CELLULAR

# EVK-U20, EVK-U23

## LISA-U200, LISA-U230 HSPA+/UMTS/EGPRS/GSM Cellular evaluation kit

### User Guide


**Abstract**

This guide explains how to set up the EVK-U20 and EVK-U23 evaluation kits to begin evaluating the u-blox LISA-U2 series HSPA+/UMTS/EGPRS/GSM cellular modules.



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| Document status explanation | |
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| Objective Specification | Document contains target values. Revised and supplementary data will be published later. |
| Advance Information | Document contains data based on early testing. Revised and supplementary data will be published later. |
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| Production Information | Document contains the final product specification. |

### This document applies to the following products:

| Product name | Type number | Firmware version | PCN / IN |
|---|---|---|---|
| EVK-U20 | EVK-U20-03S-01 | N/A | N/A |
| EVK-U23 | EVK-U23-00S-01 | N/A | N/A |

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# Contents

# 1 Starting up

## 1.1 EVK-U2x overview

The EVK-U20 and EVK-U23 are powerful and easy-to-use tools that make evaluating the u-blox LISA-U200 and LISA-U230 HSPA+/UMTS/EGPRS/GSM cellular modules simple.

The evaluation kits differ depending on which LISA-U2 series module version is mounted:

- LISA-U200 module is provided on the EVK-U20 evaluation kit
- LISA-U230 module is provided on the EVK-U23 evaluation kit

This document identifies both evaluation kits as EVK-U2x.

This section describes the main connections and settings required to get started.

☞ EVK-U2x can also be used to evaluate the LISA-U2 series modules: LISA-U201, LISA-U260, LISA-U270.

☞ See the LISA-U2 series Data Sheet [2] and the LISA-U series System Integration Manual [3] for the features supported by u-blox LISA-U2 series HSPA+/UMTS/EGPRS/GSM cellular modules.

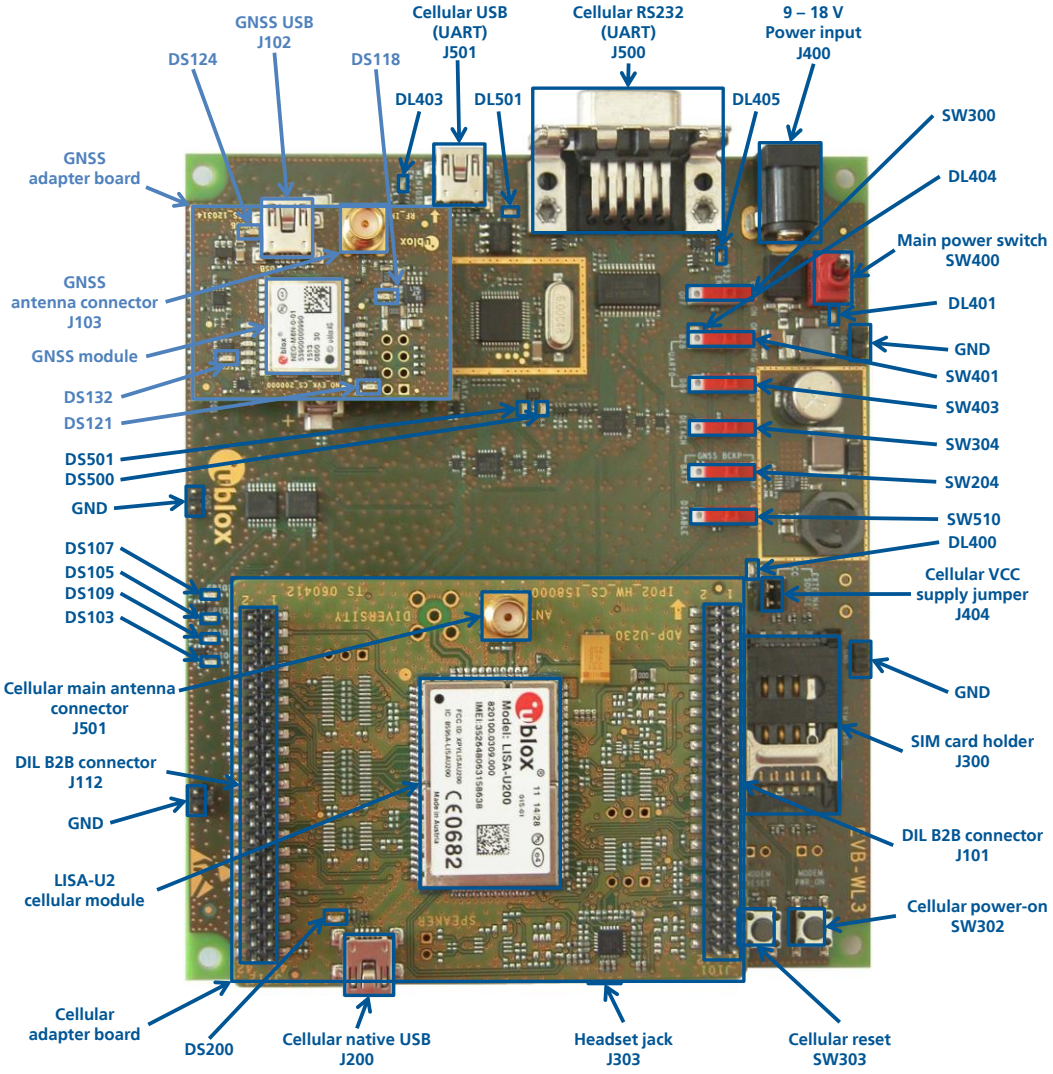



**Figure 1: EVK-U2x evaluation kit overview**

## 1.2 EVK-U2x block diagram

Figure 2 shows the main interfaces and internal connections of the EVK-U2x:

