Running AT Commands Remotely Application Note

80000ST10069a Rev.2 – 2010-08-27

Making machines talk.

APPLICABILITY TABLE

PRODUCT
GT863-PY
GT864-QUAD
GT864-PY
GM862-QUAD-PY
GM862-QUAD
GM862-GPS
GC864-PY
GC864-QUAD
GC864-PY w/ SIM holder
GC864-DUAL
GE863-PY
GE863-QUAD
GE863-GPS
GE863-SIM
GE863-PRO^3
GE864-PY
GE864-QUAD
GE864-QUAD AUTOMOTIVE
GE864-QUAD ATEX
GE865-QUAD

SW Version
7.03.02 / 7.02.07
10.0x.xx2

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

Contents

1. INTRODUCTION 5
1.1. CONTACT INFORMATION, SUPPORT 5
1.2. TEXT CONVENTIONS 6
1.3. RELATED DOCUMENTS 6
1.4. DOCUMENT HISTORY 6
2. SMSATRUN 7
2.1. REQUIREMENTS 7
2.2. ALERTS 8
2.3. DESCRIPTION 9
2.4. EXAMPLE SMS ATRUN 14
2.5. DELAYS AND NOTES 16
2.5.1. Delays 16
2.5.2. Notes 17
3. TCPATRUN 19
3.1. CONFIGURATION 20
3.2. TCPATRUN IN SERVER MODE 21
3.2.1. Description 21
3.2.2. Authentication mode 24
3.3. TCPATRUN IN CLIENT MODE 25
3.3.1. Description 25
3.4. AT COMMANDS IN SEQUENCE 27
3.5. TRANSPARENCE 28
3.6. ALERTS 28
3.7. EXAMPLES 30
3.7.1. TCP ATRUN in server mode and AT commands 30
3.7.2. TCPATCMDSEQ feature 31
3.8. DELAYS AND NOTES 32
3.8.1. Delays 32
3.8.2. Notes 33
3.9. TCPATRUN AND PYTHON 34

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

DISCLAIMER

The information contained in this document is the proprietary information of Telit Communications S.p.A. and its affiliates ("TELIT"). The contents are confidential and any disclosure to persons other than the officers, employees, agents or subcontractors of the owner or licensee of this document, without the prior written consent of Telit, is strictly prohibited.

Telit makes every effort to ensure the quality of the information it makes available. Notwithstanding the foregoing, Telit does not make any warranty as to the information contained herein, and does not accept any liability for any injury, loss or damage of any kind incurred by use of or reliance upon the information.

Telit disclaims any and all responsibility for the application of the devices characterized in this document, and notes that the application of the device must comply with the safety standards of the applicable country, and where applicable, with the relevant wiring rules.

Telit reserves the right to make modifications, additions and deletions to this document due to typographical errors, inaccurate information, or improvements to programs and/or equipment at any time and without notice. Such changes will, nevertheless be incorporated into new editions of this application note.

Copyright: Transmittal, reproduction, dissemination and/or editing of this document as well as utilization of its contents and communication thereof to others without express authorization are prohibited. Offenders will be held liable for payment of damages. All rights are reserved.

Copyright © Telit Communications SpA 2010.

1. Introduction

The information presented in this document is believed to be accurate and reliable. However, no responsibility is assumed by Telit Communications S.p.A. for its use, nor any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent rights of Telit Communications S.p.A. other than for circuitry embodied in Telit products. This document is subject to change without notice.

1.1. 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.

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

1.2. Text Conventions

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

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

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

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

1.3. Related Documents

- AT Commands Reference guide, 80000ST10025a

1.4. Document History

Revision	Date	Changes
ISSUE #0	2009-08-28	Release First ISSUE# 0
ISSUE #1	2010-05-07	Added commands in paragraph 3.9.2 (Notes) Correction of delays table regarding AT+CFUN command in paragraph 3.9.1 Correction in the pictures in paragraph 2.3 "Alerts" moved from paragraph 3.3.1 to paragraph 3.6 and integrated with a note about Idle Activity Timeout
ISSUE #2	2010-05-18	Deletion of note 15 in par. 3.9.2 Notes Shifted paragraph 3.9 in par. 2.5, renamed Delays and Notes. Added par. 3.9 regarding Python use. Changed the images in par 2.3 and in par. 3.1 (before 3.1). Added notes about ATZ command and about Packet Size

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

2. SMSATRUN

2.1. Requirements

Two kinds of SMS are valid for the SMS ATRUN service:

1. Simple ATRUN SMS:
   a) the SMS originating address shall match with a number defined in a white list in the module
   b) the text has to begin with the string "AT" or "HAT"
   c) the SMS coding alphabet has to be default GSM 7 bit or 8 bit
2. Digest ATRUN SMS:
   a) The SMS User Data has to contain an header comprising a MD5 digest calculated on the useful text with a password belonging to a white list in the module
   b) the text has to begin with the string "AT" or "HAT"
   c) the SMS coding alphabet has to be 8 bit

In the Digest SMS case the SMS User Data has the following format:

Offset	Size	Value	Description
0	3	0xD0D0D0	RUNAT SMS Code
3	1	0	Transaction Id
4	1	0x11	Segment 1 of 1
5	1		Session Id
6	24		Digest: B64(MD5(B64(MD5(Pwd)):B64(MD5(Useful Text))))
30			Useful Text

Table 1 Digest ATRUN SMS User Data Format

The format is the same of OTA service SMS protocol: obviously the first 3 bytes code value is different

- If the text begins with the "AT" string, then the AT command response has to be sent to the sender by one or more **response SMS**. If the text begins with the "HAT" string, then the AT command response hasn't to be sent to the sender

- After the "AT" (or "HAT") string there are the commands. For example: AT+CGMR;+CGSN or HAT+CGMR;+CGSN

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

- The response SMS from the module to the sender are coded with the same alphabet and is of the same kind of the received SMS (Simple SMS or Digest SMS)

- The received SMS hasn't to be concatenated, but the response SMS can be concatenated. In the case of Digest SMS, the MD5 digest is calculated on the portion of text contained in the same SMS; the User Data has the following format:

Offset	Size	Value	Description
0	3	0xD1D1D1	Response RUNAT SMS Code
3	1	0	Transaction Id
4	1	0x11	Segment 1 of 1
5	1		Session Id
6	24		Digest: B64(MD5(B64(MD5(Pwd)):B64(MD5(Useful Text))))
30			Useful Text

Table 2 Response Digest ATRUN SMS User Data Format

- When the SMS RUN AT service is enabled setting to 1 the parameter <mod> of the AT command #SMSATRUN, then the AT instance specified by the parameter <muxInstance> of the AT command #SMSATRUNCFG is reserved to run the AT commands inserted in the received validated SMS

- If the SMS RUN AT service is disabled setting to 0 the parameter <mod> of the AT command #SMSATRUN, then the used AT instance is returned to the previous user, if there is

- The <mod> of the AT command #SMSATRUN and <muxInstance> parameter of the AT command #SMSATRUNCFG are stored in the NVM. At boot, if the <mod> parameter is set to 1, then the AT instance specified in the <muxInstance> is automatically reserved to run the AT commands inserted in the received validated SMS

2.2. Alerts

- If the <mod> parameter of the AT command #SMSATRUN is set to 1, then all received SMS are subjected to a test to validate them as ATRUN SMS

- If a SMS is recognized as ATRUN SMS, it is handled and silently discarded

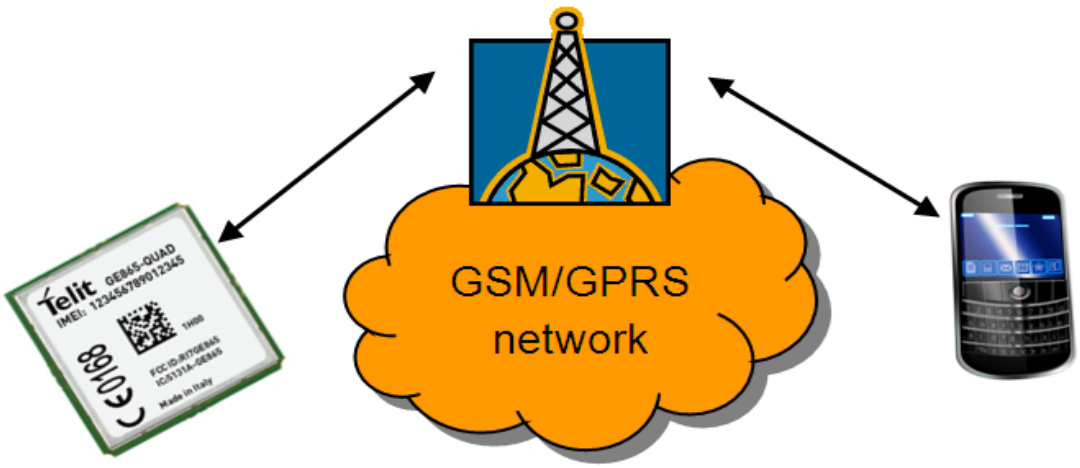
Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

- When an AT instance is reserved for the SMS ATRUN service, then every other request to use it, coming from other services, is refused: only the OTA service can subtract the AT instance reserved to SMS ATRUN service.

