

Connecting SIM-T02 GSM Modem to CyBro-2

TN-008



cybroTech

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Safety information

Radio device has limitations in the vicinity of electronic devices:

- Switch the modem off when you are in the hospital or near medical devices like pacemakers. The modem may interfere with the operation of these devices.
- Switch the modem off when flying. Secure it so that it cannot be switched on inadvertently.
- Switch the modem off when you are near gas station, fuel depots, chemical plants or blasting operations. The modem can disturb the operation of technical equipment.
- Interference can occur if the device is used near televisions or radios.
- In order to avoid possible damage, we recommend that you only use the specified accessories. These have been tested and have shown to work well with the modem.

Note: Warranty does not apply in the event of improper use.

1 Introductions

This document explains SIM-T02 GSM modem configuration and connection to CyBro-2 PLC controller.

Second part of the document contains an explanation on demo application prepared for easier beginning.

2 What you need

To setup the modem you'll need:

- GSM (GPRS) Modem (included in package)
- Power supply for modem (included in package)
- SIM card
- HD-15 to RS-232 DATA&CTRL cable (included in package)
- PC with any Terminal software (e.g. HyperTerminal)



To use modem with CyBro-2 you'll also need:

- Cybrotech CyBro-2 controller
- Programming cable (ORDER CODE: CAD-PP-P2)
- GSM modem cable (ORDER CODE: CAD-GSM01-P2)
- CyPro development software installed¹



¹ Available for download at <http://www.cybrotech.co.uk/index.php?lang=en&module=file&path=/Software>

3 Configuring modem

Modem must use standard AT commands for control. After each command processed successfully modem responds with OK.

- 1) Insert SIM card into the modem.
- 2) Connect antenna to the modem.
- 3) Connect the power to the modem.
- 4) Connect the modem with PC (use RS-232 cable)
- 5) Open a terminal window (e.g. HyperTerminal in Windows).
- 6) Make a new connection and set the corresponding COM port (e.g. COM1), baud rate 9600, 8 data bits, 1 stop bit, hardware handshaking (Figure 1)

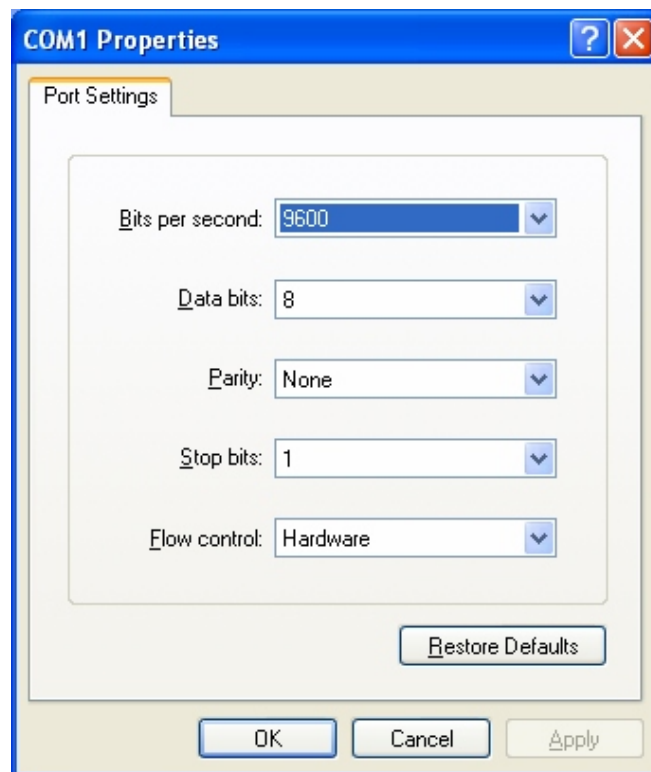


Figure 1: HyperTerminal port settings.

- 7) Establish a connection to modem.
- 8) Send: AT (type in terminal window and press ENTER).

If connection is set up correctly modem will respond whit OK otherwise repeat steps 1. through 6.

