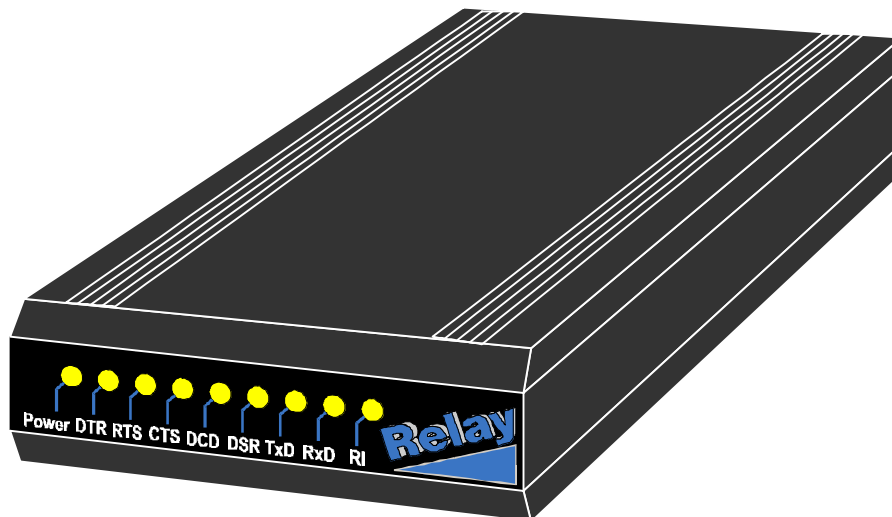


M-Bus – Modem

General

The system for M-Bus data transmission through an analog telephone line comprises a modem for the PC and a modem for the level converter from RS232C to M-Bus. It allows remote transmission that complies with the data security level from EN1434–3 in conformance with standards, especially the transmission of the even parity bit. The modem may also be used in standard mode for standardized data transmissions (incl. fax) with a data communications speed of up to 14400 baud.

Connections and Display Elements



The M-Bus modem contains eight yellow LEDs on the front to indicate the operating states and the DTE interface signals (RS-232C). The power LED indicates the ready state of the modem. The RI LED signals (synchronized) the bell character for an incoming call. The DCD LED indicates that a data communications connection has been established with a remote station modem. RxD and TxD LED change their brightness in synchronization with incoming and outgoing data. Please refer to the modem manual for more detailed information on the other LEDs.



The following connections are situated at the back of the modem:

Power: AC or DC power socket: 10–36VDC or 8–24VAC
(A 9V AC plug-in power supply unit is part of the delivery scope.)

Serial: DSUB-9F connector for RS-232C serial interface

Line: RJ12C socket to connect the analog telephone line

Configuring the M-Bus Modem on the PC

Two M-Bus modems are required to configure a simple M-Bus data communications link: one for the PC and one for the level converter (RS-232C → M-Bus) on the bus.

The RS-232C interface of the PC M-Bus modem is connected to the computer port with a 9-pole 1:1 cable (accessories). When the power supply unit has been inserted the power LED and some other LEDs should shine.

The configuration of the modem as an M-Bus modem is explained below. This configuration can be stored in the modem EEPROM with the **AT&W0&W1** command, so that if the operating voltage is disconnected or if the modem receives an **ATZ** command it returns to the M-Bus mode.

Configuration Steps for the M-Bus Modem (PC)

- Start terminal program (for example TELIX, HYPERTERM, ZOC) and select a COM port, any data format and baud rate (for example 9600,8,N,1).
- Enter **AT<CR>** (modem should detect baud rate; if no entry echo appears on the screen, enter next command line blindly).
- Enter **AT&F<CR>** (initialize modem with factory profile).
- **ATU1<CR>** (user command to set the M-Bus mode). Note: Both lines may also be combined to **AT&FU1<CR>**.
- **AT&W0&W1<CR>** (store configuration permanently in the modem EEPROM).

The M-Bus application program may also contain the initialization string “**AT&FU1<CR>**”, which will then be transmitted to the modem with every program start or before the telephone connection is setup. Modern M-Bus programs have been developed for the MS Windows 95®, Windows 98® or Windows NT® operating systems. They communicate with a modem by means of a Windows internal modem driver (Tapi devices). A diskette containing an installation file **Mdmrelay.inf** for Windows operating systems is supplied as part of the delivery scope of the M-Bus modem for the PC.

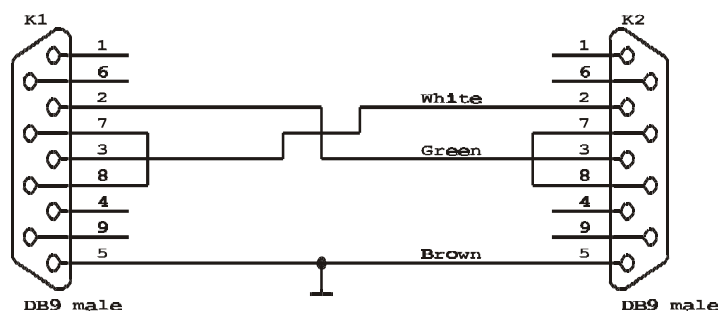
An Example of the Installation of the M-Bus Modem Driver for MS Windows 95 / 98 /NT®

- Insert the supplied diskette with the INF file in the PC drive
- Select system control with Start / Settings
- Start the modem configuration by double clicking on the “Modems” symbol
- Click Append / Select modem / Diskette / OK in succession
- Select Relay M-Bus modem 2400 bps (300 bps) (select desired modem with 2400 baud or 300 baud)

Baud rate, data format (8E1) and initialization string (**AT&FU1**) are setup after the modem driver has been installed. The driver for the M-Bus modem can be selected and used in the application program now.