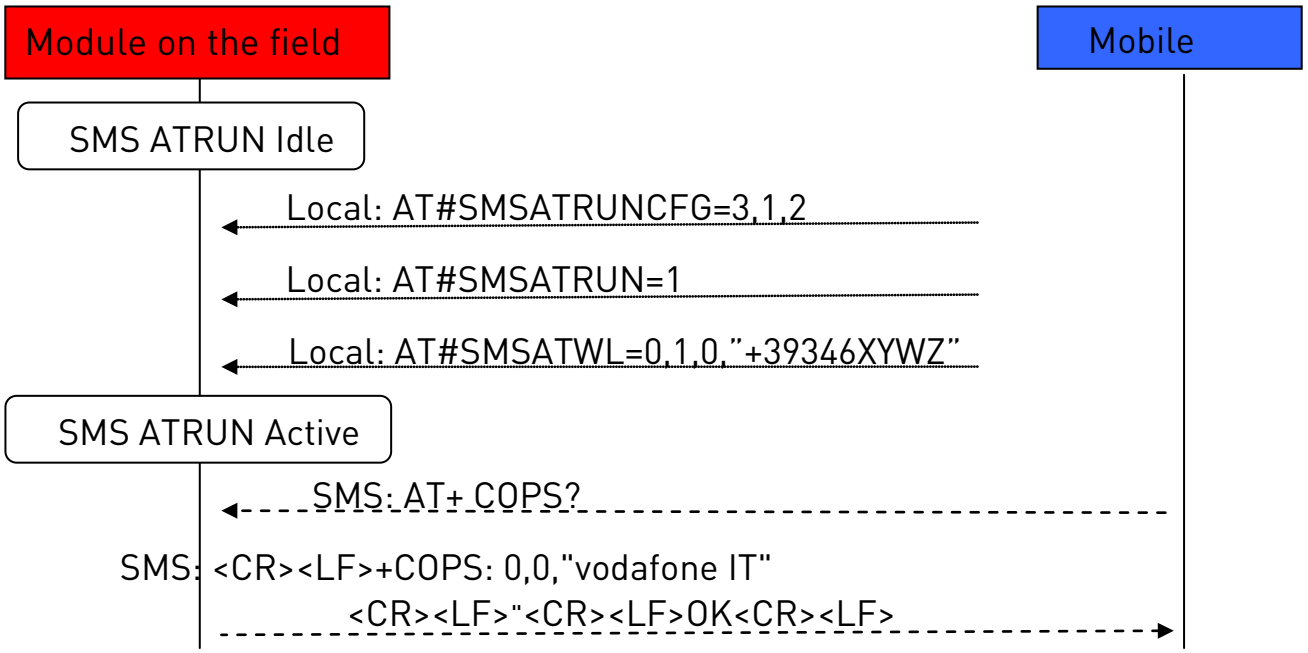
- if the service is activated on the first instance (<muxInstance> = 1 in AT#SMSATRUNCFG), the control of that instance will be loosed and there will be the need of the multiplexer to deactivate the service by the second or third instance.

2.3. Description

This service allows an user to run an AT Command via SMS. The user can send an SMS requesting the module to know the selected network operator or to set a GPIO
The scenario is the following:



Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved



First of all, the SMS ATRUN service is locally configured and enabled in the *module on the field* by the command #SMSATRUNCFG and :

AT#SMSATRUNCFG=3,1,2
// the service is configured to run on the third instance, the unsolicited is enabled and
// the timeout for the response to the AT commands is set to 2 minutes

AT#SMSATRUN=1 // the service is enabled

and the *mobile* number is added in the white list by the command #SMSATWL:

AT#SMSATWL=0,1,0,"+39346XYWZ" //the number +39346XYWZ is added in the
// first position of the white list

At this point the SMS ATRUN service is enabled and AT commands can be issued to the *module on the field* via SMS from another device containing the SIM with the number added in the white list.

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

For example another *mobile* can set the GPIO of the *module on the field* issuing the command AT#GPIO=2,1 using the following standard AT command

AT+CMGS=346XYWZ
> AT#GPIO=2,1

The *module on the field* let run the AT+COPS? on the third instance and will send back to the *mobile* an SMS with the response. The *mobile* reads the arrived SMS:

+CMTI: "SM",1
AT+CMGR=1
+CMGR: "REC UNREAD","+39346XYWZ","","08/05/28,11:04:37+08"

+COPS: 0,0,"vodafone IT"

OK

If the *mobile* doesn't want to receive back the response, it can issue the following command:

AT+CMGS=346XYWZ
> HAT+COPS?

If the *mobile* wants to communicate to the *module on the field* using the Digest ATRUN SMS, a common password has to be inserted locally in the white list of the *module on the field* by the command AT#SMSATWL:

```
AT#SMSATWL=0,2,1,"1234567890123456"      //the password has to be 16
                                         // characters length and is
                                         // inserted, in this example, in
                                         // position 2 of the white list
```

A maximum number of 2 passwords can be inserted in the white list.
Now the *mobile* can also change the SIM because the sender number isn't checked from *module on the field* in the case of Digest ATRUN SMS.
So the *mobile* can interrogate the *module on the field*, to know the selected network operator, issuing the command AT+COPS? using the following standard AT command

AT+CMGS=53
>0791934329002000110000C91934386867611001 5AD26D0D0D000110157696A4370327156337 34E762B61727532305A5561773D3D41542B434F50533F

Where the User Data portion Is formatted according to Table 1 as follows:

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

Offset	Size	Value	Description
0	3	D0D0D0	RUNAT SMS Code
3	1	00	Transaction Id
4	1	11	Segment 1 of 1
5	1	01	Session Id
6	24	57696A437032715633734E762B61727532305A5561773D3D	Digest: B64(MD5(B64(MD5(Pwd)):B64(MD5(AT+COPS?))))
30		41542B434F50533F	AT+COPS?

The *module on the field* let run the AT+COPS? on the third instance and will send back to the *mobile* an SMS with the response. The *mobile* reads the arrived SMS:

+CMTI: "SM",1
AT+CMGR=1
+CMGR: 0,"",83
07919343290020000 40C9193438686761100158050922102818040D1D1D10011014A756E72613772306B494563483971563534326E33513D3D0D0A2B434F50533A20302C302C22766F6461666F6E65204954220D0A0D0A4F4B0D0A

Where the User Data portion Is formatted according to Table 2 as follows:

Offset	Size	Value	Description
0	3	D1D1D1	Response RUNAT SMS Code
3	1	00	Transaction Id
4	1	11	Segment 1 of 1
5	1	01	Session Id
6	24	4A756E72613772306B494563483971563534326E33513D3D	Digest: B64(MD5(B64(MD5(Pwd)):B64(MD5(<CR><LF>+COPS: 0,0,"vodafone IT"<CR><LF>"<CR><LF>OK<CR><LF>))))
30		0D0A2B434F50533A20302C302C22766F6461666F6E65204954220D0A0D0A4F4B0D0A	<CR><LF>+COPS: 0,0,"vodafone IT"<CR><LF>"<CR><LF>OK<CR><LF>

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

ALERTS:

Some AT commands can fail if set through SMS ATRUN service, due to an interaction of the AT command execution with the SMS service. These problems can be avoided inserting a delay before AT command execution (e.g. AT+COPS=? using SMS ATRUN).

This delay is set through the command AT#ATRUNDELAY:

AT#ATRUNDELAY=1,5 sets for SMS ATRUN commands a delay of 5 seconds

Once set, the delay is valid till a new AT#ATRUNDELAY is issued.

Some other commands can block the AT command sending-AT command response receiving mechanism if set through ATRUN service, see below.