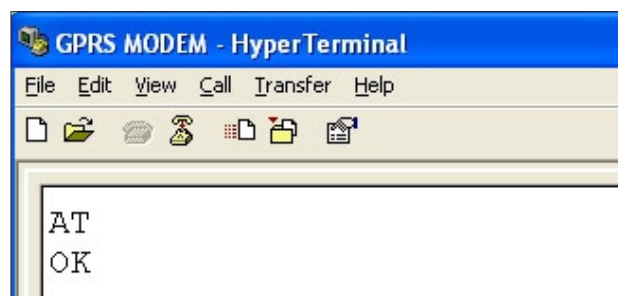


Figure 2: Modem response to command AT.

- 9) Send: AT+CPIN="xxxx"
xxxx = PIN number of SIM card (e.g. AT+CPIN="1234")
You have three tries if entering an incorrect PIN number before PUK number is required.
- 10) Send: AT+CLCK="SC",0,"xxxx"
xxxx = PIN number of SIM card (e.g. AT+CLCK="SC",0,"1234")
Unlocks SIM card permanently. Entering PIN number on power-up is no longer required.
- 11) Send: AT+IPR=19200
Sets baud rate of the modem to 19200 bits/sec.
- 12) Set HyperTerminal's baud rate to 19200.
- 13) Send: AT+IFC=0,0
Sets hardware flow control to NONE.
- 14) Send: AT+CNMI=2,1,0,0
Sets how new SMS will be shown to CyBro-2. (When receiving new SMS modem will send notification e.g. +CMTI: "SM",3)
- 15) Send: AT+CSCA="+xxxx"
+xxxx = your service provider's SMS center number
(e.g. AT+CSCA="+38641001333")
- 16) Send: AT+CMGF=1
SMS are sent to CyBro in TEXT format.
- 17) Send: AT+CLIP=1
Identifies caller by his phone number.
- 18) Send: ATE0
Don't echo sent characters.
- 19) Send: AT&W
Stores all settings.
- 20) Connect modem on COM2 of CyBro-2 with GSM modem cable.
- 21) Connect CyBro-2 to PC using programming cable and run CyPro development tool (Figures 3 and 4).

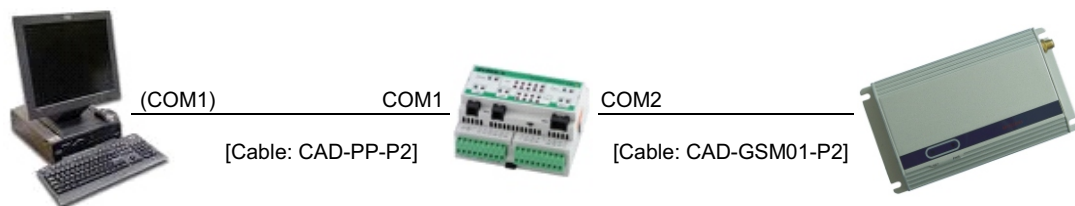


Figure 3: Connecting schematic.

