Leon G100 GSM/GPRS Modules

GSM/GPRS Evaluation Board

User Manual

Version 1.0

GSM/GPRS Evaluation Board

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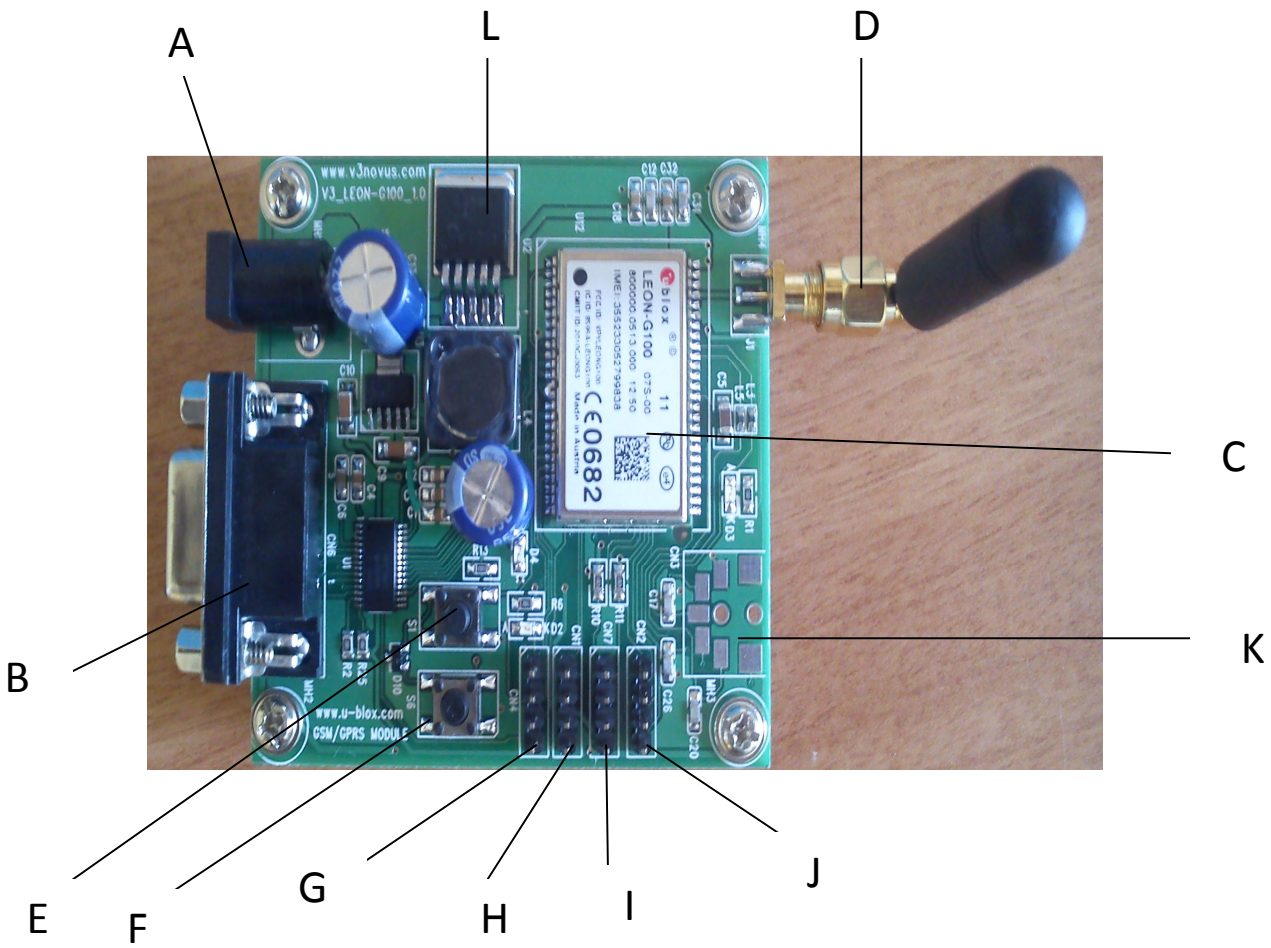
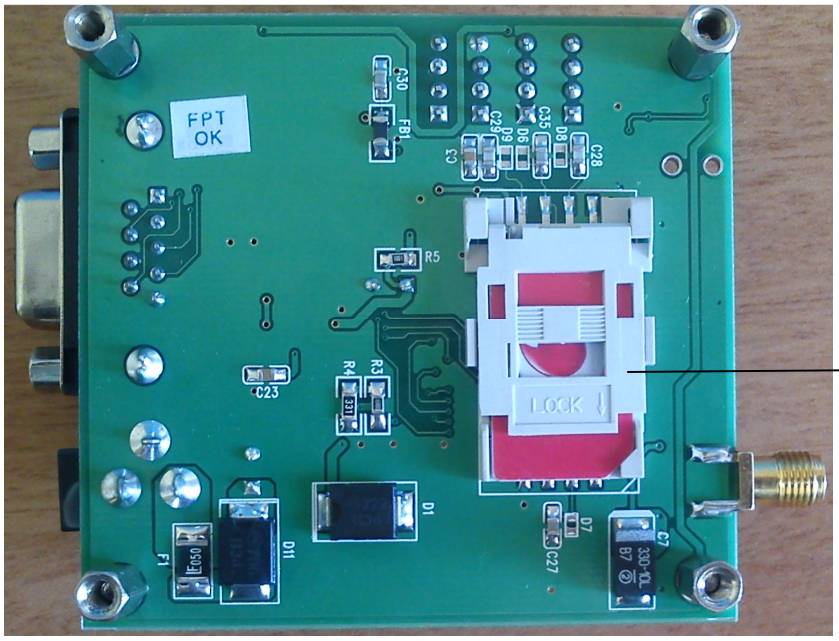
GSM/GPRS Evaluation Board