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

2.4. Example SMS ATRUN

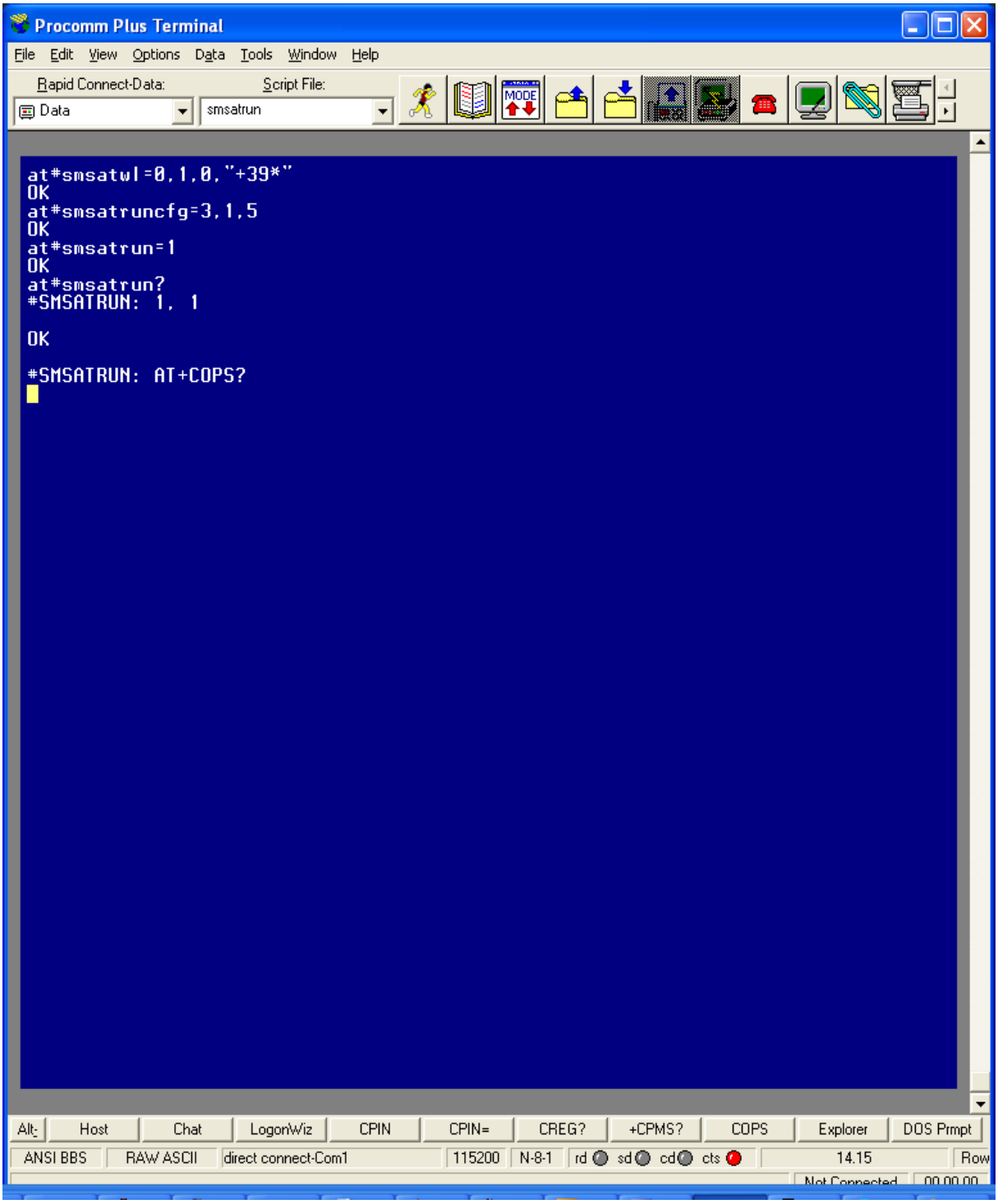


Figure 1: Module in the field

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

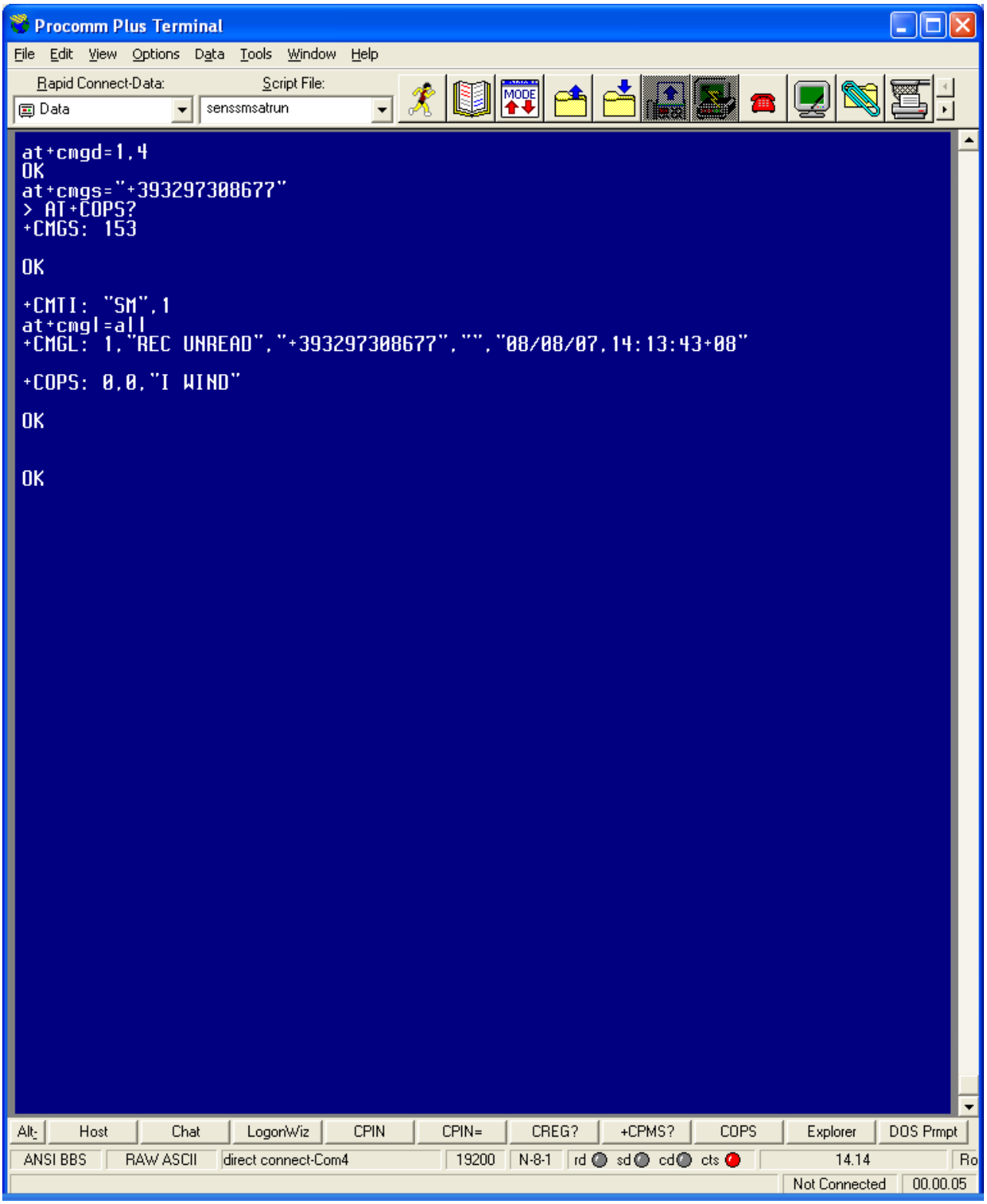


Figure 2: Mobile

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

In *Figure 1: Module in the field* it's shown the local configuration:

- All the numbers starting with +39 are added in the white list by the command #SMSATWL
- the service is configured with the command #SMSATRUNCFG to run on the third instance, the unsolicited is enabled and the timeout for the response to the AT commands is set to 2 minutes
- the service is enabled with the command #SMSATRUN

In *Figure* 2: *Mobile* the mobile sends to the module in the field an SMS with the text containing the string AT+COPS?.
At the SMS reception, the module on the field runs automatically the command AT+COPS?, puts on the instance the URC *#SMSATRUN: AT+COPS?* (as shown *in Figure 1: Module in the field*) and sends back the response SMS.
As shown in *Figure 2: Mobile*, the SMS received from the mobile contains the response to the command AT+COPS? that the module on the field has executed.

2.5. DELAYS AND NOTES

2.5.1. Delays

The following table shows the suggested delays (in seconds) for SMS ATRUN service. These delays are set using AT#ATRUNDELAY command.

