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3G SARA click

3G SARA click

3G SARA click	
IC/Module	u-blox U201 [1]
Interface	UART, STAT, PWRKEY, RI, CTS
Power supply	3.3V or 5V
Product page	www.mikroe.com/click/3g-sara [2]
Schematic	3G SARA click schematic [3]

3G SARA click is a mikroBUS™ add-on board with **the smallest UMTS/HSPA cellular modem** available today – the u-blox U201, from the award-winning SARA series. The board has **everything you need to add 3G to your devices** and make them respond and react to phone calls and messages – or send/receive data at speeds up to 7.2 Mb/s – from anywhere in the world. The code example we provide will let you put it to use quickly.

Features and usage notes

To start using 3G SARA click you will need a microSIM card and an SMA antenna (sold separately), plus a mic/earphone headset if you want to send and receive calls. Everything else is already on the board.

Apart from the SIM card slot, SMA antenna connector, audio jack and stereo audio codec IC, 3G SARA click also has a Micro USB port to connect the module to a PC. The following is a list of specifications of the board and the module itself:

- u-blox SARA U201 3G module on board:
  - 3.75G compatible with HSUPA (5.76 Mb/s), HSDA (7.2 Mb/s), UMTS, GPRS, EDGE
  - HSPA/GSM GLOBAL COVERAGE, no regional restrictions (800/850/900/1900/2100 frequency bands)
  - Embedded Protocol stacks:
    - Dual stack IPv4/IPv6
    - Embedded TCP/IP, UDP/IP
    - HTTP/FTP/SSL (Secure Socket Layer)
    - SSL TLS 1.2 (for embedded TCP/IP)
    - Ethernet over USB

- eSIM and Bearer-Independent-Protocol
- MAX9860 16-Bit Mono Audio Voice Codec IC
- 4-Pole (TRRS) 3.5 mm Audio jack for mic/earphone headset
- SIM Card slot
- SMA Antenna connector (antenna sold separately)
- Micro USB port for connecting to PC
- MikroBUS™ UART interface (+ several additional pins)
- 3.3V, or 5V power supply

u-blox provides a free PC app [4] for controlling and testing the 3C SARA click from your computer. Developers can also write their own custom applications using the USB-UART communication line.
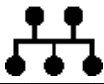
u-blox evaluation software

As described u-blox, "The m-center cellular evaluation software, available free-of-charge, is a powerful and easy to use tool for evaluating, configuring, and testing of u-blox cellular modules. It includes an intuitive, easy to understand and easy to use graphical interface. m-center provides a convenient means to configure u-blox cellular modules and save the configuration in the module EPROM. It is also possible to view and edit SIM phonebook entries, send text messages, and communicate with the wireless module using AT commands. m-center can be used to restore the cellular module's factory default settings and to perform traces."

Pinout diagram

This table shows how the pinout on 3G SARA click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS™		Pin	Notes
Network Status	**STAT**	1 AN	PWM 16	**RI**	Incoming ring detection
Power ON/OFF	**PWRKEY**	2 RST	INT 15	**CTS**	UART Clear To Send
UART Request To Send	**RTS**	3 CS	RX 14	**TXD**	UART data Transmit
		4 SCK	TX 13	**RXD**	UART data Receive
		5 MISO	SCL 12		
		6 MOSI	SDA 11		
	+3.3V	7 +3.3V	+5V 10	**+5V**	
	GND	8 GND	GND 9	**GND**	

STAT pin (#1) shows the network status The pin configured to provide the "Network status indication" function is set as:

- *Continuous Low:* if no service (no network coverage or not registered)
- *Cyclically High for 100 ms, Low for 2 s:* if registered home 2G network
- *Cyclically High for 50 ms, Low for 50 ms, High for 50 ms, Low for 2 s:* if registered home 3G network
- *Cyclically High for 100 ms, Low for 100 ms, High for 100 ms, Low for 2 s:* if registered visitor 2G network (roaming)
- *Cyclically High for 50 ms, Low for 50 ms, High for 50 ms, Low for 100 ms:* if registered visitor 3G network (roaming)
- *Continuous High:* if voice or data 2G/3G call enabled

3G SARA click can run on either a 3.3V or a 5V power supply. 3.3V is selected by default. To switch to 5V, use the onboard jumpers (zero ohm resistors).

Programming

The code example we provide requires you to provide PIN definitions inside your project, to match the mikroBUS™ socket where the click is placed. You will also need to edit the interrupt routine inside "dev_hal.c" file if needed – depending on the UART BUS used.

The idea of the demo is to make a remote lock for a gate which locks on unlocks the gate using relay click by calling the phone number which is inserted to 3G Sara click board. Only phone numbers stored in "approved" variable inside the "3G_sara_gate.c" file can toggle the relay. User can also edit "platoform.pld" file to have everything logged on UART bus for debug.

Code example

This routine checks caller ID and compares it to the numbers stored in "approved" variable. If the same number exists this function toggles the relay and sends confirmation message about the relay state.

```c
void reply_info_to_caller( void )
{
  int check;
  char tmp_cmd[ 50 ] = { 0 };

  for( check = 0; check < SUBSCRIBERS; check++ ){        // Check caller ID
    if( !strcmp( tmp_num, approved[check] ) ){

      strcpy( tmp_cmd, "AT+CMGS=" );                     // Compose
sting for new SMS with caller ID
      strcat( tmp_cmd, tmp_num );
      at_cmd( tmp_cmd );

      if( !RELAY_1 )
        at_cmd_addition( "Access granted!" );
      else
        at_cmd_addition( "Gate locked!" );

      RELAY_1 = ~RELAY_1;                                // Toggle relay
    }
  }
}
```

Code examples for 3G-SARA click, written for MikroElektronika hardware and compilers are available on [Libstock].

Resources

- u-blox U201 3G SARA click data sheet [1]
- Demo code / Library [5]
- Tutorial: 2G, 3G and 4G [6]
- Tutorial: AT commands and parsers [7]
- mikroBUS™ standard specifications [8]

References

[1] https://www.u-blox.com/sites/default/files/SARA-U2_DataSheet_%28UBX-13005287%29.pdf

[2] http://www.mikroe.com/click/3g-sara

[3] http://cdn-docs.mikroe.com/images/c/ca/3G_SARA_click_schematic.pdf

[4] https://www.u-blox.com/en/product/m-center

[5] http://libstock.mikroe.com/projects/view/1938/3g-sara-click

[6] http://learn.mikroe.com/2g-3g-4g-speed/

[7] http://learn.mikroe.com/gsm-part-2-parser/

[8] http://www.mikroe.com/mikrobus/

Article Sources and Contributors

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