1. Image with Label and Descriptions:



TOP VIEW

GSM/GPRS Evaluation Board



BOTTOM VIEW

(A) Power Connector :

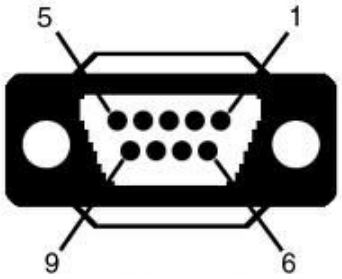
The Power supply is availble through a DC Jack.
Input Power = 6-32 Vdc @ 1.2A minimum

(B) Serial Port {DB9} :

The RS-232 port is available through D - TYPE 9 pin female connector

The main characteristics are:

Baud rate from 300 to 115,200 bits/s
Autobauding (300 to 38,400 bits/s)
Short circuit (to Ground) protection on all outputs.
Input voltage range: -12V to +12V
Pin out (refers to DTE side):
Pin 1 = DCD Output
Pin 2 = RX Output
Pin 3 = TX Input
Pin 4 = DTR Input
Pin 5 = Ground
Pin 6 = DSR Output
Pin 7 = RTS Input
Pin 8 = CTS Output
Pin 9 = RI Output



To connect to a PC / Laptop a pin to pin, 9 pin cable needed with D type connectors (male).

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(C) GSM/GPRS Module – Leon G100/G200

LEON-G100/G200 modules provide full feature quad band GSM/GPRS data and voice communication in a compact andcost optimized SMT form factor. LEON modules are fullyqualified and certified and feature extremely low power consumption and a rich set of Internet protocols. They are ideally suited to M2M and automotive applications such as: Fleet management, Automatic Meter Reading (AMR), peopleand asset tracking, surveillance and security and Point of Sales(PoS) terminals.

LEON modules implement fully integrated access to u-bloxGPS receivers. Wireless and GPS are controlled through a singleserial port from any host processor, and A-GPS (AssistNowOnline and AssistNow Offline) functionality is integrated.