AT+COPS=? AT+CGCLASS AT+CFUN AT#GPRS AT#SIMDET AT#CSURV AT#CSURVC AT#CSURVU AT#CSURVUC AT#CSURVB AT#CSURVBC AT#CSURVP AT#CSURVPC	10
AT#SGACT AT+CGACT AT+CGATT	5

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

2.5.2. Notes

1) To send AT\x and AT^xxx commands it is necessary to set the outgoing SMS's Data Coding Scheme (DCS) so that they are 8 bits coded, because characters '\ 'and '^' are not included in the standard GSM 7 bit alphabet. AT#SMSMODE must be set to 1, and the SMS text must be in hexadecimal format; the answer SMS received to the sent command is also 8 bit coded (hexadecimal format);

2) AT#REBOOT and AT#SHDN commands do not send back the answer SMS before powering down the "module in the field"; AT+CFUN=4, AT+CGCLASS="CG" and AT+COPS=2 commands do not send back the answer SMS before deregistering the module;

3) AT#SIMDET=0, AT+CGDATA="PPP",1, AT#FTPPUT, AT$GPSNMUN=3, ATQ1 and ATQ2 commands cause a block of the SMS exchange mechanism, until the "module in the field" reboots after timeout set with AT#SMSATRUNCFG command expires;

4) AT+CMUX=0, AT#BND=3, AT+CFUN=2 and AT+CFUN=4 commands cause an irreversible block of the SMS exchange mechanism;

5) AT+CGCLASS="CG" and AT+CGSMS=0 commands cause an irreversible block of the SMS exchange mechanism, until a new AT+CGCLASS or AT+CGSMS command is sent with TCP ATRUN; AT+CFUN=4 and AT+COPS=2 commands cause an irreversible block of the SMS exchange mechanism, until a new AT+CFUN or AT+COPS command is sent with TCP ATRUN;

6) enabling of FDN phonebook in the "module in the field" causes an irreversible block of the SMS exchange mechanism if the "mobile" phone number is not in the FDN list; FDN must then be disabled using TCP ATRUN;

7) if ATD command is sent to the "module in the field" to start a data call the response SMS, containing the CONNECT or NO CARRIER result, is received only after the call has been disconnected by the called party;

8)AT+CMGS, AT+CMGW, AT#SEMAIL, AT#SSEND, AT#WSCRIPT and all commands that require to insert data after a prompt is received cannot be executed via SMS ATRUN, because the prompt is not sent back in an SMS response;

9) The commands of AT#CSURV family will have their response truncated if too long (response text longer than the text that can fit into a concatenated SMS made up of the maximum number of SMS that can be concatenated, i.e. 15);

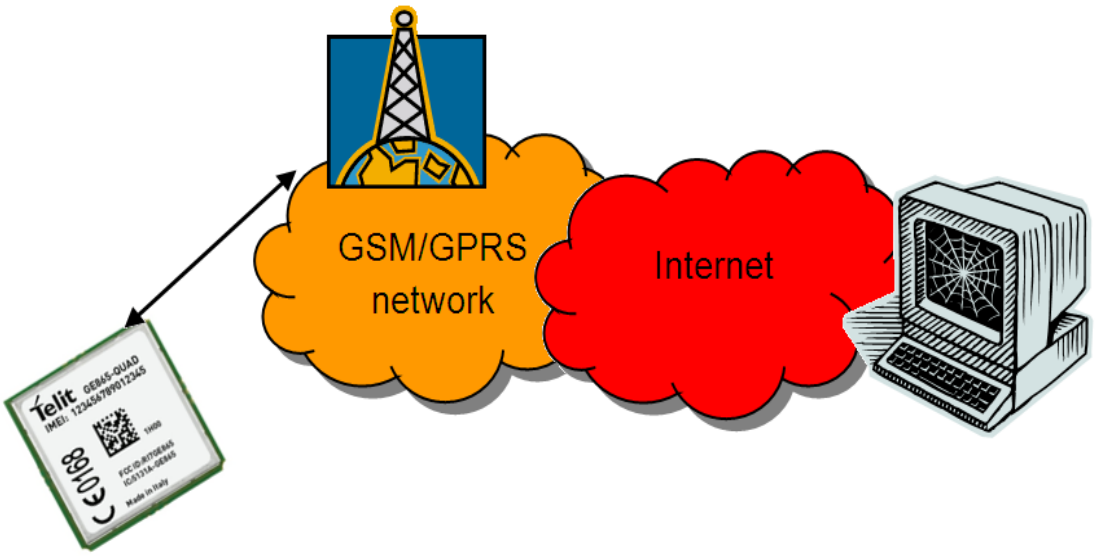
Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

10) The command ATZ returns ERROR if a Data Call is up;

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

3. TCPATRUN

AT command execution can also be requested via TCP. The AT interface input and output will be redirected to the TCP socket.



There are two kinds of TCP ATRUN service, differing the one from the other in the way the module connects to the remote PC.
In the first kind of TCP ATRUN, the module acts as a server, that is to say it is in TCP listen state, waiting for an incoming TCP/IP connection from a client.
In the second one, the module acts as a client, that is to say it tries, as soon as the service is enabled, to connect to a server.
In next paragraphs we describe the AT command sequence to start the TCP ATRUN service and how the service behaves. Please refer to the AT commands specification for the exact commands syntax.

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

3.1. Configuration

To start TCPATRUN service, either in server mode or in client mode, it is necessary that a PDP context is opened, through the command AT#SGACT:

AT#SGACT=1,1 for example, here we open the PDP context with id 1

The answer, in case of success, will be the IP address of the module:

#SGACT: "212.141.113.92"

It is recommended to use the command "AT#SGACTCFG" to set the context "auto-activation": in this way the context will be automatically activated in case of switching off/on, in case of deactivation from Network and in case of SIM removal.

AT#SGACTCFG=1,1 the auto-activation is set on context 1

It is suggested to configure the socket parameters through the command AT#SCFG (please read the paragraph *"Alerts"*), using the socket identifier (the first parameter). For example:

AT#SCFG=1,1,300,0,600,1

Now, some configuration parameters have to be set for both type of service, through the command AT#TCPATRUNCFG:

AT#TCPATRUNCFG =1,2,1024,12345,`"212.141.125.127`",1,5,1,5,2

The first parameter is the identifier of the socket that will be used, the second one is the instance (in the module the AT interface can use three instances) that will be dedicated to the TCP ATRUN, the third one is the TCP port for listen (used in server mode), the fourth one and the fifth one are respectively the TCP port and IP address of the host (for the client mode), the sixth one is for enabling the unsolicited that advises of the connection/disconnection from server, the seventh one is the timeout for an AT command execution, the eighth one is for choosing the authentication mode (in server mode), the ninth one is the number of attempts to connect that the module will do in case of automatic re-start of the service (in client mode), the last one is the delay (in minutes) from one attempt and the other (in client mode).

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

3.2. TCPATRUN in server mode

3.2.1. Description

The TCP ATRUN service in server mode is enabled locally by the AT command AT#TCPATRUNL.
This command puts the module in listen state on a determined port, so that a client can connect from remote opening a TCP socket to the IP address and port of the module. Once connected, the client can issue AT commands to the module.

Note that the TCP ATRUN service in server mode is useful with static IP address.

The TCP access to the module is controlled by a firewall.
In the case of TCP ATRUN service, this firewall can be set (and saved in memory) by the following command

AT#TCPATRUNFRWL=1,"212.141.112.216","255.255.255.255"

The two strings represent the IP address and mask

The service is also protected by the authentication parameters: Username and Password.
These parameters are set (and saved in memory) through the following command

AT#TCPATRUNAUTH=1,"testuser","testpassw"

The user can choose between two kinds of authentication procedure, as we will see in the next paragraph.

Finally, the TCP ATRUN service can be enabled using "AT#TCPATRUNL":

AT#TCPATRUNL =1

Now, referring to the parameters configuration that has been set in this example through the command AT#TCPATRUNCFG:

the socket 1 is in listen state on port 1024, and the IP address is the one given by the AT#SGACT command.
The client can connect to the module if its address is included in the firewall.
It can use Telnet or a dedicated program to open the socket and communicate with the module. Once connected, username and password have to be transmitted in a way that depends on the authentication mode set with AT#TCPATRUNCFG.