Configuring the M-Bus Modem on the Bus

The modem on the bus requires an M-Bus level converter with serial RS-232C interface. A special serial cable with the following assignment has been supplied:



Interface Cable Assignment for Bus Modem

Modems for the level converter are pre-configured for the M-Bus mode for delivery. Should the modem be used for other data communications systems or if you are not sure whether it has been setup for the M-Bus mode, it can be reconfigured at any time. You will need a 1:1 RS-232C interface cable for this purpose (not the cable described above and supplied!) and a PC with a terminal program.

Configuration Steps for Modem (M-Bus at Level Converter Side)

- Start terminal program and select COM port, any data format and baud rate for example 9600,8,N,1.
- Enter **AT**<CR> (modem should detect baud rate; if no entry echo appears on the screen, enter next command line blindly).
- Enter **AT&F**<CR> (initialize modem with factory profile).
- **ATU2**<CR> (user command to set M-Bus mode). Note: Both lines may be combined to **AT&FU2**<CR>. The U2 command saves the set profile in both EEPROM profiles in the modem. No more entry echoes are output by the modem after this entry (quiet mode).

This configuration has the advantage that the modem returns to the M-Bus mode if the operating voltage is disconnected or the modem receives an **ATZ** command.

Modem and level converter are connected with the special serial cable. The telephone cable (also supplied with the accessories) is then plugged into the telephone socket. The M-Bus modem is ready for operation when the operating voltage is applied (no on/off switch!). The bus modem can now be called from the PC modem and M-Bus data can be transmitted.

Requirements on the M-Bus Application Software

- Data format: 8 data bits, even parity, 1 stop bit,
baud rate = M-Bus baud rate (300 or 2400 baud)
- Initialization of modem: **AT&FU1**<CR>
- Dialling: **ATDT**<telephone number><CR> (voice frequency)
or **ATDP**<telephone number><CR> (pulse mode)
- Hanging up: Drop the DTR line (Important, “+++” entry followed by **ATH0** is not possible)

The M-Bus baud rate is defined by the PC software by selecting the baud rate to the PC MODEM. The baud rate can be changed online (for example from 2400 baud to 300 baud). The permissible response time for the M-Bus meter should be increased due to the delays on the telephone line (min. 200 ms).

Overview of Special Modem Commands

Some special AT commands for configuring the M-Bus mode have been described above. Here is the complete overview:

- **ATU0<CR>** Normal mode for non M-Bus applications (for example V.42, fax, and so on).
The factory profile is loaded and saved in the EEPROM profiles 0 and 1 (same affect as AT&F&W0&W1).
- **ATU1<CR>** Configuration for the calling M-Bus modem on the PC.
This command does not save the selected M-Bus profile in the EEPROM profiles (if required, enter AT&W0&W1 as well).
- **ATU2<CR>** Configuration for the selected modem on the M-Bus installation side.
The M-Bus profile is saved in the EEPROM profiles 0 and 1. Important, the modem does not answer when this command is entered. No echo is output with all future entries (quiet mode).
- **ATI4<CR>** Command for outputting the modem type and the software version.
The command can also be used to test the modem with a terminal program; the modem answers even in "quiet mode" when functioning correctly.

Important note: Commands may be prefixed with the U command in the same command line, however no command should follow.

For example: AT&FU1<CR> is a correct entry whereas
ATU1&W0&W1 is executed up to "U1" only.

Please refer to the modem manual for more details on the AT commands.

M-Bus Software Compatibility

The M-Bus modem has been tested successfully with the following software products:

- [M-Bus OLE server](#) version 2.0 with modem support (ZMess)
- [Look@M-Bus](#) version 1.0 and 1.1 (ZMess)
- [Mcom for Windows](#) v1.11 and v2.5 (SVM)

Compatibility with M-Bus Level Converters

The following level converters have been tested successfully with the M-Bus MODEM system:

- [MR004C](#) Level converter for 60 slaves
- [MR005](#) Level converter for 3 slaves
- [MR006](#) Level converter for 20 slaves
- [DR004](#) Level converter for 120 slaves
- [DR003](#) Level converter for 250 slaves

Specifications

- Operating voltage range 10–36V DC or 8–24V AC
- Power consumption approximately 0.8W in sleep mode (after 5 s), approximately 1.4W in command mode, approximately 2.5W in connect mode
- Temperature range 5–55°C (0–55°C after 15 min. operation), -20°C to 80°C storage
- Humidity 5–95% (non-condensing)
- DTE baud rate (M-Bus mode) 300–2400 baud
- Single-bit distortion (M-Bus mode) max. $\pm 1/6$ bit time at 2400 baud and, or $\pm 1/48$ bit time at 300 baud (not cumulative)
- Data communications speeds (standard mode) 300–14400 baud (fax 2400–14400 baud)
- Data communications standard (standard mode) V.21/V.22/V.22bis/V.23/V.32/V.32bis/MNP5/V.42/V.42bis (see modem manual)
- Fax transmission standard (standard mode) V.17/V.27ter/V.29/EIA Class II, Group 3
- DTE data format (standard mode) 300–115200 baud; 7 or 8 data bits; 1 or 2 stop bits; even, odd or fixed parity
- Housing Black aluminium profile housing, modem for bus side with DIN rail clip (top of housing)
- Dimensions of housing 135 x 29 x 70 mm (l x h x w) without sockets and DIN rail clip

Conformity Markings and Approvals

- CE conformity
- BZT approval for Germany
- CTR21 (EC type-examination certificate)