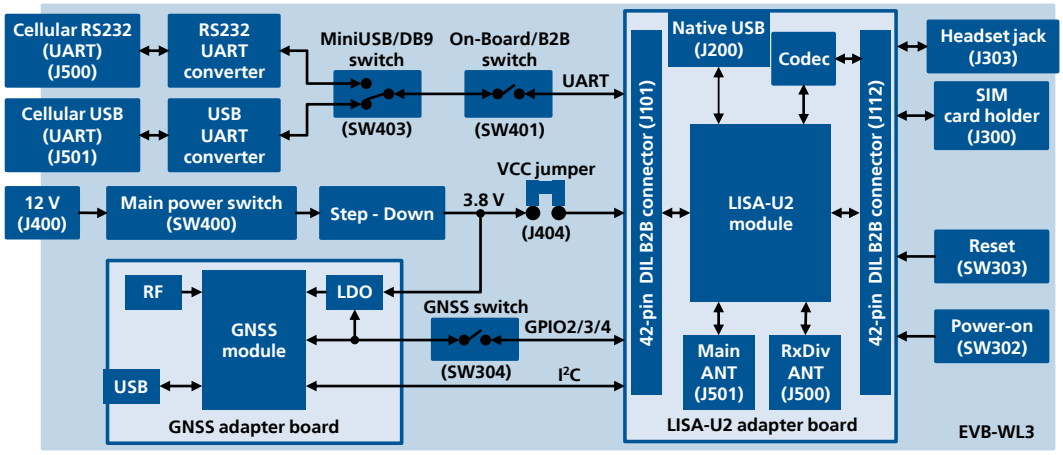



**Figure 2: EVK-U2x block diagram**

The EVK-U2x is formed by three boards:

- The lower one, called EVB-WL3, contains the power supply and other peripherals for the LISA-U2 series cellular module (SIM card holder, Reset button and Power-on button).
- The cellular adapter board, called ADP-U200 or ADP-U230 contains the LISA-U200 or the LISA-U230 cellular module, the antennas and USB connectors for the cellular module.
- The GNSS adapter board, called ADP-GNSS, contains the u-blox GNSS module, the GNSS antenna connector and the USB connector for the GNSS module.

The boards are connected by means of male header board-to-board connectors provided on the bottom of the adapter boards and their corresponding female connectors provided on top of the lower board

The USB interface of the cellular module is available on the cellular native USB connector on the adapter board, while the other peripherals are available on the Dual-In-Line male Board-to-Board connectors provided on the top layer of the adapter board (J101, J112), which are pin-to-pin compatible to the connectors on the bottom layer of the adapter board.

## 1.3 Switches, jumpers and buttons

| Function | Description | Name | Board |
|---|---|---|---|
| Main Power Switch | Switch to power on / off the whole evaluation kit | SW400 | EVB |
| Cellular VCC | Jumper socket to provide the 3.8 V supply to the cellular module VCC input | J404 | EVB |
| Cellular Power-on | Push button to switch-on the cellular module | SW302 | EVB |
| Cellular Reset | Push button to reset the cellular module | SW303 | EVB |
| Cellular UART detach | Slide switch to attach / detach cellular module UART from USB and RS232 connectors: when detached, UART signals available only on the DIL B2B connector on ADP board | SW401 | EVB |
| Cellular UART routing | Slide switch to select cellular module UART routing on USB or on RS232 connector | SW403 | EVB |
| Cellular GPIO detach | Slide switch to attach / detach the cellular module GPIOs, SIM_DET from peripherals: when detached, the signals are available only on the DIL B2B connector on ADP board | SW300 | EVB |
| Cellular GNSS detach | Slide switch to attach / detach the cellular module to the GNSS module (GPIO2-3-4): when detached, the signals are available only on DIL B2B connector on ADP board | SW304 | EVB |
| GNSS V_BCKP | Slide switch to connect / disconnect backup battery to V_BCKP pin of GNSS module | SW204 | EVB |

**Table 1: EVK-U2x switches and buttons description**

## 1.4 Connectors

| Function | Description | Name | Board |
|---|---|---|---|
| 9 - 18 V Power Input | Connector for the AC / DC power adapter of the EVK<br>AC: 100-240 V, 0.8 A, 50-60 Hz / DC: +12 V, 2.5 A<br>IEC 60417-5172<br>Class II equipment | J400 | EVB |
| Cellular main antenna | SMA connector for the cellular module main antenna | J501 | ADP-U2xx |
| Cellular Rx div antenna | SMA connector for the cellular module Rx diversity antenna | J500 | ADP-U2xx |
| SIM card holder | SIM card holder | J300 | EVB |
| Cellular native USB | Mini USB connector for cellular module native USB interface | J313 | ADP-U2xx |
| Cellular USB (UART) | Mini USB connector for cellular module UART interface converted as USB interface | J501 | EVB |
| Cellular RS232 (UART) | DB9 connector for cellular module UART interface converted as RS232 interface | J500 | EVB |
| Cellular headset | Audio headset jack connector for cellular module audio interface | J303 | EVB |
| DIL B2B headers | Dual-In-Line Board-to-Board connectors for cellular module interfaces | J101, J112 | ADP-U2xx |
| GNSS antenna | SMA connector for the GNSS module antenna (GNSS antenna) | J103 | ADP-GNSS |
| GNSS USB | Mini USB connector for GNSS module USB interface | J102 | ADP-GNSS |
| GNSS backup battery | Backup battery socket for the GNSS module (under GNSS adapter board) | BT200 | EVB |
| GND | Ground terminals for probe reference | J402/3/5/6 | EVB |

**Table 2: EVK-U2x connectors' description**

**Caution! In the unlikely event of a failure in the internal protection circuitry there is a risk of an explosion when charging fully or partially discharged battery. Replace battery when it no longer has sufficient charge for unit operation. Control the battery before use if the device has not been used for an extended period of time.**

**Caution! Risk of explosion if battery is replaced with an incorrect type. Dispose of used batteries according to the instructions!**