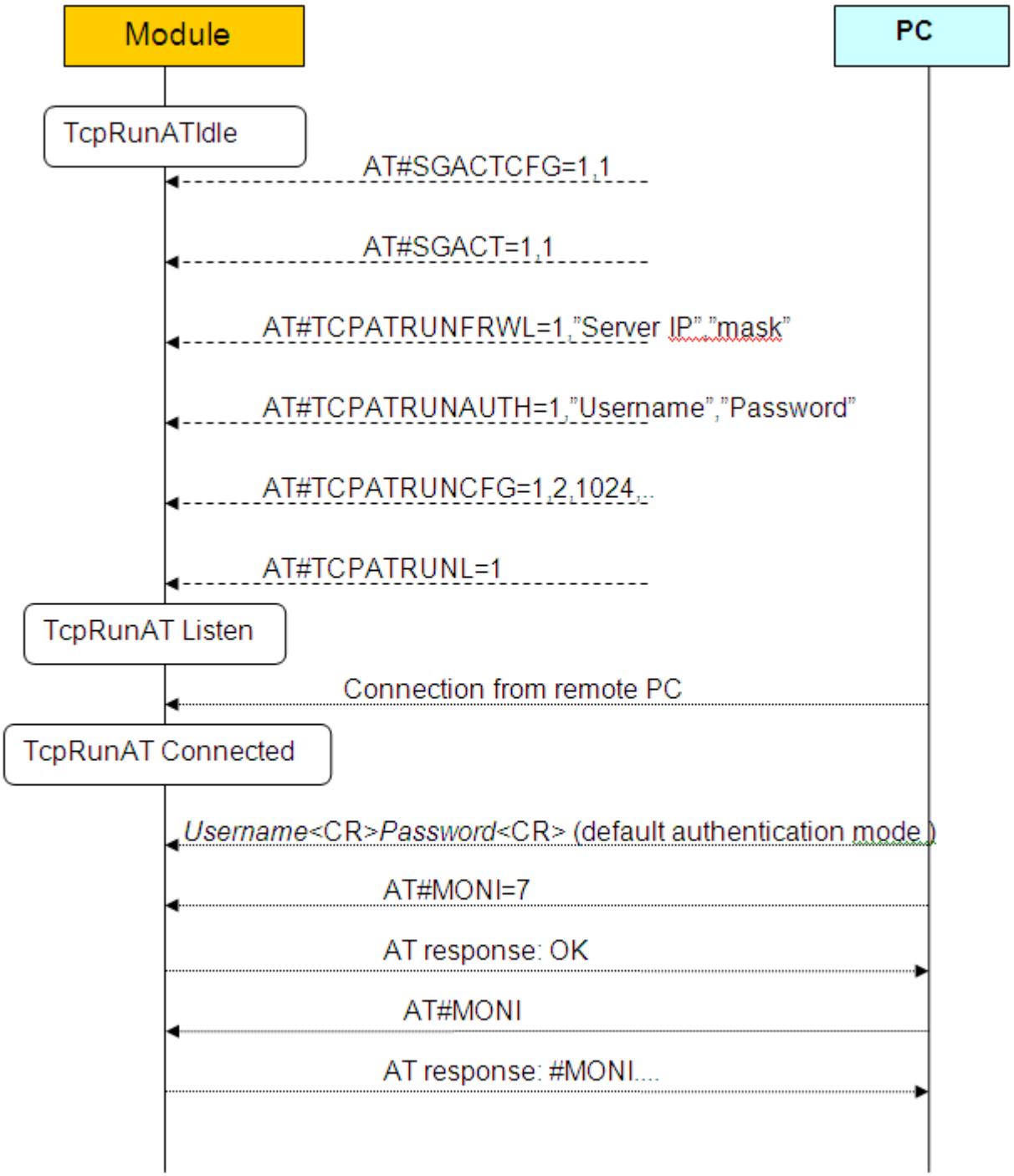
Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

After authentication, an AT command can be issued and the module will parse the command and send the response.

For example, client can interrogate the module about all the cells in the neighbour of the serving cell, by the commands AT#MONI=7 and AT#MONI.

If the TCP ATRUN service is not disabled, it automatically starts at every start-up of the module as long as the PDP context auto-activation has been set by AT#SGACTCFG.
The same happens in case of a deactivation from Network and in case of SIM removal.

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved



Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

3.2.2. Authentication mode

Setting the *authentication mode* parameter in the command AT#TCPATRUNCFG, the user can choose between two kinds of authentication: "automatic" and "step-by-step". The first one is useful for easily automate the procedure, the second one is more graphically pleasant.

3.2.2.1. Automatic mode (default)

Once the connection between server and module is opened and before issuing any AT command, username and password have to be transmitted in the following way:

userid<CR>*passw*<CR> (where <CR> means Carriage Return and is equal to 0x0d)

After these strings, AT commands can be sent to the module.
The couple *Username – Password* has to be included in the authentication parameters list built through the command AT#TCPATRUNAUTH, otherwise the module will immediately close the connection.
If a timeout expires in the module without receiving one of the two parameters, then the module will close the connection.

3.2.2.2. Step-by-step

Once the connection between server and module is opened, the module first requests the Username and then, if the Username has been received and accepted (*userid*<CR>), requests the Password. Once the Password has been received and accepted (*passw*<CR>), the module transmits a "Login successful" message.

Username: *userid*
Password: *passw*
Login successful.

From this moment AT commands sent by the server are parsed by the module.
Also in this case, if the couple *Username – Password* is not included in the authentication parameters list, or if the timeout expires without receiving a parameter, the module will close the connection.

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

3.3. TCPATRUN in client mode

3.3.1. Description

This TCP ATRUN service is enabled locally by the AT command AT#TCPATRUND:

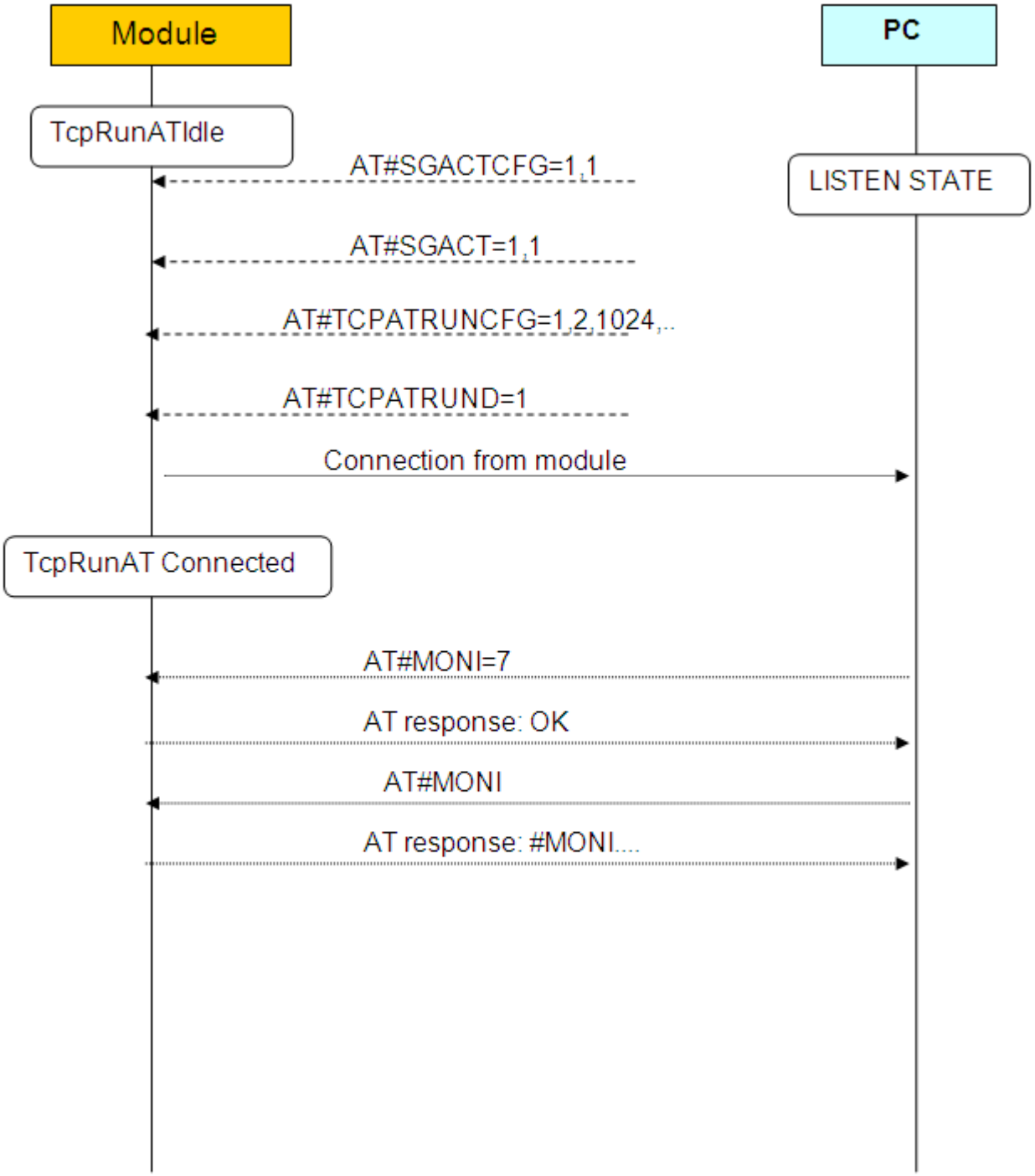
AT#TCPATRUND = 1

This command opens a TCP socket to connect to the Host IP address and to the Host port specified in AT#TCPATRUNCFG.

