

RTU-COM with GSM

User Notes and Short Form AT Command Survey

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1. Introduction

This document is a guide for using GSM communication and GSM data accounts, and changing settings in the RTU-COM integrated GSM modem.

The RTU-COM has 1 LED, which give you an indication of the modems' status:

LED	Colour	Status
Modem	Green	Constant OFF: Modem switched off
		Constant ON: Modem switched on and searching for network.
		Flashing slowly: Modem connected to Network provider – idle mode.
		Flashing rapidly: Modem connected to Network provider - transmission mode.

2. GSM Network Connection

It is up to you to choose which GSM Network you would like to use, but please be aware that there are three different frequencies used for GSM communications, 900, 1800 and 1900 Mhz. For instance in the UK, Vodaphone and Cellnet use 900Mhz and One to One and Orange use 1800Mhz. RTU-COM GSM is dualband and support both 900 and 1800MHz. A list of GSM Networks and their frequencies is available in the AT Commands manual, but please check with your Network Provider to confirm that no changes have been made.

When opening your GSM account please ask your Network Provider for a Data Account. Data Accounts usually have a much lower monthly charge than Audio Accounts.

Regardless of the type of account you have, Data or Audio, you must ensure that the SIM card you receive is DATA ENABLED. Even if you have a Data Account, please check to confirm that it has been Data Enabled, sometimes this is not done automatically.

You will normally receive three telephone numbers with each account, one for Audio (probably won't work on a Data Account), one for Fax and one for Data. Obviously the Data number is the one to use. If you do not have a separate Data number please confirm with your Network Provider that the number you have is a Data number. The reason for this additional numbering is that not all the analogue fixed-line exchanges/switches can process and route the digital data that the digitally-based GSM networks use. Thus the digital data must be fed through an appropriate incoming voice, data, or fax number.

Once you are satisfied that you have an Enabled Data Account, please check that the SIM card PIN number is not enabled. To do this place the SIM card in a normal GSM phone and check that the need to insert the PIN number, when the power is switched on, is disabled. If you want the PIN number to be enabled or if you are not able to switch it off, then you can keep the PIN code on the SIM card. In this case you must enter the code in the RTU-COM config table. Remember to enter the right number - if not the RTU-COM will quickly use up the 3 retries and you will need to enter a PUK code before getting access to the account.

You may now place the SIM card in your RTU-COM, power it up and check the Network connection. On power up the modem LED on the front of the unit will be lit steady, this means power is on, but no Network Connection is available. After a short period of time the LED will start to flash, short time lit and longer time dark, this means a Network Connection is established.

Please configure the RTU-COM, so that on power up, it will delay about 10 seconds before dialling and/or sending SMS messages. This delay allows the RTU-COM and modem time to initialise.

3. Configuration

You have only access to change the GSM modem settings when you are connected direct to the RTU-COM programmer port. You must stop the B-CON application program, set switch 10 to ON and re-power the RTU-COM module. Now the RTU-COM will enter into modem configuration mode, and you can change modem setting like in any other external modem with a terminal program like Hyper Terminal. Note that you will get a ":" prompt in your terminal window if it is open during changing the switch. As with other types of modem the integrated GSM modem have many different configurations available. The factory default configuration is a general-purpose type, which in general will work, but you may need to adjust some settings. In most cases only a few changes may be necessary.

IMPORTANT: Some settings cannot be changed by a reset of the modem. The settings for data communication via the RS232 port, speed and format, can only be changed by the appropriate AT command. If you change these settings, you must keep a note of them, to be able to communicate with the GSM module. We recommend that these settings are placed on a label attached to the rear of the module.

In most cases only a few changes may be necessary and the most common are outlined below:

The integrated GSM modem is Hayes compatible, meaning that it uses Hayes type AT commands. For setting up the configuration, these commands can either be loaded into its internal memory or can be given to the RTU-COM, in the form of an initialisation string.