## 1.5 LEDs

| Function | Description | LED # | Board | Color |
|---|---|---|---|---|
| Main Power | Power supply plugged in the **9 - 18 V Power Input** | DL401 | EVB | |
| Cellular VCC supply | Cellular module supplied. **Main Power Switch** must be switched on | DL400 | EVB | |
| Cellular native USB | USB cable plugged in **Cellular native USB** connector | DS200 | ADP-U2xx | |
| Cellular USB | USB cable plugged in **Cellular USB** connector for UART access | DL501 | EVB | |
| Cellular USB / UART | Green light is activated when UART is routed to **Cellular USB** connector<br>Red light blinks at UART TX or RX data on **Cellular USB** connector | DL403 | EVB | |
| Cellular RS232 / UART | Green light is activated when UART is routed to **Cellular RS232** connector<br>Red light blinks at UART TX or RX data on **Cellular RS232** connector | DL405 | EVB | |
| Cellular UART detach | UART signals are available only on the DIL B2B connector on ADP board | DL404 | EVB | |
| Cellular RI indicator | RI line turns ON (active low) | DS501 | EVB | |
| Cellular CTS indicator | CTS line turns ON (active low) | DS500 | EVB | |
| Cellular GPIOs indicators | Green light is activated when cellular GPIO1 is high<br>Green light is activated when cellular GPIO2 is high<br>Green light is activated when cellular GPIO3 is high<br>Green light is activated when cellular GPIO4 is high | DS107<br>DS105<br>DS109<br>DS103 | EVB<br>EVB<br>EVB<br>EVB | |
| GNSS VCC supply | GNSS module supply is turned ON | DS118 | ADP-GNSS | |
| GNSS USB | USB cable plugged in **GNSS USB** connector | DS124 | ADP-GNSS | |
| GNSS timepulse | Pulses at 1 Hz when valid GNSS fix | DS121 | ADP-GNSS | |
| Cellular / GNSS DDC | Cellular / GNSS module communication over DDC ($I^2C$) interface | DS132 | ADP-GNSS | |

**Table 3: EVK-U2x LEDs' description**

## 1.6 EVK-U2x pinout

| DIL Name/Pin Number | LISA Signal Name | LISA Pin N° | LISA Pin N° | LISA Signal Name | DIL Name/Pin Number |
|---|---|---|---|---|---|
| J112 Pins 7-8-9-10 | GND | 1 | 65 | GND | J112 Pins 7-8-9-10 |
| J112 Pin 3 | V_BCKP | 2 | 64 | GND | J112 Pins 7-8-9-10 |
| J112 Pins 7-8-9-10 | GND | 3 | 63 | VCC | J101 Pins 7-8-9-10 |
| J112 Pin 36 | V_INT | 4 | 62 | VCC | J101 Pins 7-8-9-10 |
| J112 Pin 22 | RSVD | 5 | 61 | VCC | J101 Pins 7-8-9-10 |
| J112 Pins 7-8-9-10 | GND | 6 | 60 | GND | J112 Pins 7-8-9-10 |
| J112 Pins 7-8-9-10 | GND | 7 | 59 | SPI_MRDY / GPIO14 | J112 Pin 37 |
| J112 Pins 7-8-9-10 | GND | 8 | 58 | SPI_SRDY / GPIO13 | J112 Pin 39 |
| J112 Pin 18 | DSR | 9 | 57 | SPI_MISO / GPIO12 | J101 Pin 17 |
| J112 Pin 17 | RI | 10 | 56 | SPI_MOSI / GPIO11 | J101 Pin 18 |
| J112 Pin 11 | DCD | 11 | 55 | SPI_SCLK / GPIO10 | J101 Pin 19 |
| J112 Pin 12 | DTR | 12 | 54 | GPIO9 / I2S1_WA | J112 Pin 30 |
| J112 Pin 13 | RTS | 13 | 53 | GPIO8 / I2S1_CLK | J112 Pin 34 |
| J112 Pin 14 | CTS | 14 | 52 | RSVD / CODEC_CLK | J112 Pin 24 |
| J112 Pin 15 | TXD | 15 | 51 | GPIO5 | J112 Pin 23 |
| J112 Pin 16 | RXD | 16 | 50 | VSIM | J101 Pin 13 |
| J112 Pins 7-8-9-10 | GND | 17 | 49 | SIM_RST | J101 Pin 16 |
| Not present | VUSB_DET | 18 | 48 | SIM_IO | J101 Pin 14 |
| J112 Pin 29 | PWR_ON | 19 | 47 | SIM_CLK | J101 Pin 15 |
| J112 Pin 33 | GPIO1 | 20 | 46 | SDA | J101 Pin 21 |
| J112 Pin 31 | GPIO2 | 21 | 45 | SCL | J101 Pin 20 |
| J101 Pin 26 | RESET_N | 22 | 44 | RSVD / I2S_RXD | J101 Pin 23 |
| J112 Pin 32 | GPIO3 | 23 | 43 | RSVD / I2S_CLK | J101 Pin 22 |
| J112 Pin 25 | GPIO4 | 24 | 42 | RSVD / I2S_TXD | J101 Pin 24 |
| J112 Pins 7-8-9-10 | GND | 25 | 41 | RSVD / I2S_WA | J101 Pin 25 |
| Not present | USB_D- | 26 | 40 | GPIO7 / I2S1_TXD | J112 Pin 28 |
| Not present | USB_D+ | 27 | 39 | GPIO6 / I2S1_RXD | J112 Pin 27 |

**Table 4: Cellular module interfaces availability on the 42-pins Dual-In-Line Board-to-Board connectors on the Adapter Board**

## 1.7 Software installation

The USB driver can be downloaded from the EVK-U2x collection found on u-blox.com/evk-downloads.. Save the executable file to any location of the hard drive on the computer. The installation can be started by running the executable file on the computer running the Windows operating system.

## 1.8 Board setup and settings

1 Insert a SIM card into the **SIM card holder** (J300).

2 Connect a cellular antenna provided with the evaluation kit box to the **Cellular main antenna** SMA connector (J501 on ADP-U2xx, RF input/output for transmission and reception of 3G/2G RF signals).

3 In case of EVK-U23, connect a cellular antenna provided with the evaluation kit box to the **Cellular Rx div antenna** SMA connector (J500 on ADP-U2xx, RF input for reception of 3G RF signals as per DL Rx diversity). Place the Rx div cellular antenna far enough from the main cellular antenna (should be more than 20 cm).

4 If the GNSS functionality is required, connect the GNSS antenna provided with the evaluation kit box to the **GNSS antenna** SMA connector (J103 on ADP-GNSS). Put the GNSS antenna in a place with good sky view.

5 Connect the AC / DC +12 V power adapter provided with the evaluation kit box to **9 – 18 V Power Input** connector (J400 on EVB). LED DL401 lights blue.

6 Be sure to insert a jumper socket on the **Cellular VCC supply jumper** (J404). This provides the connection from the 3.8 V output of the supply circuit on the EVB to the VCC input of the module.

7 To enable board power supply, turn **Main Power** switch (SW400) to ON position. LED DL400 lights green. The cellular module switches on.