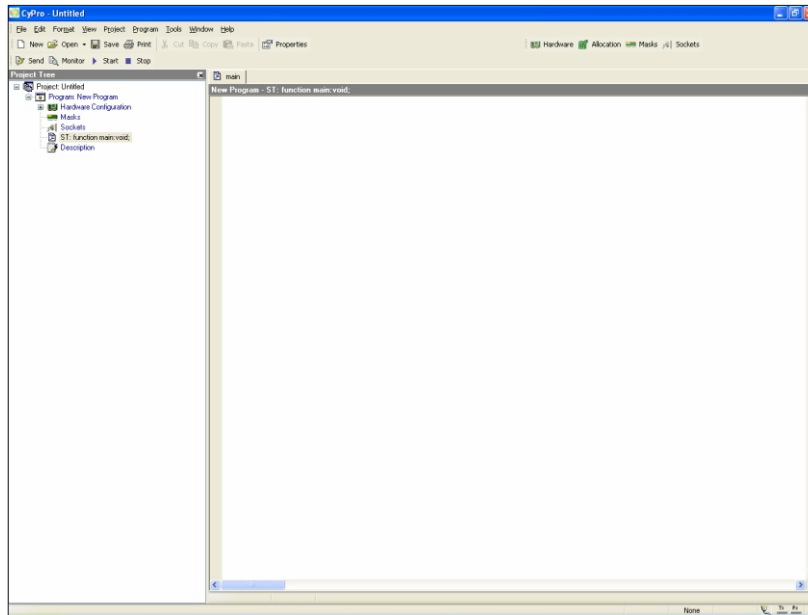


Figure 4: CyPro development tool main interface window.

- 22) Power-up CyBro-2.
- 23) **Open** project “GPRSModem.cyp”.
- 24) Run **Hardware detect** => **Autodetect**. If connections are OK CyBro-2 should automatically be detected.

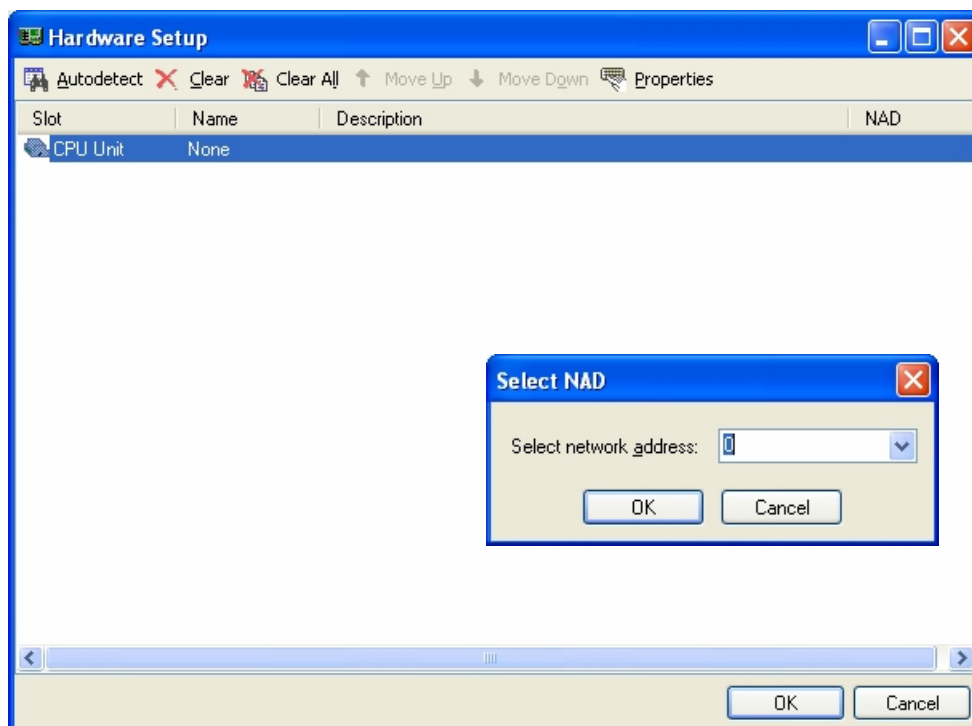


Figure 5: Detecting hardware in CyPro software.

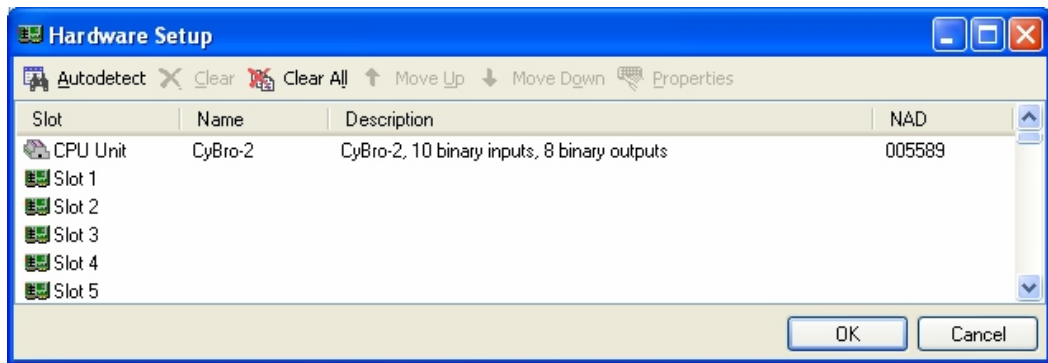


Figure 6: Successful detection of CyBro-2.