The compact SMT package enables easy manufacturing, andsimple forward migration to u-blox LISA UMTS/HSPA andCDMA 1xRTT modules and seamless GSM to UMTS and GSMto CDMA handover. This allows customers to take maximumadvantage of their hardware and software investments,and provides very short time to market. An extensive set ofnational regulatory and operator certificates is available. RILsoftware for Android and Embedded Windows is availablefree of charge.

LEON modules are manufactured in ISO/TS 16949 certifiedsites. Each module is tested and inspected during production.The modules are qualified according to ISO 16750 – Environmentalconditions and electrical testing for electrical andelectronic equipment for road vehicles

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Product selector

Module	Bands	Interface					Audio		Functions												
	GSM/GPRS quad band	UART	SPI	USB	DDC for u-blox GPS	GPIO	Analog Audio	Digital Audio	Network indication	Antenna Supervisor	Jamming Detection	Embedded TCP/UDP	FTP, HTTP, SMTP	SSL	GPS/GNSS via Modem	AssistNow software	FW update via serial interface	FOTA	In-band modem	Battery charging	CellLocate
LEON-G100	•	1			1	4	2	1	•	•	•	•	•		•	•	•	A			•
LEON-G100 eCall	•	1			1	4	2	1	•	•	•	•	•		•	•	•	A	•		•
LEON-G200	•	1			1	4	2	1	•	•	•	•	•		•	•	•	•		•	•

A = available upon request with LEON-G100 Automotive module

(D) Antenna

The Antenna connector is available on the left side of the connector and is a female SMA Connector

Antenna Requirements	
Frequency range	Standard Dual Band GSM/DCS frequency range or Standard Quad Band GSM/DCS/PCS frequency range if used for all four bands
Bandwidth	70 MHz in GSM850, 80 MHz in GSM & 170 MHz in DCS & 140 MHz PCS band
Gain	Gain < 3dBi
Impedance	50 ohm
Input power	> 2 W peak power

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(E) Power On { S1 }

Press S1 to Power on the Module from Sleep mode.

Please refer the Leon G100 datasheet and AT Command usermanual for more information on Power on Module feature.

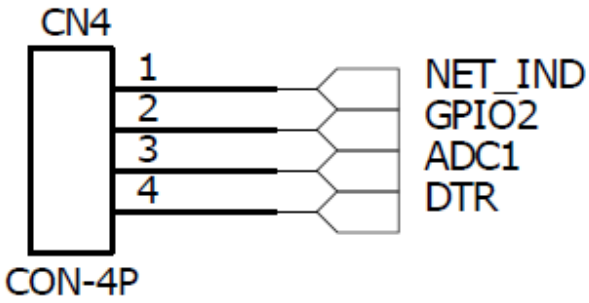
(F) Reset { S6 }

Press S6 to Reset the GSM/GPRS Module.