To allow the module to connect, the server (the remote PC) has to have been put in listen through a dedicated program at the port specified with AT#TCPATRUNCFG command (in the previous example 12345).
If the response to AT#TCPATRUND command is "OK", the module is connected to the remote PC and ready to receive AT commands.

If the TCP ATRUN service is not disabled, it automatically starts at every start-up of the module as long as the PDP context auto-activation has been set through AT#SGACTCFG.
The same happens in case of a deactivation from Network and in case of SIM removal. This means that the module will automatically try to connect to the Host IP (the one set through AT#TCPATRUNCFG), and if connection is not successful, it will retry. The number of attempts and the delay between one and the other will be those set through AT# TCPATRUNCFG.

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved



Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

3.4. AT commands in sequence

The standard usage of AT interface consists in waiting for response to an AT command before issuing another one. Each command ends with the delimiter character (<CR> is the default). In alternative, AT commands can be issued separated by ";", being treated like a single command. For example, the response to

```
AT# SGACT=1,1;#SS
```

could be

```
#SGACT: 212.141.252.44

#SS: 1,1,212.141.121.05, 1024,212.141.121.148,1332
#SS: 2,0
#SS: 3,0
#SS: 4,0
#SS: 5,0
#SS: 6,0

OK
```

What happens if the remote application doesn't wait for an AT command response before issuing another one?
If AT commands are issued with the delimiter character but without waiting for response, some commands can be ignored, for example in the sequence

```
AT#SGACT=1,1
AT#SS
```

The AT#SS would be ignored.

In the case of AT commands issued through TCP ATRUN service, a new feature has been introduced that solves this problem.
This feature is enabled through the command

AT#TCPATCMDSEQ=1.

If enabled, the response to the sequence

```
AT#SGACT=1,1
AT#SS
```

could be for example

```
#SGACT: 212.141.252.44
```

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

```
OK

#SS: 1,1,212.141.121.05, 1024,212.141.121.148,1332
#SS: 2,0
#SS: 3,0
#SS: 4,0
#SS: 5,0
#SS: 6,0

OK
```

The command AT#TCPATCMDSEQ can be set from any instance, but it just affects AT commands issued through ATRUN service.

3.5. Transparence

From TCP ATRUN service, it is possible to connect directly to a serial port of the module, in transparent mode, that is to say that data will be transferred directly between TCP ATRUN and the serial port specified. So any data in input on the serial port will be sent to the remote PC via TCP/IP (and vice-versa). This connection is opened issuing the command AT#TCPATCONSER=<port>,<rate> from the TCP ATRUN instance.

After this command has been issued, if no error has occurred, then a "CONNECT" will be returned from module to advise that the TCP ATRUN instance is in *online mode* and connected to the port specified.
To exit from online mode and close the connection, the escape sequence (the default is "+++") has to be sent on the TCP ATRUN instance, taking into account that the escape sequence needs to be sent in one single packet. (So the use of Telnet for Windows, sending every single byte in a TCP packet, is not appropriate in this case).

3.6. Alerts

For the connection used by the TCP ATRUN service, a particular socket identifier is used (see the first parameter of AT#TCPATRUNCFG). So all the settings on that socket can affect the connection: please refer to the module Easy GPRS User Guide for the use of the AT commands concerning TCP sockets.
In particular, by the command AT#SCFG, the user can read and change the packet size, the Transmission Timeout and the Idle Activity Timeout.

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

To summarize briefly the meaning of the Transmission Timeout: if the bytes to be sent from the module are less than packet size, then they will be sent just at Transmission Timeout expiry. So in the case of TCP ATRUN service, it is suggested to set the minimum Transmission Timeout to avoid to wait for responses. It is strongly recommended to avoid having it set to infinite.
It is also recommended not to set a Packet Size smaller than the default one.

The meaning of the Idle Activity Timeout is this: if there is no data exchange within the Idle Activity Timeout period, the connection is closed. This is useful in the following situation: if the TCP/IP socket is closed by the remote PC in an "unilateral" way, that is to say without signal exchange with the other side of the connection, on the local side (the module on the field) the connection is still up, but cannot be used anymore.
In this situation, if the Idle Activity Timeout has been set locally on the module, it will automatically close the connection, otherwise the only way to close it is using the AT command AT#TCPATRUNCLOSE locally.
After the connection local closure, the TCP ATRUN status is still enabled, so the service re-starts automatically.

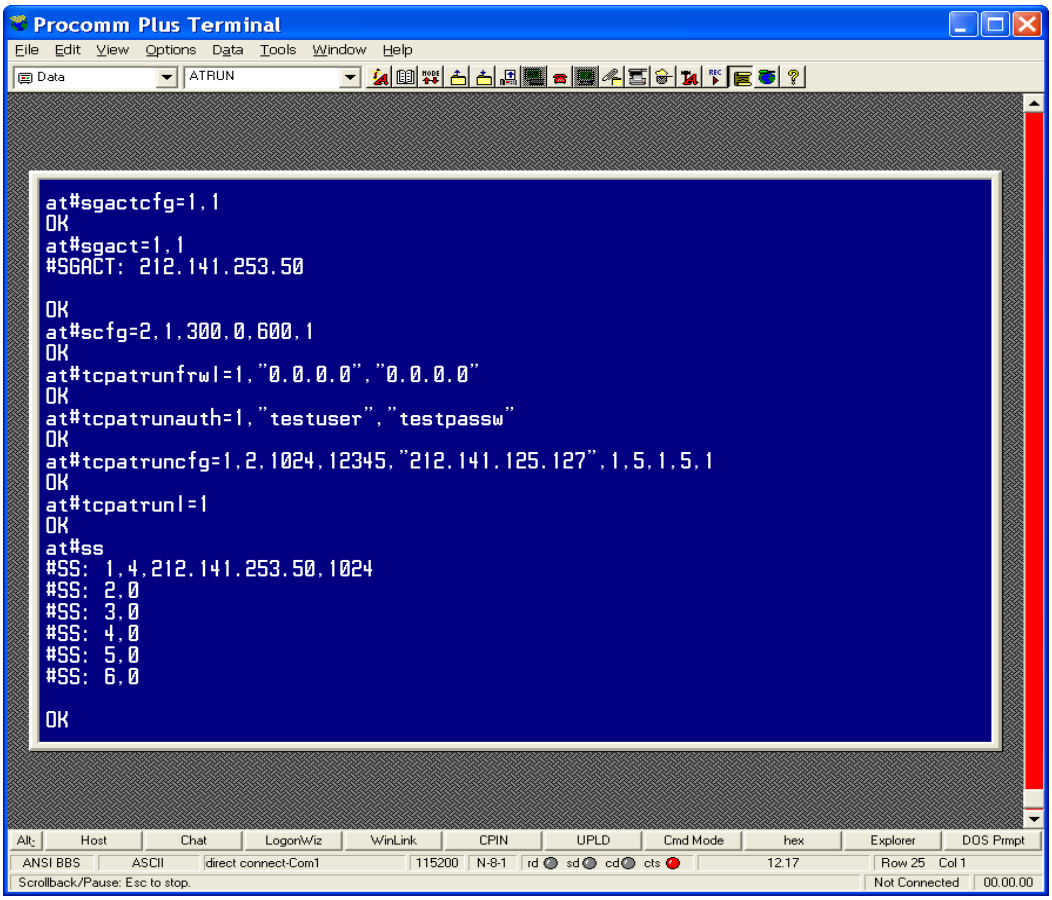
If the TCPATRUN service, in server or client mode, is activated on the first instance (<muxInstance> = 1 in AT#TCPATRUNCFG), the control of that instance will be loosed and there will be the need of the multiplexer to deactivate the service by the second or third instance.