4 GPRSModem.cyp demo application

This demo program has some basic functionality for demonstrating the use of the GSM (GPRS) modem in home automation.

CyBro's output pins **QX0** and **QX1** are controllable via phone calls or SMS messages sent to modem.

Before loading demo program into CyBro-2 there are some changes that must be made.

4.1 Adjusting application

- 1) In modem_DecodeCaller subroutine:

Line 4,13: Insert phone number of the phone which will be able to send commands to CyBro¹(Figure 7).

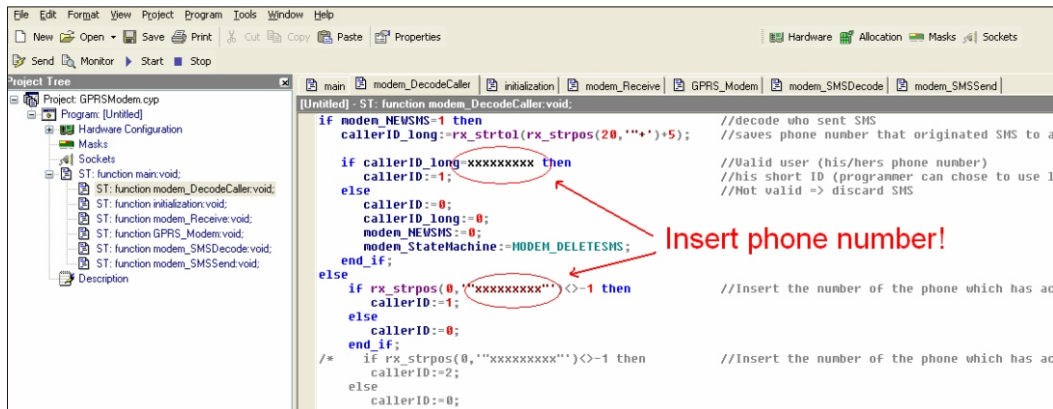


Figure 7: Inserting phone number.

- 2) In modem_SMSSend subroutine:

Line 6: Change to your country's prefix number. Also the number of 'X' following prefix must be equal to the number of digits your phone numbers have.

Line 7: If your country's prefix number is not 3 digits long then adjust second parameter to 12 (for 2 digits) or 11 (for 1 digit).

```
dprns(0,0,0, 'AT+CMGS="+386xxxxxxx"\n' );
dprnl(0,13,0,8,0, callerID_long);
tx_start(24);
```

Figure 8: Adjusting modem_SMSSend subroutine.

- 3) Load demo program into CyBro-2 and run it.