Please refer the Leon G100 datasheet and AT Command usermanual

for more information on Power on Module feature

(G) Connector - CN4



NET_IND : Network Indication
ADC1 : ADC Input
DTR : UART Data Terminal Ready

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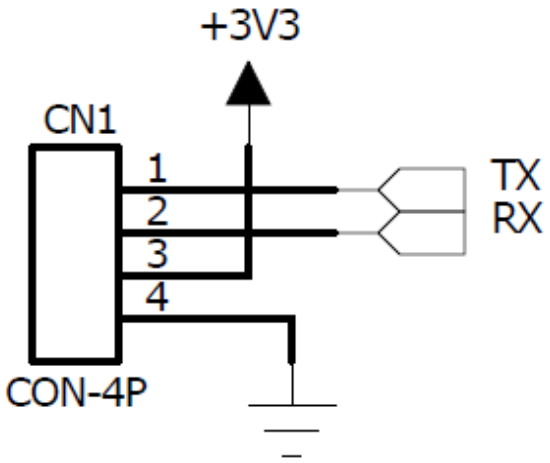
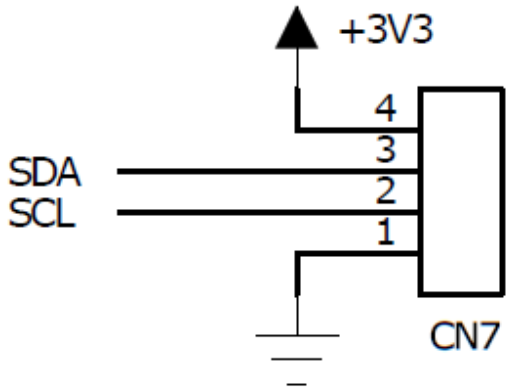
(H) Connector - CN1



TTL Levels of RX and TX available on Connector - CN1

(I) Connector - CN7



SDA - I2C Data Line
SCL – I2C Clock Line

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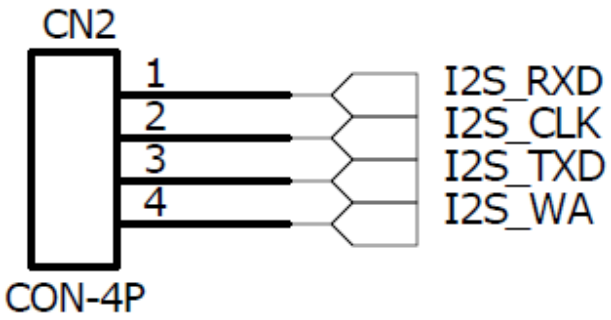
(J) Connector - CN2



I2S_RXD : I2S receive data
I2S_CLK : I2S Clock
I2S_TXD : I2S transmit data
I2S_WA : I2S word alignment

(K) Audio

Jack interface available for Audio Interface

(L) Switching Voltage Regulator

3.3V, 5V, 12V, and adjustable output versions

Input voltage range up to 40V

(M) SIM Interface

The Evaluation board features a SIM Holder on the back side of the board for inserting SIM Card.

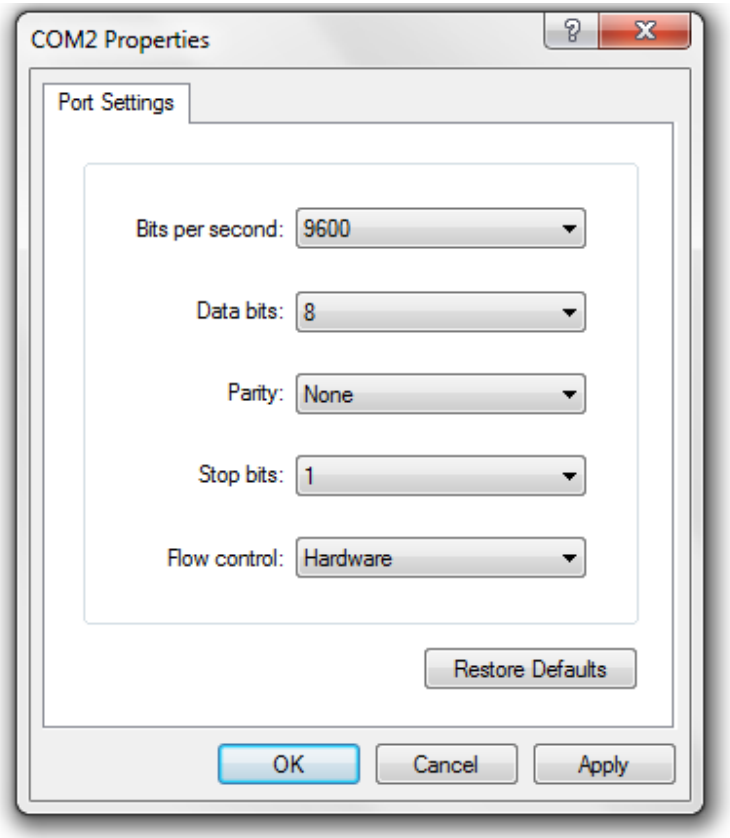
GSM/GPRS Evaluation Board

2. Eval Board Set Up :

The Set up is done by connecting the eval board with Power Adopter and connecting the board RS232 Serial Port to the Computer using a Stadard Serial Cable or USB to Serial Converter.