☞ If the cellular module is powered off using AT+CPWROFF command, press the **Cellular Power ON** button (SW302) or the **Cellular Reset** button (SW303) to switch on the module again.

8 For communication via UART interface of the cellular module, the following connections are allowed and can be alternatively enabled in a mutually exclusive way (see Table 5 for switch position and LED status):

a. Connect a USB cable to the mini USB connector (**Cellular USB**, J501 on EVB), LED DL501 lights blue
b. Connect an RS232 cable to DB9 connector (**Cellular RS232**, J500 on EVB)

When a USB cable is connected to the mini USB connector, two COM ports are enabled in Windows (the numbering of the COM ports can be seen via the Windows Device Manager). The serial port for AT commands is available over the first numbered COM port opened by the driver.

| Type of connections | SW401 | SW403 | LED |
|---|---|---|---|
| Access to cellular UART over the **Cellular USB (UART)** mini USB connector (J501) | ON BOARD | MINIUSB | DL403 |
| Access to cellular UART over the **Cellular RS232 (UART)** DB9 connector (J500) | ON BOARD | DB9 | DL405 |
| Access to cellular UART on DIL Board-to-Board connector on the adapter board: cellular UART detached from USB (UART) J501 and RS232 (UART) J500 connectors | B2B | Do not care | DL404 |

**Table 5: Cellular UART interface configuration and routing**

9 For communication via USB interface of the cellular module, connect a USB cable to Cellular Native USB connector (J313 on ADP). LED DL300 on ADP lights blue.

After the end of the module boot, the COM ports listed in Table 6 are enabled by the Windows USB driver (details as the numbering of the ports can be seen via the Windows Device Manager)[1]:

| Parameter | Type | Remarks |
|---|---|---|
| u-blox Modem USB1 AT and data | Modems | AT command interface and data communication |
| u-blox Modem USB2 AT and data | Ports (COM & LPT) | AT command interface and data communication |
| u-blox Modem USB3 AT and data | Ports (COM & LPT) | AT command interface and data communication |
| u-blox Modem USB4 GNSS | Ports (COM & LPT) | GNSS tunneling |
| u-blox Modem USB5 Primary Log | Ports (COM & LPT) | Diagnostic purpose |
| u-blox Modem USB6 Secondary Log | Ports (COM & LPT) | Diagnostic purpose |
| u-blox Modem USB7 SAP | Ports (COM & LPT) | Remote SIM Access profile |

**Table 6: COM-ports in use for Cellular Native USB ports**

[1] A message of "driver installation fail" may appear on Windows if the USB cable has been connected before the end of the module boot, but this can be ignored as the normal operating functionality of the module will be anyway available after the end of the module boot.

☞ When using USB drivers for Windows, if a dial-up connection is created and then started on the "Modems Type" interface (USB1), the following commands are issued to the module through USB1 during the dial-up initialization phase:

```
AT&F&D2&C1S0=0<cr> ATE0V1<cr> AT\Q0<cr>
```

These commands reset all profile parameters to factory-programmed values. This is strictly related to the provided Windows modem driver, and is not controlled by the FW module. If needed, profile parameters other than the factory-programmed values must be set after the dial up connection is disconnected.

10 Run an AT terminal application (e.g. m-center, HyperTerminal) on PC COM-port, with these settings:

- Data rate: 115200 b/s
- Data bits: 8
- Parity: N
- Stop bits: 1
- Flow control: HW

See Appendix A for how to configure the AT-Terminal for Windows-XP, Windows 7 and Vista.

11 Connect the headset provided with the evaluation kit box to the **Headset jack** connector (J303 on EVB), if the audio functionality is required.

## 1.9 Enabling verbose error result codes

| Command sent by DTE (user) | DCE response (modem) | Description |
|---|---|---|
| AT+CMEE=2 | OK | Enables cellular module to report verbose error result codes. |

## 1.10 PIN code insertion (when required)

| Command sent by DTE (user) | DCE response (modem) | Description |
|---|---|---|
| AT+CPIN="8180" | OK | Enter the PIN code, if needed (enter the PIN of the SIM card – 8180 is written here as an example). |
| AT+CLCK="SC",0,"8180" | OK | Unlock the PIN at power on (the last parameter is the PIN of the SIM card – 8180 is written here as an example). |
| AT+CLCK="SC",1,"8180" | OK | Lock the PIN at power on (the last parameter is the PIN of the SIM card – 8180 is written here as an example). |

## 1.11 Registration on a cellular network

| Command sent by DTE (user) | DCE response (modem) | Description |
|---|---|---|
| AT+CREG? | +CREG: 0, 1<br>OK | Verify the network registration. |
| AT+COPS=0 | OK | Register the phone on the network.<br>The cellular module automatically registers itself on the cellular network. This command is necessary only if the automatic registration failed (AT+CREG? returns 0,0). |
| AT+URAT=1,2 | OK | Select radio access technology: 1=GSM/UMTS dual mode; 2=UMTS. |
| AT+COPS? | +COPS: 0,0,"I TIM",2<br>OK | Read operator name; 2 means radio access UMTS. |

## 1.12 Audio codec configuration and enabling / disabling

| Command sent by DTE (user) | DCE response (module) | Description |
|---|---|---|
| AT+UGPIOC? | +UGPIOC:<br>16,255<br>23,3<br>24,4<br>25,5<br>**34,12**<br>**35,12**<br>**36,12**<br>**37,12**<br>42,7<br>OK | Check the I2S pins (<gpio_id> = 34, 35, 36, 37) configuration: they must be configured as I2S digital audio interface (<gpio_mode> = 12) to provide voice capability at the EVB headset jack connector using the external audio codec mounted on the EVK-U2x. |
| AT+USPM? | +USPM: **0,0**,0,0,2<br>OK | Check the audio path mode setting: both the <main_uplink> path and the <main_downlink> path must be configured as I2S digital audio interface (e.g. <main_uplink> = 0, <main_downlink> = 0) to provide voice capability at the EVB headset jack connector using the external audio codec mounted on the EVK-U2x. |
| AT+UEXTDCONF=0,1 | OK | The audio codec configuration is **enabled** at any subsequent re-boot of the module, with the execution of the following actions:<br>• Set module CODEC_CLK pin to provide 13 MHz master clock to the external Maxim MAX9860 audio codec mounted on EVK-U2x<br>• Open the DDC logical channel connected to the external codec<br>• Send, via DDC, the specified byte sequence for codec configuration<br>• Close the DDC logical channel connected to the external codec<br>Note that the AT+UEXTDCONF setting must be saved in the module' non volatile memory by switching off the module with AT+CPWROFF to be in use at any subsequent re-boot of the module. |
| AT+UEXTDCONF=0,0 | OK | The audio codec configuration is **disabled** at any subsequent re-boot of the module.<br>Note that the AT+UEXTDCONF setting must be saved in the module' non volatile memory by switching off the module with AT+CPWROFF to be in use at any subsequent re-boot of the module. |

## 1.13 Switching off the EVK-U2x

To switch off the EVK-U2x, send the AT+CPWROFF command. Make sure to use this command before switching off the main power, otherwise settings and configuration parameters may not be saved on EVK-U2x.