Line 8: If number of characters that are to be sent to modem is changed insert the correct value here (Figure 9).

```

[Untitled] - ST: function modem_SMSSend: void;
//This subroutine send a response SMS (if needed) to a received SMS (if a valid one was received)

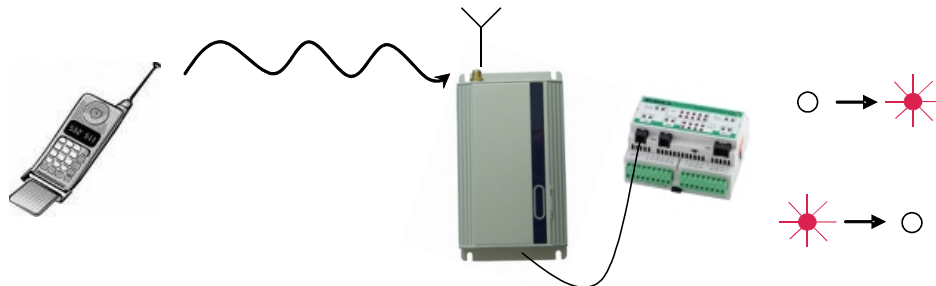
//response SMS compiling
if modem_SMSSending=1 and !tx_active() then
  dprns(0,0,0,"AT+CMGS<'+386xxxxxxx'\n'"); //Country prefix is added here!!
  dprnl(0,12,0,0,0,caller_ib_long); //inserts a phone number from the sender of the orig
  tx_start(24);
  rx_stop();
  rx_start(0,'>',0,HTOUT,HTOUT);
  modem_SMSSending=-2;
elseif modem_SMSSending=-2 and !rx_active() and !tx_active() then
  clr(0);
  modem_BitsForTx:=0;
  if rx_strpos(0,'>')<>-1 then
    //Compile and send SMS content
    if keyword_Flag[0]=1 then

```

Figure 9: Adjusting modem_SMSSend subroutine.

4.2 Functionality

- Calling GPRS modem with the phone whose number you entered in modem_DecodeCaller subroutine will toggle the output 0 on CyBro-2 (QX0). Call will be terminated by CyBro-2 automatically upon output toggling.



- Sending SMS with keywords can also control output pins. Sending SMS must also be done from a phone whose number was set in modem_DecodeCaller subroutine. Order in which they are sent is not important.

Keywords:

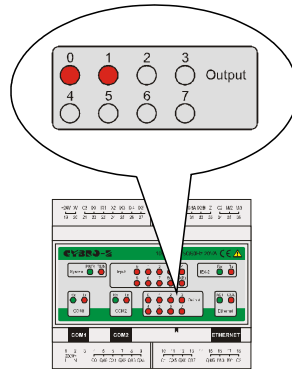
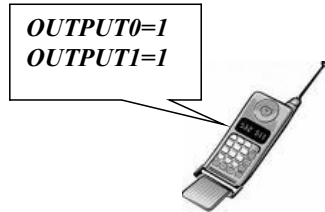
- OUTPUT0=X** -where X can be 0 (OFF), 1 (ON) or 2 (TOGGLE ON/OFF)
- OUTPUT1=X** -where X can be 0 (OFF), 1 (ON) or 2 (TOGGLE ON/OFF)
- STATUS=?** -sending this keyword will make a response SMS with value of both outputs

▪Example:

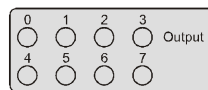
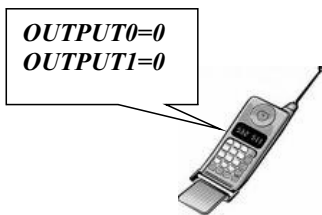
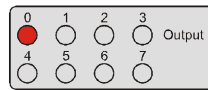
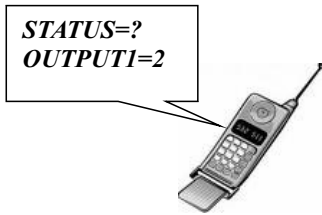
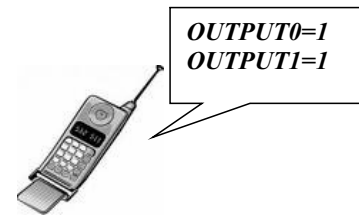
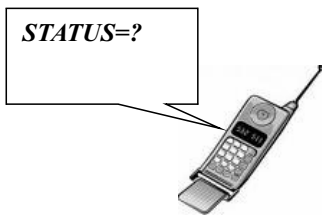
SMS sent to modem:

ACTION:

Response SMS:



(no response SMS)



(no response SMS)

5 Including subroutine in custom project

Subroutines found in demo projects can be used as a base for incorporating system controllability by SMS in any custom project.

Note to include all subroutines and allocated variables!