The Software application for using the PC RS232 standard serial interface (COM-PORT) as Data Terminal Equipment (DTE) is usually Hyper Terminal

Connect using the COM-port to which the “Evaluation Board” Terminal is connected with the following settings.

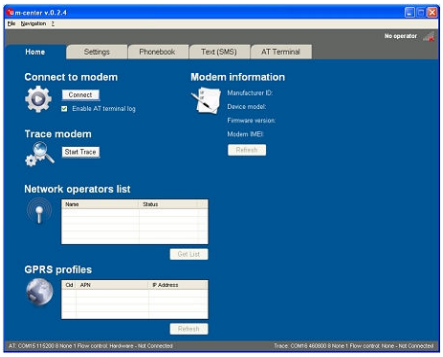


GSM/GPRS Evaluation Board

3. m-center wireless evaluation software

The m-center wireless module evaluation software provides a powerful platform for evaluation, configuration and testing of u-blox' LEON family of GSM/GPRS and LISA UMTS/HSDPA modem products.

m-center is PC-compatible, and provides an intuitive, easy to understand and use graphical interface. The application is provided free-of-charge.



The application can be downloaded from the below link

http://www.u-blox.com/en/evaluation-tools-a-software/u-center/m-center.html

4. Network Registration, Sending SMS and GPRS Activation

Please go through "AT Commands Examples for U-blox wireless modules", available on

http://www.u-blox.com/en/download/resources-application-notes/wireless-application-notes.html

5. SMS AT Commands

Command	Response	Description
AT	OK	Attention
AT+CMGF=1	OK	Set Preferred message format to text Mode
AT+CMGS="+919945374668"<CR> >This is a text Message <Ctrl-Z>	+CMGS: 67 OK	Send Message from SIM Card

6. GPRS Activation

Configuring a data connection for FTP, HTTP, SMTP and TCP/IP AT commands is performed as follows:

Command	Response	Description
AT+CGATT?	+CGATT: 1 OK	Check GPRS Attach Status • The first parameter indicated the GPRS status (in this case 1 - GPRS attached)
AT+UPSND=0,8	+UPSND: 0,8,0 OK	Check the status of the GPRS connection profile associated to GPRS connection profile identifier “0”. The GPRS profile status is provided by the third parameter (in this case 0 - not active)
AT+UPSD=0,1,"airtelgprs.com"	OK	Setup APN for GPRS connection profile “0”. APN "airtelgprs.com" is for the APN operator Airtel APN "www" is for the APN operator Vodafone
AT+UPSDA=0,1	OK	Save GPRS profile in the NVM.
AT+UPSDA=0,3	OK	Activate the GPRS connection

AT+UPSND=0,8	+UPSND: 0,8,1 OK	Check the status of the GPRS connection profile associated to GPRS connection profile identifier "0". The GPRS profile status is provided by the third parameter (in this case 1 - active).
AT+UPSND=0,0	+UPSND: 0,0,"93.68.225.175" OK	Check the assigned IP address

7. Direct Link / Data Mode

When a modem is in data mode, any characters sent to the modem are intended to be transmitted to the remote party. The modem enters data mode immediately after it makes a connection.

The modem would report the word "CONNECT" and then switch to data mode. Any further characters received over the serial link are deemed to be from the remote party, and any characters sent are transmitted to the remote party.

To take the modem to direct link mode and exit, Please follow below commands.