# Appendix

# A Setting up AT terminal applications for communication with EVK-U2x

The u-blox m-center cellular module evaluation tool is a powerful platform for evaluating, configuring and testing u-blox cellular products. m-center includes an AT commands terminal for communication with the device and can be downloaded free-of-charge from our website (http://www.u-blox.com).

1. Follow the board setup instructions in section 1.8 to provide all the required connections and switching on the cellular module.
2. Run the m-center tool: after the m-center start-up, the **Home** page appears.
3. On the **Home** page, set up the AT COM port; for the setting values see section 1.8.

   Check with Windows Device Manager to find out which COM port is being used by EVK-U2x.
4. Enable the connection to u-blox cellular module by clicking on the **Connect** button.
5. Retrieve the module and network information by clicking on the **Get Info** button.
6. The module information is retrieved and displayed on the **Home** page.
7. Click on the **AT Terminal** button, found at the upper right of the **Home** page. A new window opens and the AT command terminal is now ready for communication with EVK-U2x.
8. The AT terminal is ready to use.

   For the complete list of AT commands supported by the modules and their syntax, see the u-blox AT Commands Manual [1].

   For more information on using the m-center tool, see the m-center User Guide [4].

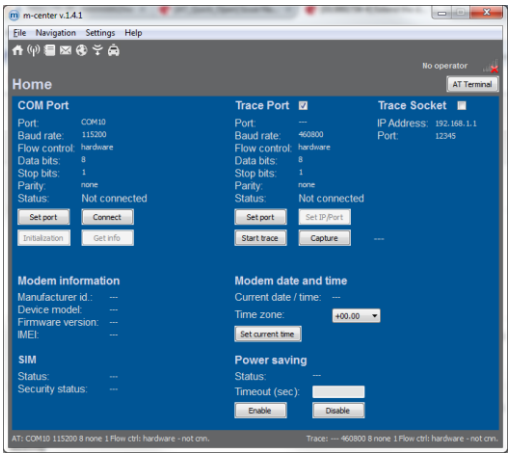



**Figure 3: m-center Home page**

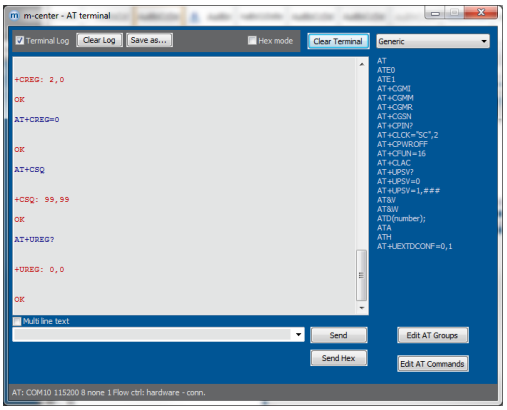



**Figure 4: AT Terminal window**

# B Setting up cellular packet data connection on PC

This section describes how to set up a packet data connection with Windows 7 operating systems (for PC) and EVK-U2x, using the TCP/IP stack of the PC (external TCP/IP stack).

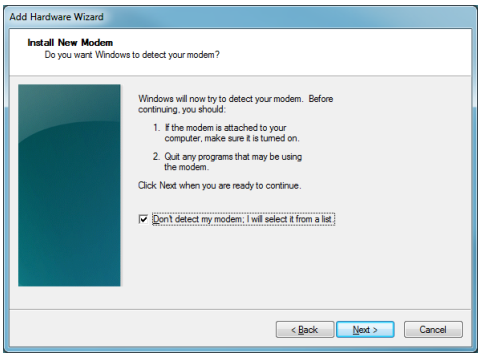
The following examples describe how to install and configure two different kinds of modem on Windows:

1. Low data rate modem, over the UART interface of the cellular module connected to the Windows PC by the **Cellular USB** connector (J501 on EVB) or the **Cellular RS232** connector (J500 on EVB)
2. High data rate modem, over the native USB interface of the cellular module connected to the Windows PC by the **Cellular Native USB** connector (J313 on ADP)

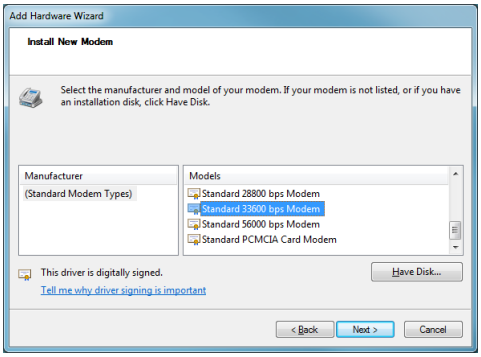
## B.1 How to install and configure a low data rate modem connection

This example describes how to install and configure a low data rate packet data connection on a PC with Windows 7 operating system. This uses the TCP/IP stack of the PC over the UART interface of the cellular module connected to the Windows PC by the **Cellular USB** connector (J501 on EVB) or the **Cellular RS232** connector (J500 on EVB).

1. Follow the board setup instructions in section 1.8 to provide the required connections with EVK-U2x.

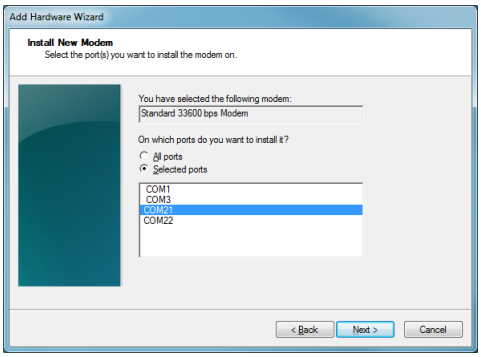



2. Select "Control panel > Phones and Modem > Modems > Add". This opens the Install New Modem Wizard.
3. Select the **Don't detect my modem** checkbox.

