

Getting Started Guide to the Brodersen UCM-9X GSM Data Terminal

Congratulations on purchasing one of the best GSM Data Terminal available today. The UCM-9X will provide reliable service, provided it is connected to an appropriate GSM Network and configured correctly. This booklet will guide you through these stages.

Packed in with the GSM Data Terminal you will find a diskette, this contains document files, e.g. this booklet, the data sheet and a manual of AT Commands, all in PDF format.

GSM Network Connection

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.

You may now place the SIM card in your UCM-9X, power it up and check the Network connection (refer to Users Manual). On power up the LED on the front of the unit will be flashing. See data sheet for details about what LED indications means.

Please configure the device, connected to the UCM-9X, so that, on power up, it will delay about 10 seconds before dialling and/or sending SMS messages. This delay allows the UCM-9x time to initialise.

Configuration

As with other types of modem the UCM-9X has many different configurations available, possibly only one of which will be suitable for your application. The factory default configuration is a general-purpose type, which will work with many different types of equipment, but you may need to adjust some settings.

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:

You should be aware of two terms, which are used extensively in Data Communications, DTE (Data Terminal Equipment) and DCE (Data Communications Equipment).

PCs, industrial controllers and telemetry outstations are normally DTEs and modems are normally DCEs.

The UCM-9X is a DCE and the device to which you connect it will almost certainly be a DTE.

In the text below the UCM-9X will now be referred to as the DCE and your Connected Equipment as the DTE.

The UCM-9X (DCE) 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 unit, by its connected equipment (DTE), 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 Telemetry Outstation is AT&C1E0V0S0=1. A full explanation of these parameters is given in the AT Commands manual, but the most commonly used, and therefore the most likely you will have to adjust are:

Command Explanation

- ATVn** Result codes in numerical or verbose form.
V0 numerical, 0,1, etc.
V1 verbose, OK, ERROR, etc.
Check which type of result code your DTE requires.
- 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+CMGF** Defines the mode for SMS text messages. Default the modem is set to PDU mode. If you use the UCM-93 to send text messages (SMS messages) controlled by a PLC, RTU etc. you will need to change the SMS mode to text mode. The AT command to do this are;
+CMGF=1 Enable SMS text mode
+CMGF=0 Enable SMS PDU mode
The actual setting can be read by command;
+CMGF?
- 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. Check if your DTE supports RTS/CTS flow control (Hardware flow control).
With Flow Control the DTE will send data to the DCE. The DCE will store this data in a buffer. When this buffer is full, the DCE will drop the CTS-line, telling the DTE that it has to stop transmitting data until the signal raises again. If the RTS-signal is OFF, transmitting data to the DTE is stopped until the signal switches to ON.
- AT+IPR** Defines the Baud rate used for communications between the DTE and DCE.
AT+IPR=0 The Baud rate is selected automatically
AT+IPR=9600 The Baud rate is fixed at 9600 baud or another speed.
This is best left at its default setting of 0 (auto), unless your DTE demands otherwise. Please see the IMPORTANT notice on page 1.

AT+CBST Defines the type of Bearer to be used. That is the communication between the DCE and the GSM Network.

AT+CBST=0,0,0 Auto baud rate selection, transparent mode

AT+CBST=0,0,1 Auto baud rate selection, non-transparent mode

AT+CBST=7,0,0 9600 (V32) baud rate selected, transparent mode

AT+CBST=4,0,1 2400 (V24bis) baud rate selected, non-transparent mode

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. Try either to see which is best for your application.

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.

ATEn Defines if the DCE echoes (sends back) characters to the DTE.

ATE0 Characters are not echoed

ATE1 Characters are echoed

Check which your DTE requires

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.

If your DTE will not work with the default configuration in the UCM-9X, remembering that the ATS0 command must be changed if incoming calls are to be answered, the above are the most likely parameters that may need changing. Experience suggests that only one or two points may need to be changed. You will need information from the manufacturer of your Connected Equipment (DTE) in order to configure the UCM-9X (DCE) correctly. Ask for advice on each of the above commands.

If you wish to give the DCE these commands via an initialisation string, from the DTE, either on power up and/or when a call is to be made, then they may be made in the normal manner, such as:

AT +IPR=0 +CBST=0,0,1 &C1 E0 V0 S0=1

Note. The spaces have been inserted for clarity and need not be placed in the string. Again for clarity we suggest that upper case is used.

Configure via terminal programme

If you wish to store the configuration permanently in the UCM-9X (DCE) then you may use a PC terminal programme, such as HyperTerminal (supplied with Windows) as follows.

Start HyperTerminal, name the new connection and hit OK. On next pop-up box go to “Connect using” and select “Direct to Com1”, assuming you are using Com1. Hit OK.

On next pop-up box go to “Bits per second” and select 9600, leave all other parameters as they are. Hit OK.

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You will now have a screen via which you can communicate with the DCE, BUT NOT BEFORE YOU HAVE TURNED ON THE CAPS LOCK. Please make sure you do this.

Now type AT and return. The DCE will respond with OK. (If you have problems with odd characters you might have another Windows program interfering on the chosen COM port. Please make sure that no programs or drivers are initiated on the COM port you use. If so you will have problem with getting full time access to the modem).

If the DCE responds with a 0 or 1, enter ATV1 and return, you will then get an OK. (see ATV command above)

If you can't see what you type, carefully enter ATE1 and return. Text should then appear. (see ATE command above)

You are now ready to talk to the DCE.

Configuration commands are simply entered thus:

```
ATS0=1 [return]
OK (response from DCE)
```

Each command can be entered in this way, making sure that the DCE responds with an OK after each carriage return. OK means the command has been accepted. If the DCE responds with "ERROR", the command has not been accepted and you should re-enter it, carefully checking your syntax.

Your screen could then look like:

```
AT+CBST=0,0,1
OK
AT+IPR=0
OK
ATS0=1
OK
```

When you finished entered your configuration commands you need to store them in the memory of the DCE. To do this enter:

```
AT&W
OK
```

You have now configured the DCE.

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 DCE 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.
- AT+V0 Will display the DCE current configuration
- AT+F This command is used to restore the factory settings from EEPROM, 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

For additional information / documentation please visit our support area on the company home page:
URL: www.brodersensystems.com