Verify that the module is registered with the network and a GPRS connection is activated. Follow the steps in "GPRS Activation" (chapter 6).

Command	Response	Description
AT+USOCR=6	+USOCR: 0 OK	TCP socket creation. In this example Socket #0 is created. The command response provides the new socket identifier (in this example #0). If a new socket is created, a new socket identifier will be returned.
AT+USOCO=0,"151.9.34.66",444	OK	Connect socket #0 to port 444 of a remote host with IP address 151.9.34.66.

		The connection is now uniquely associated to the socket. Socket is now ready for read / writes operations.
AT+USODL=0	CONNECT	Activate direct link mode for socket #0. CONNECT response means a transparent end-to-end communication has been established with the previous connected TCP socket via the serial interface. Now data received on socket #0 will be redirected to the serial port and data written on serial port will sent to socket #0.
+++	DISCONNECT OK	Exit from direct link mode; this will not close the TCP connection. Now you are in command mode. Data can be read or written on socket #0 using usual TCP commands (+USOWR, +USORD). DISCONNECT message is provided on LEON-G100-04S / LEON-G200-04S and subsequent versions and LISA-U1 series

8. Sending an Email / SMTP

To send an email from Leon G100 modules, please follow below SMTP AT Commands

Sets up the necessary parameters for SMTP service, or resets parameters to factory-programmed value. To change the settings the Set command needs to be executed for each single <param_tag>.

Read command returns the current setting of all the SMTP parameters, one per line (i.e. the SMTP profile).

The SMTP parameter values specified with this command are all volatile (not stored in non-volatile memory).

Type	Syntax	Response	Example
Read	AT+USMTP?	+USMTP: 0,<param_val1_0> ... +USMTP: 6,<param_val1_6>, <param_val2_6> OK	+USMTP: 0,"69.147.102.58" +USMTP: 1,"" +USMTP: 2,"username" +USMTP: 4,1 +USMTP: 5,0 +USMTP: 6,0,0 OK
Test	AT+USMTP=?	+USMTP: (list of supported <param_tag>s) OK	+USMTP: (0-6) OK

Defined Values

Parameter	Type	Description
<param_val1>		Type and content depend on <param_tag> (details below). If <param_val1> is not specified, the value for the corresponding <param_tag> is reset
<param_val2>		Type and content depend on related <param_tag> (see details below)

<param_tag>	Number	• 0: SMTP server IP address;
		  ○ <param_val1> is text string of SMTP server IP address in dotted decimal notation form
		  ○ <param_val2> parameter is not allowed
		• 1: SMTP server name
		  ○ <param_val1> is text string of SMTP server name (e.g. "smtp.server.com") Maximum length is 128 characters
		  ○ <param_val2> is not allowed
		• 2: Username
		  ○ <param_val1> is user name text string (maximum 30 characters)

Parameter	Type	Description
		for the SMTP login procedure, if authentication is used ○ <param_val2> is not allowed. • 3: Password ○ <param_val1> is password text string (maximum 30 characters) for the SMTP login procedure if authentication is used ○ <param_val2> is not allowed • 4: Authentication type ○ <param_val1> is the SMTP authentication method (if any): ○ 0 (default value): No authentication ○ 1: Plain authentication ○ 2: Login authentication ○ <param_val2> is not allowed • 5: Inactivity timeout ○ <param_val1> is the inactivity timeout period in seconds, from 0 to 86400 s. 0 means no timeout (the SMTP session will not be terminated in the absence of incoming traffic); the default value is 30 s ○ <param_val2> is not allowed. • 6: Time zone, used for the date header field of mails ○ <param_val1> Number type value of hour differential, in range [-12; 12] (default is 0). ○ <param_val2> Number type value of minute differential, in range [0; 59] (default is 0). This is a mandatory parameter if <param_tag>=6 and <param_val1> is specified.

Make sure the module is registered with the network and a GPRS connection is activated. Follow the steps in “GPRS Activation” (chapter 6).