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

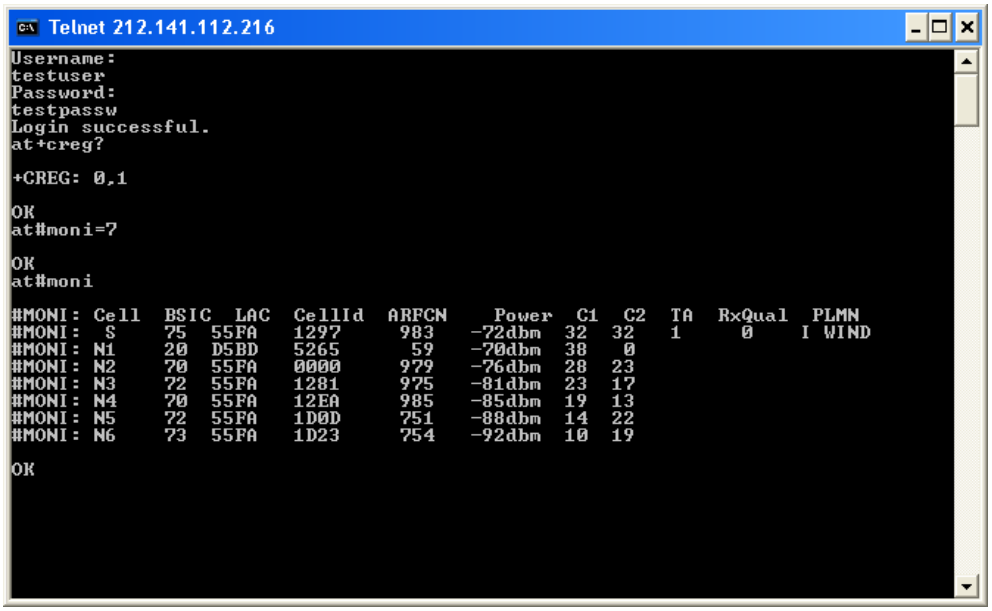
3.7. Examples

3.7.1. TCP ATRUN in server mode and AT commands

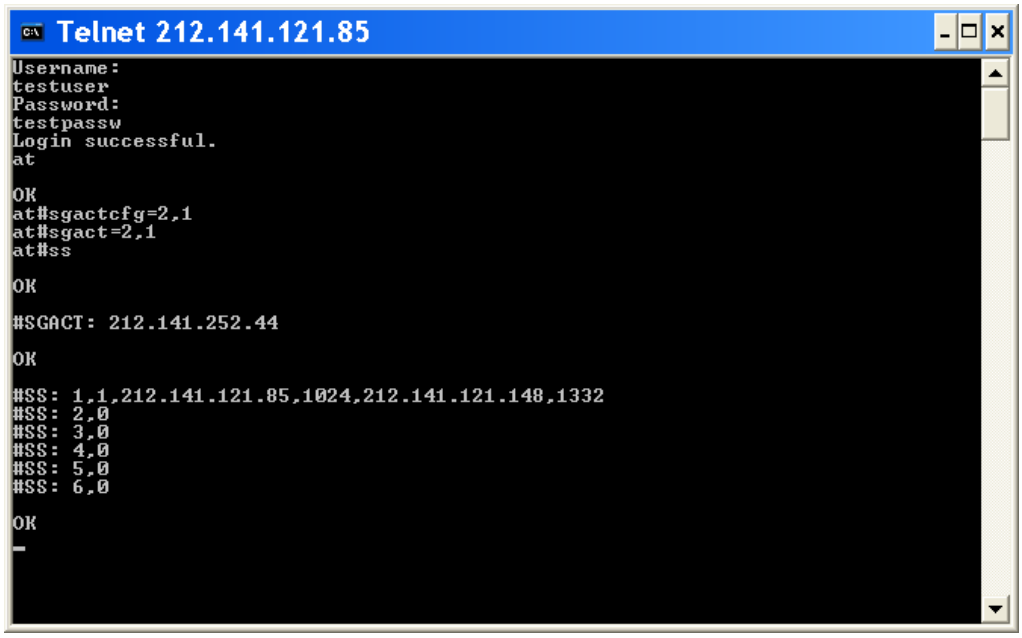
Remote Mobile



PC (telnet)



3.7.2. TCPATCMDSEQ feature



ALERTS:

Some AT commands can fail if set through TCP ATRUN service, due to an interaction of the AT command execution with the GPRS service. These problems can be avoided inserting a delay before AT command execution (e.g. AT+COPS=? using SMS ATRUN).

This delay is set through the command AT#ATRUNDELAY:

AT#ATRUNDELAY=0,5 sets for TCP ATRUN commands a delay of 5 seconds

Once set, the delay is valid till a new AT#ATRUNDELAY is issued.

Some other commands can block the AT command sending-AT command response receiving mechanism if set through ATRUN service, see below.

3.8. DELAYS AND NOTES

3.8.1. Delays

The following table shows the suggested delays (in seconds) for TCP ATRUN. These delays are set using AT#ATRUNDELAY command.

AT+COPS=?	10
AT#CSURV AT#CSURVC AT#CSURVU AT#CSURVUC AT#CSURVB AT#CSURVBC AT#CSURVP AT#CSURVPC	10

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

3.8.2. Notes

1) AT#SKTD, AT#SKTL, AT#SKTSAV:
Initial setting for TCPATRUN service(through AT#TCPATRUNCFG) has to be done: <connId> different from <muxInstance>.

2) AT#QDNS:

a) Initial setting for TCPATRUN service(through AT#TCPATRUNCFG) has to be done: <muxInstance> = 1.

b) Initial setting by the command AT#SCFG has to be done:
<connId> set for TPCATRUN service(through AT#TCPATRUNCFG) has to be associated to a <cid> different from 1.

3) AT#GPRS: same as 2b)

4) AT#SKTOP: same as 2) and furthermore:
Initial setting for TCPATRUN service(through AT#TCPATRUNCFG) has to be done: <connId> different from 1.

5) If initial setting for TCPATRUN service(through AT#TCPATRUNCFG) has done: <connId> = <muxInstance>,
then parameters set by AT#PKTSZ, AT#SKTTO, AT#DSTO affect the same <connId> socket on which TCPATRUN service is running.

6) AT+CGATT=0, AT+CGACT=0, AT+CGCLASS="CC", AT#SHDN, AT#BND=2, AT#BND=3, ATQ1, ATQ2, AT#SIMDET=0, AT+CFUN=2 and AT+CFUN=4 commands cause an irreversible block of the TCP AT RUN mechanism;

7) The commands of AT#CSURV family can have the response truncated if too long: these commands in fact send their responses during the network search, but while they are executed, the GPRS service is suspended and so the TCP ATRUN cannot transmit anything. It stores these responses in a buffer till the network search completes; anyway, the use of this command is deprecated.

8) The command ATZ returns ERROR if a Data Call is up and this Data Call has been set up on a "muxInstance" different from the TCPATRUN "muxInstance". The ATZ returns ERROR also in the case the TCPATRUN works on an IPEGSM context (opened through AT#SGACT=0,1), because the IPEGSM context is based on a Data Call.

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved

3.9. TCPATRUN and Python

TCPARUN allows to download/upgrade/execute a Python script into Telit modules using a remote TCP/IP connection (e.g Telnet). Below is reported a generic example to demonstrate this feature.

The module has been configured before in TCPATRUN in server mode with the AT sequence reported below. This sequence can be configured locally (module site) or using SMSATRUN service.

AT+CGDCONT=1,"IP","myAPN"

AT#SCFG=1,1,1500,0,600,50 // set Inactivity Timeout to 0

AT#TCPATRUNCFG=1,3,1024,... // listening on port 1024

AT#TCPATRUNFRWL=2;#TCPATRUNFRWL=1,"217.0.0.0","255.0.0.0"

AT#TCPATRUNAUTH=1,"MyUser","MyPwd"

AT#SGACT=1,1 // activate the context

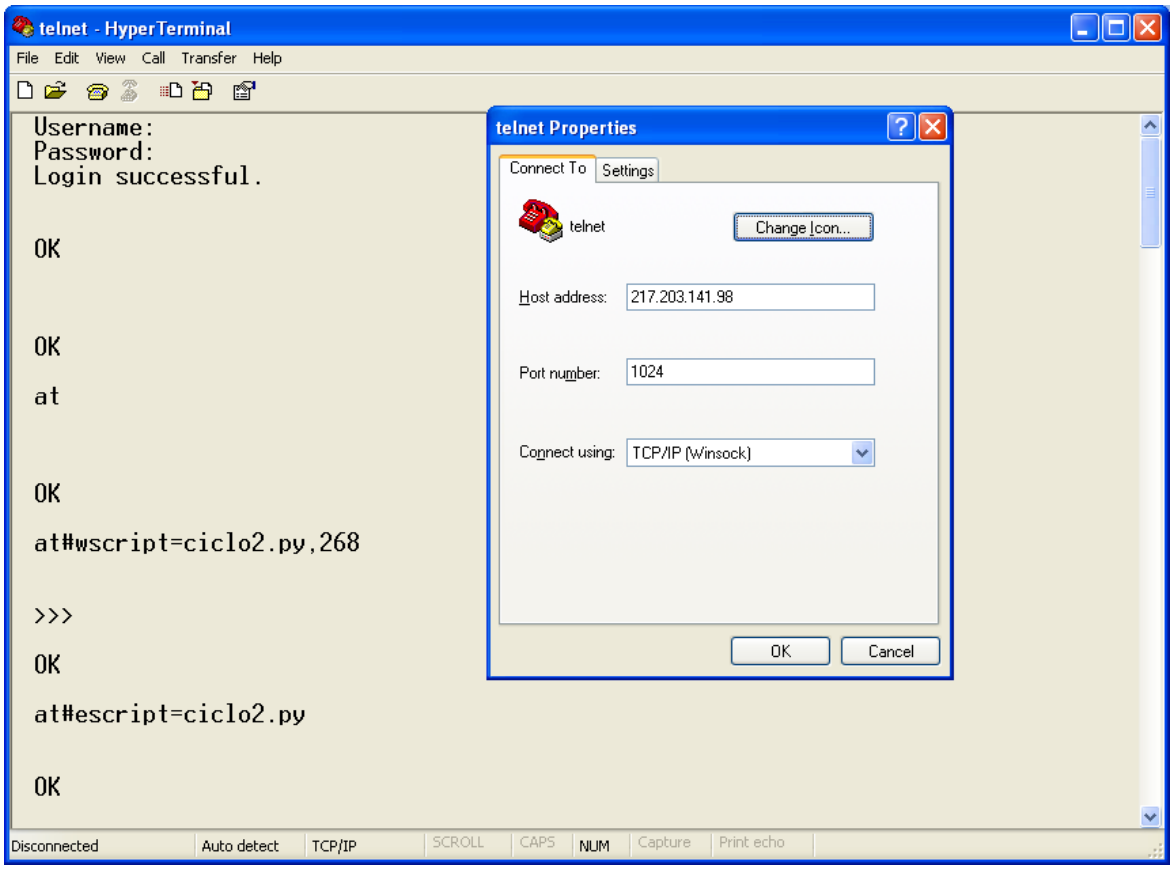
AT#TCPATRUNL=1 // start TCPRUNAT service