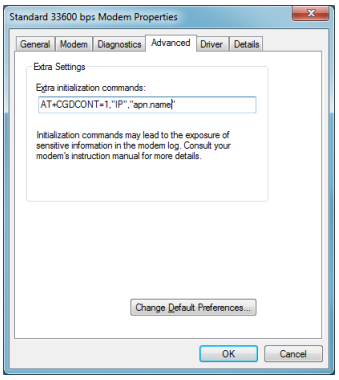



4. Select the Standard Modem (33600 b/s).

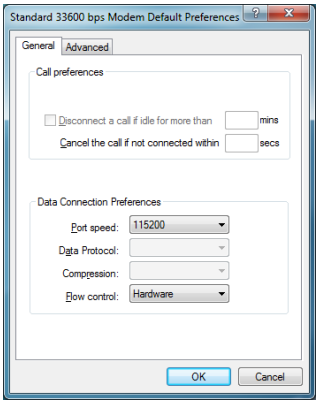
5. Set the COM-port on which the modem will be installed.




6. Select "Control panel > Phones and Modem > Modems > Standard Modem 33600 bps Modem > Properties".
7. Select "Change Settings > Advanced".
8. Add APN settings command (APN shown in the picture is an example. Make sure to have the correct APN defined by the network operator).
9. Click on **Change Default Preferences**.

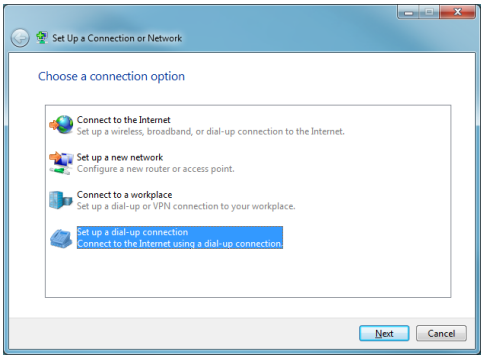



10. Click on **OK** twice and the new connection is now ready to be configured.

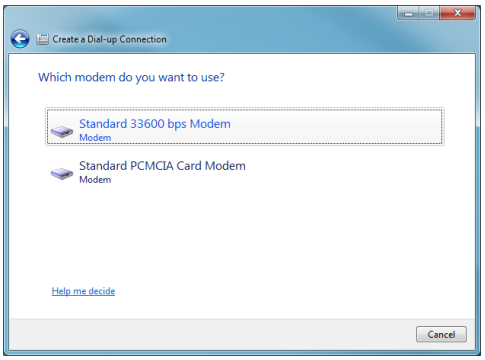



☞ The modem can also be configured using the Device Manager by clicking on the modem name.

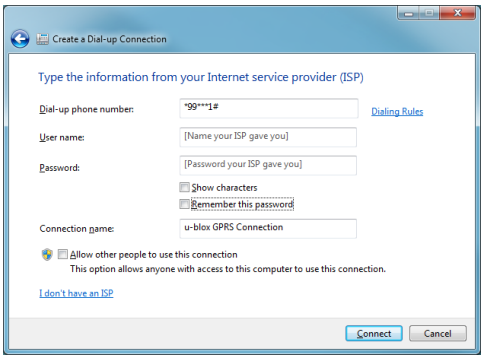
11. To configure a new connection, select "Control Panel > Network and Sharing Center > Set up a new connection or network".



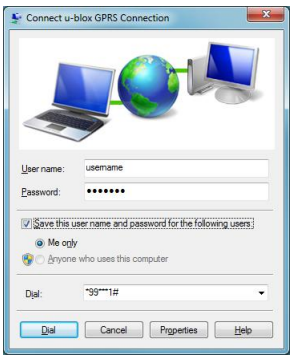
12. Select the modem, if requested (the question appears only if more than one modem is available).




13. Enter parameters for dial-up connection:
    - The module telephone number (*99***1#)
    - The specific GPRS account information for the network operator
    - A name for the new connection (e.g. "u-blox GPRS Connection")




14. The packet data connection is now ready to be used with the EVK-U2x. To check the connection, start a browser.



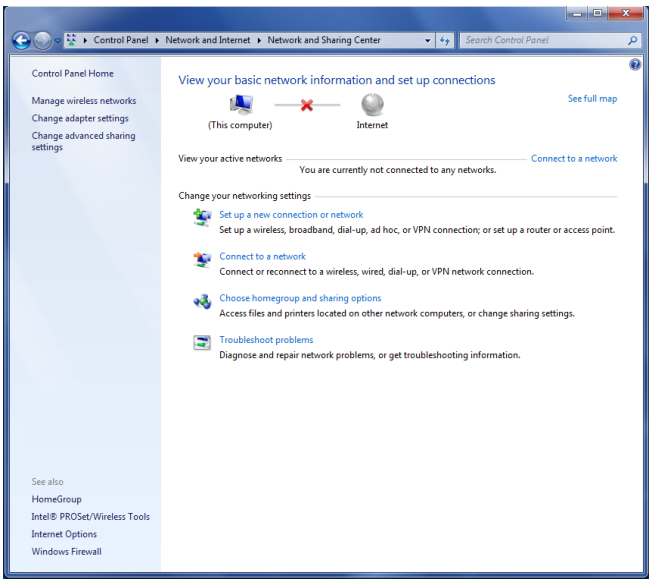

☞ Consult the cellular network operator for username and password. In most cases, these can be left empty.

