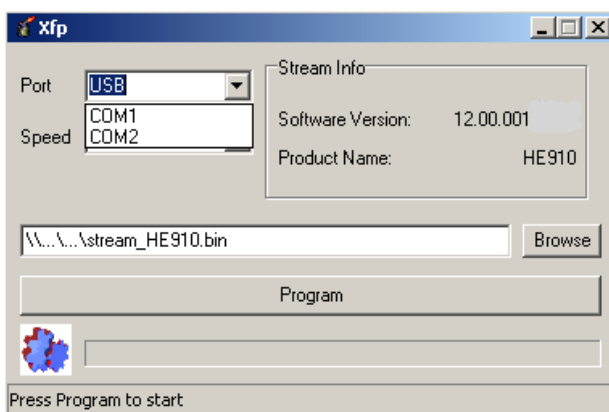
4. Read the instructions and follow them. The following windows are displayed on the screen when the module is successfully programmed.





- 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.



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	2012-09-20	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



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 EDGA 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