A remote computer works as an IP client and Telnet is used to connect to the module on the field.

To start a Telnet session on the remote computer, it is possible to use Hyper Terminal or any other terminal emulator via TCP/IP, setting the right port (1024 in this case) and the IP address of the module (returned by AT#SGACT). After the login phase (login requires username and password), the Python script can be downloaded on the module, entering on Telnet, AT#WSCRIPT command using the same settings described in the Telit_Easy_Script_Python user guide.

Below is reported a screen-shot of the procedure described above.

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved



To upgrade a Python script that is running using TCPATRUN service we recommend this procedure that can be easily execute using remote Telnet:

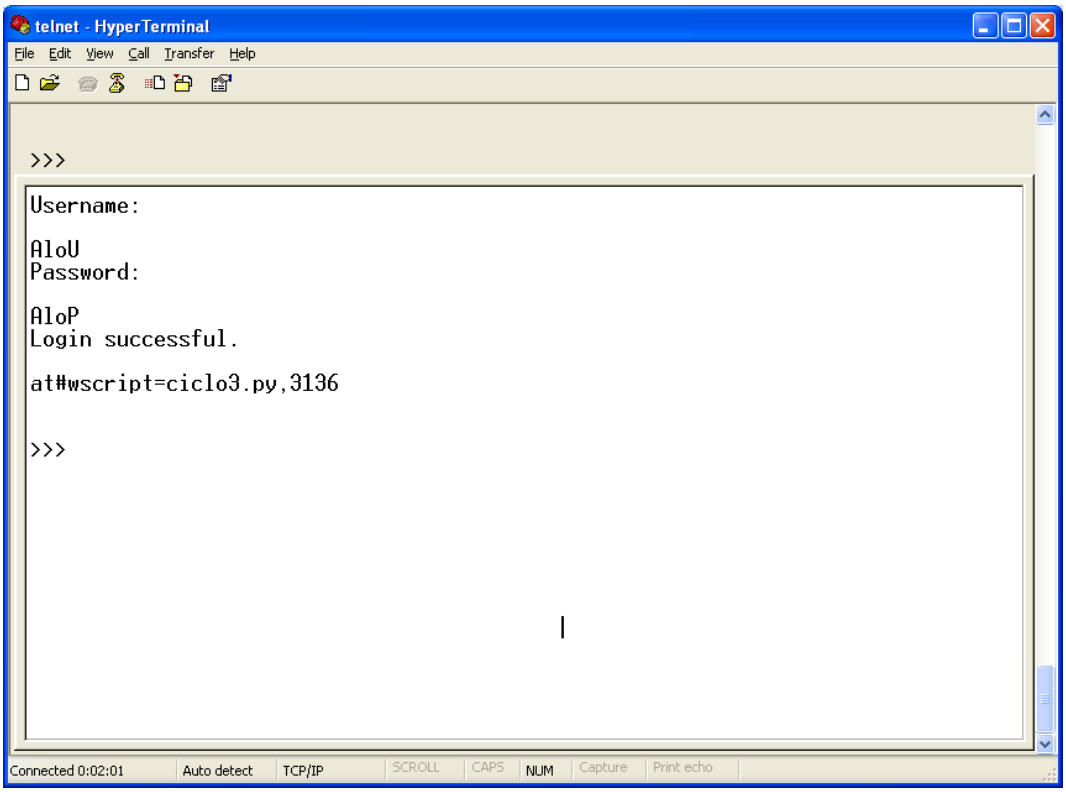
1) download a new PY script with the same procedure above

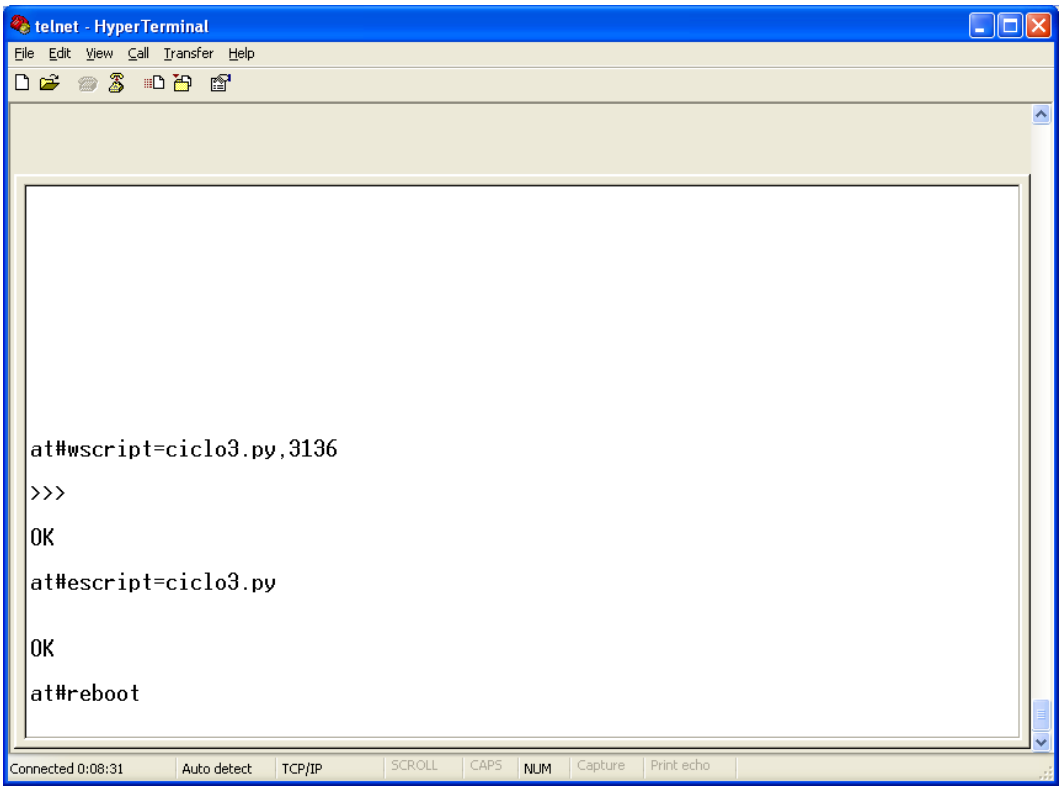
2) enable the new PY script with AT#ESCRIPT=ciclo3.py"

3) reboot the module with AT#REBOOT to start the execution of the new python script (ciclo3.py)

Below is reported a series of screen-shots of the steps described above.

Reproduction forbidden without Telit Communications S.p.A. written authorization - All Rights Reserved


telnet - HyperTerminal
File Edit View Call Transfer Help
>>>
Username:
AloU
Password:
AloP
Login successful.
at#wscript=ciclo3.py,3136
>>>
Connected 0:02:01
Auto detect
TCP/IP
SCROLL
CAPS
NUM
Capture
Print echo


telnet - HyperTerminal
File Edit View Call Transfer Help
at#wscript=ciclo3.py,3136
>>>
OK
at#escript=ciclo3.py
OK
at#reboot
Connected 0:08:31
Auto detect
TCP/IP
SCROLL
CAPS
NUM
Capture
Print echo