## B.2 How to install and configure a high data rate modem connection

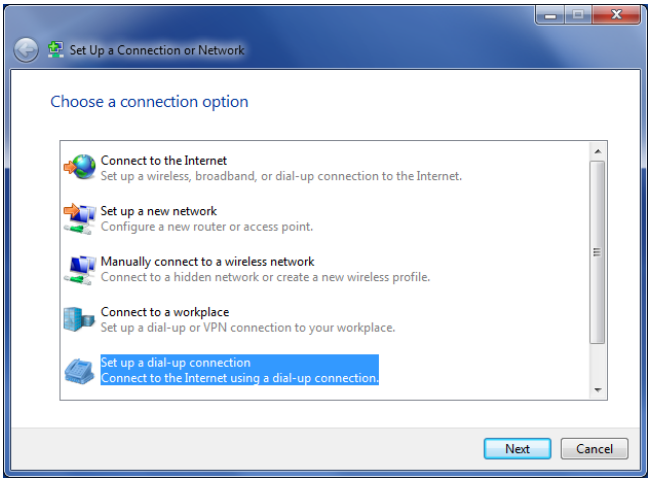
This example describes how to install and configure a high data rate packet data connection on a PC with the Windows 7 operating system, using the TCP/IP stack of the PC, over the native USB interface of the cellular module connected to the Windows PC by the **Cellular Native USB** connector (J200 on ADP).

1. Follow the board setup instructions in section 1.8 to provide the required connections with EVK-U2x.

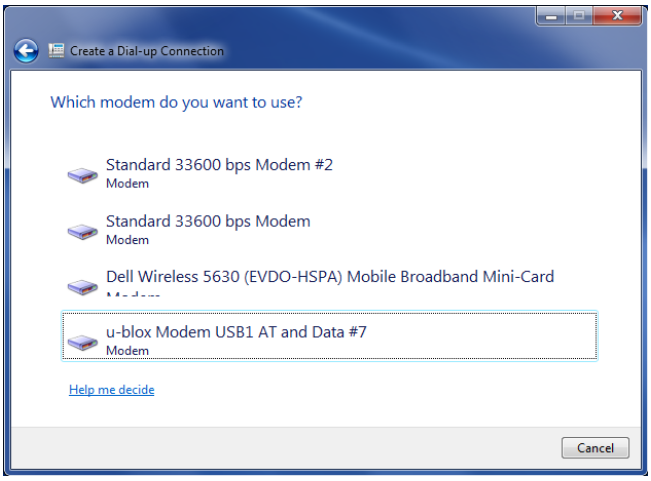
2. Select: "Control Panel > Network and Internet > Network and Sharing Center > Setup a new connection or network" This opens the "Choose a connection option" Wizard.



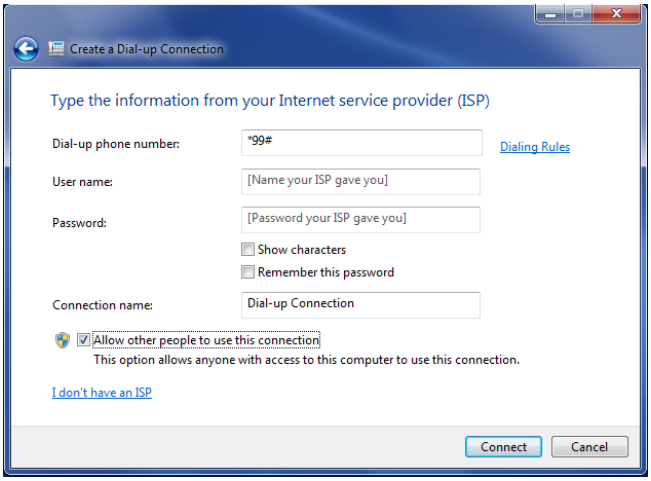

3. Select **Set up a dial-up connection**. Click on **Next**.



4. Select **u-blox Modem USB1 AT and Data #X** (X=7 in the picture).




5. Enter the modem telephone number (*99***1#), select **Allow other people to use this connection** and click **Connect** to finalize the procedure.




☞ Consult the cellular network operator for username and password. In most cases, these can be left empty.

# C Examples of AT commands

For the complete description and syntax of supported AT commands, see the u-blox AT commands Manual [1].

## C.1 Voice call

Incoming voice call:

| Command sent by DTE (user) | DCE response (module) | Description |
|---|---|---|
| AT+CLIP=1 | OK | Activation of Caller line ID presentation. |
| | | Call the phone number of the SIM in the device. |
| | RING | Incoming Call. |
| | +CLIP: "+3930012345678",145,,,,0<br>RING<br>+CLIP: "+3930012345678",145,,,,0 | Presentation of Caller ID: +3930012345678 is written here as example. |
| ATA | OK | Answer to the voice call. |
| ATH | OK | Talk to the caller using the headset.<br>Hang up. |

Outgoing voice call:

| Command sent by DTE (user) | DCE response (module) | Description |
|---|---|---|
| AT+CLIP=1 | OK | Activation of caller line ID presentation. |
| ATD+3930012345678; | OK | Outgoing voice call (+3930012345678 is written here as example). |
| | | The voice call is accepted from the network. |
| ATH | OK | Hang up. |

## C.2 Data call (CSD mode)

| Command sent by DTE (user) | DCE response (module) | Description |
|---|---|---|
| AT+CBST=7,0,1 | OK | Configure the data call to 9600 RLP analog. |
| ATD+3930012345678 | CONNECT 9600<br>~ }#À!}!}1} }4}"}&} }*} }<br>}%}&ú…}<□}'}"}(}"}/Ë~~ }#À!}!}2}<br>}4}"}&}<br>}*} } }%}&ú…}<□}'}"}(}"Åv~~<br>}#À!}!}3} }4}"}&} }*} }<br>}%}&ú…}<□}'}"}(}"Œå~ +++<br>OK | Outgoing data call (+3930012345678 is written here as example). |
| | | Connect to the remote analog modem. |
| ATH | OK | Hang up. |
| AT+CBST=71,0,1 | OK | Set data call to 9600 RLP V.110 ISDN. |
| ATD+3930012345678 | | Outgoing data call (+3930012345678 is written here as example). |
| | CONNECT 9600<br>~ }#À!}!Œ} }4}"}&} }*} }<br>}%}&ú„Ej}'}"}(}"Kì~~ }#À!}!□}<br>}4}"}&} }*}<br>} }%}&ú„Ej}'}"}(}"}"_~~ }#À!}!Ž}<br>}4}"}&} }*} }<br>}%}&ú„Ej}'}"}(}"Èâ~ +++<br>OK | Connect to the remote ISDN modem. |
| ATH | OK | Hang up. |