AT commands always start with "AT" and several commands can be given in one command string, provided the string does not exceed 40 characters. For instance the default

initialisation string used in a Brodersen RTU-COM Telemetry Outstation is AT&C1E0V0S0=1. A full explanation of these parameters is given in the AT Commands manual, but the most commonly used, you will find listed below:

3. Commonly used AT commands

Command	Explanation
ATVn	Result codes in numerical or verbose form. V0 numerical, 0,1, etc. V1 verbose, OK, ERROR, etc. RTU-COM require V0.
AT&Cn	Carrier Detect &C0 DCD is always active &C1 DCD is active if modem is on line Data Carrier Detect (DCD) is a hardware signal that notifies the DTE that the DCE is in communication with another modem. Some software will not start-up properly if the DCD is active. Default is &C1.
AT&Dn	Data Terminal Ready settings &D0 Modem ignores DTR &D1 Modem switches from data to command mode when DTR switches from ON to OFF &D2 Upon DTR switch from ON to OFF, the call is cleared down
AT+IFC	Defines if Flow Control is used between DTE and DCE. +IFC=0,0 No flow control +IFC=2,2 RTS flow control (preferred) Flow control is the use of RS232 signals to start and stop the flow of data to avoid data loss during buffering.

AT+IPR	<p>Defines the Baud rate used for communications between the DTE and DCE.</p> <p>AT+IPR=0 The Baud rate is selected automatically</p> <p>AT+IPR=9600 The Baud rate is fixed at 9600 baud or another speed.</p> <p style="padding-left: 100px;">This is best left at its default setting of 0 (auto). See IMPORTANT notice on page 1.</p>
AT+CBST	<p>Defines the type of Bearer to be used. That is the communication between the DCE and the GSM Network.</p> <p>AT+CBST=0,0,0 Auto baud rate selection, transparent mode</p> <p>AT+CBST=0,0,1 Auto baud rate selection, non-transparent mode</p> <p>AT+CBST=7,0,0 9600 (V32) baud rate selected, transparent mode</p> <p>AT+CBST=4,0,1 2400 (V24bis) baud rate selected, non-transparent mode</p> <p>Usually the baud rate is best left in the default Auto selection. Non-transparent copes with bad connections better than transparent mode, but transparent mode will pass data more quickly. Non-transparent mode is default and recommended.</p> <p>Non Transparent communication utilises a special GSM network-based error correction facility called "Radio Link Protocol" (RLP) that ensures more robust transmission. What this essentially means is that the GSM network will add special error correction codes to control the flow of data. This ensures that the data transmitted first obtains a special acknowledgement signal from the receiver that informs the transmitter that the data has been received as transmitted and that the receiver is ready to receive the next set of data from the transmitter. If there is no such acknowledgement signal from the receiver, the networks will utilise their "data buffering" feature by using a special "forward correction" technique to ensure uninterrupted data transmission throughout. With transparent data transmission GSM error correction is not applied, over the air interface.</p>
ATEn	<p>Defines if the DCE echoes (sends back) characters to the DTE.</p> <p>ATE0 Characters are not echoed</p> <p>ATE1 Characters are echoed</p> <p>Check which your DTE requires</p>

ATS0=n Defines whether the DCE should answer incoming calls automatically.

ATS0=0 Incoming calls not answered

ATS0=1 Incoming calls answered after 1 ring

ATS0=5 Incoming calls answered after 5 rings

The default is 0, therefore if incoming calls are to be answered this point must be changed. Usually set to 1. Note - make sure you use a 0 (zero) after the S and not a letter O.

Test/information Commands

There are some other useful commands you can use to obtain information or test the DCE:

ATDnnnn This causes the DCE to dial a number (nnnnnn)

ATH Hang up

ATA Answer an incoming call

Informative Commands

ATI Used to query modem for its identifiers, such as frequency

AT+COPS? Will inform you as to which GSM Network you are connected. See list of provider in the AT Commands manual.

AT+CSQ Will tell you the signal strength. 17 roughly equates to 4 bars on a hand phone, 10 to about 2 bars, which should be sufficient for data transfer. NOTE: The indication is an average value and might not reflect the real quality and level of the signal strength.

AT&V0 Will display the DCE current configuration

AT&F This command is used to restore the factory settings from FLASH, this will take you back to square one. NOTE: Changes in Data Communication parameters are not set back to default settings.

Please address the list in the appendix of the AT Commands Manual.

Additional information / applicable documents

RTU-COM Data sheet

RTU-COM Mounting and Installation Instructions

RTU-COM PSTN AT-Command guide

GSM Integration modem - At Command Manual

- find all the documents at the Brodersen Controls A/S homepage:

WWW.BRODERSENCONTROLS.COM

or contact your local distributor for further info and support.