8.1 Parameter configuration for SMTP using the +USMTP.

Command	Response	Description
AT+USMTP=1,"mail.v3novus.com"	OK	SMTP server hostname
AT+USMTP=2,"user name"	OK	Login ID
AT+USMTP=3,"password"	OK	Login Password
AT+USMTP=4,0	OK	Authentication type (no authentication)
AT+USMTP=5,3600	OK	Inactivity timeout
AT+UDNSRN=0, "mail.v3novus .com"	+UDNSRN:"69.167.151.16" OK	Hostname resolution

8.2 Prepare the mail envelope and body using the +USMTPM command

Command	Response	Description
AT+USMTPM	OK	Reset all the parameters
AT+USMTPM=0,"USER1@v3novus.com"	OK	Set up mail sender address
AT+USMTPM=0,"USER1@v3novus.com"	OK	Set up the reply-to mail address
AT+USMTPM=2,"USER2@v3novus.com"	OK	Set up the mail receiver address
AT+USMTPM=3,"This is thesubject of the email"	OK	Set up the mail subject
AT+USMTPM=4,"This is the bodytext of the email"	OK	Set up the mail text

8.3 Send the email using the +USMTPC command

Command	Response	Description
AT+USMTPC=1	OK +UUSMTPCR: 1,1	Connect to the SMTP server
AT+USMTPC=2	OK +UUSMTPCR: 2,1	Send the email
AT+USMTPC=0	OK +UUSMTPCR: 0,1	Disconnect from the SMTP server The notification of the operation is provided by the reception of the +UUSMTPCR URC (1 means success).

9. TCP/IP AT commands

Verify that the module is registered with the network and a GPRS connection is activated. Follow the steps in “GPRS Activation” (chapter 6).

a. Socket Connect

Command	Response	Description
AT+USOCR=6	+USOCR: 0 OK	TCP socket creation. In this example Socket #0 is created. The command response returns the created socket identifier (in this case #0). If a new socket is created (without closing the already existent), a new socket identifier will be returned
AT+USOCR=6	+USOCR: 1 OK	Create another socket (in this case the socket identifier is 1).
AT+USOCO=0,"151.9.34.66",444	OK	Connect socket #0 to port 444 of a remote host with IP address 151.9.34.66. The connection is now uniquely associated to the socket. Socket is now ready for read / write operations.

b. Socket Write

Command	Response	Description
AT+USOWR=0,2	@	Request to write 2 data bytes into socket #0. Wait "@" symbol indicating the data prompt is now open (AT commands are not allowed in data prompt).
12	+USOWR : 0,2 OK	Write data bytes. It is not allowed to write fewer bytes than previously specified with AT+USOWR command. If more bytes are written respect to the threshold, the remaining bytes will be truncated. The interface is blocked until all bytes are written. If the command response is returned then the data is sent to lower level of protocol stack. This is not a notification of an acknowledgment received from the remote host data bytes have been sent to.
AT+USOWR=0,2,"12"	+USOWR: 0,2 OK	Write 2 data bytes data on socket #0. If the command response is returned then the data is sent to lower level of protocol stack. This is not a notification of an acknowledgment received from the remote host data bytes have been sent to.

C. Socket Read

Command	Response	Description
	+UUSORD: 0,2	Remote server sends 2 data bytes on socket #0. A URC is returned indicating the socket on which the data is received and the total amount of data received.
AT+USORD=0,2	+USORD: 0,2,"ar" OK	Read data. Data is returned between quotation marks.

D. Socket Close

By Remote Server

Command	Response	Description
	+UUSOCL: 1	The URC indicates the TCP connection associated to socket 1 is closed. Socket 1 is cleared. WARNING: After this indication has been received the socket buffer is cleared.

By the Module

Command	Response	Description
AT+USOCL=0	OK	Socket closed by the module (socket #0). WARNING: No +UUSOCL URC returned.