## C.3 SMS management

| Command sent by DTE (user) | DCE response (module) | Description |
|---|---|---|
| AT+CMGF=1 | OK | Set the text mode as the format that will be used. To be set before of the first operation. |
| AT+CMGS="+3930012345678"<br>SMS TEXT MESSAGE<br>0123456789<CTRL-Z> | ><br>+CMGS: 0<br>OK | Send the 1st SMS (+3930012345678 is written here as example). |
| AT+CMGS="+3930012345678" | > | Send the 2nd SMS (+3930012345678 is written here as example). |
| SMS TEXT MESSAGE<br>0123456789<CTRL-Z> | +CMGS: 1<br>OK | |
| AT+CMGL | +CMGL: 302,"REC UNREAD","+393001<br>2345678",,"05/09/27,16:40:36+08"<br>SMS TEXT MESSAGE 0123456789<br>OK | List all the incoming SMSes (+3930012345678 is written here as example). |

## C.4 Internet connection in GPRS mode (using external TCP/IP stack)

| Command sent by DTE (user) | DCE response (module) | Description |
|---|---|---|
| AT+CGATT? | +CGATT: 1<br>OK | Check if the cellular module is attached to GPRS service (1 – attached, 0 – detached). |
| AT+CGDCONT=1,"IP","uni.tim.it" | OK | Define the PDP context parameters. |
| AT+CGDCONT? | +CGDCONT: 1,"IP","my apn","0.0.0<br>.0",0,0<br>OK | |
| ATD*99***1# | CONNECT | Initiate the GPRS connection. |
| +++ | NO CARRIER | Disconnect with +++ sequence. |

## C.5 Internet connection in GPRS mode (using internal TCP/IP stack)

| Command sent by DTE (user) | DCE response (module) | Description |
|---|---|---|
| AT+UPSD=0,1,"my apn" | OK | Configure PDP-context parameters.<br>Make sure to have the correct APN. |
| AT+UPSD=0,2,"my user-name" | OK | Username and password depend on the mobile operator used. In most cases these are not required. Simply use space or omit these commands. |
| AT+UPSD=0,3,"my password" | OK | |
| AT+UPSD=0 | (configuration parameters) | Check the configuration. |
| AT+UPSDA=0,1 | OK | Store configuration in non-volatile memory (NVM). |
| AT+UPSDA=0,3 | OK | Activate the PDP context. |

Verify connection and PDP-context:

| Command sent by DTE (user) | DCE response (module) | Description |
|---|---|---|
| AT+UPSND=0,0 | (IP address) | Check IP addresses assigned. |
| AT+UPSND=0,1 | (IP address of DNS) | Check DNS assigned. |
| AT+UDNSRN=0,"www.u-blox.com" | 195.34.89.137<br>or 195.34.89.138<br>OK | Example: resolve DNS name. |

## C.6 Enable communication between cellular and GNSS modules

| Command sent by DTE (user) | DCE response (module) | Description |
|---|---|---|
| AT+UGPS=1,0 | OK | Enable communication. On the ADP-GNSS: LED DS118 lights green, LED DS132 blinks. |

## C.7 Read NMEA messages (example: GLL)

Several NMEA messages via Cellular USB or UART can be read. The example below shows how to read a GLL message to get the last available Geographic position Latitude / Longitude. For the full list of NMEA messages that can be read, see the u-blox AT commands manual [1].

| Command sent by DTE (user) | DCE response (module) | Description |
|---|---|---|
| AT+UGGLL=1 | OK | Enable the GLL message. |
| AT+UGGLL? | +UGGLL: (state),(GLL-msg)<br>OK<br>Or<br>+UGGLL: (state), Not Available<br>OK | Read the message.<br>The last available GLL message is displayed. |

## C.8 GNSS AssistNow

GNSS AssistNow Online:

| Command sent by DTE (user) | DCE response (module) | Description |
|---|---|---|
| AT+UGAOP="agps.u-blox.com",46434,1000,0 | OK | Insert server data - the parameters are written as an example. |
| AT+UPSD=0,1,"web.omnitel.it" | OK | Configure the GPRS connection - "web.omnitel.it" is written as APN example. |
| AT+UGPS=1,4 | OK | Start the GNSS. No need to do this if this is already done before. |
| AT+UGAOS=4 | OK | Send data to the u-blox server. |

GNSS AssistNow Offline:

| Command sent by DTE (user) | DCE response (module) | Description |
|---|---|---|
| AT+UGAOF="http://alp.u-blox.com/current_14d.alp",0,1,3 | OK | Insert server data - the parameters are written as an example. |
| AT+UGPS=1,2 | OK | Start the GNSS (the default interface is DDC). |

# Declaration of conformities

The equipment is intended for indoor usage. It is the user's duty to verify if further restrictions apply, such as when used in airplanes, hospitals or hazardous locations (petrol stations, refineries…).

Any changes or modification made to this equipment will void its compliance to the safety requirements.

Maintenance, inspections and/or reparations of the EVK-U2x shall be performed by u-blox AG.

Hereby, u-blox AG declares that this EVK-U2x is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

# Related documents

[1] u-blox AT Commands Manual, Docu No UBX-13002752

[2] u-blox LISA-U2 series Data Sheet, Docu No UBX-13001734

[3] u-blox LISA-U series System Integration Manual, Docu No UBX-13001118

[4] u-blox m-center User Guide, Docu No UBX-13001925

[5] u-blox EVK-U2x Quick Start, Docu No UBX-14002546

All these documents are available on our homepage (www.u-blox.com)

☞ For regular updates to u-blox documentation and to receive product change notifications, please register on our homepage (www.u-blox.com).

# Revision history

| Revision | Date | Name | Status / Comments |
|---|---|---|---|
| - | 02-Jan-2012 | lpah | Initial Release |
| 1 | 25-Jun-2012 | lpah | Extended to support EVK-U23 |
| 2 | 20-Nov-2012 | lpah | Added declaration of conformities<br>(Last revision with old doc number, 3G.G3-EK-11002) |
| A | 08-Aug-2013 | lpah | Updated USB ports description |
| A1 | 28-Aug-2013 | smos | Added note that EVK-U20 can be used to evaluate other LISA-U2 series modules |
| R06 | 29-Jul-2015 | sses | Updated EVK-U2x description including EVB-WL3 instead of EVB-WL1 |

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