TRU COMPONENTS

RS232 Multifunction Module

TRU COMPONENTS RS232 Multifunction Module Instruction Manual

Contents

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Product Information

This CAN to RS232/485/422 converter allows for bidirectional conversion between CAN and RS485/RS232/RS422 protocols. It supports various conversion modes including transparent, with logo, protocol, and Modbus RTU conversion. The device features configuration options for interface parameters, AT commands, upper computer parameters, and factory settings restoration. Additionally, it includes power and status indicators, multi-master, and multi-slave functions.

Specifications

- Product: CAN to RS232/485/422 converter
- Item No.: 2973411

Product Usage Instructions

Installation

1. Ensure the converter is powered off before installation.
2. Connect the appropriate cables to the CAN, RS485/RS232/RS422 interfaces.
3. Power on the converter and check the status indicators.

Configuration

To configure the converter:

1. Access the interface for parameter configuration.
2. Set the desired protocol conversion mode.
3. Adjust interface parameters and AT commands as needed.

Operation
Once installed and configured, the converter facilitates seamless data exchange between CAN and RS485/RS232/RS422 protocols. Monitor the status indicators for proper functionality.

FAQ

- **Q: Can this converter be used in automotive applications?**
  A: Yes, this converter is suitable for networking of automobiles and can be utilized in automotive applications.
- **Q: What should I do if I encounter technical issues?**
  A: For technical questions or support, please visit **www.conrad.com/contact** for assistance.

Introduction

Dear customer, Thank you for purchasing this product.
If there are any technical questions, please contact: **www.conrad.com/contact**

Operating Instructions for download
Use the link **www.conrad.com/downloads** (alternatively scan the QR code) to download the complete operating in-structions (or new/current versions if available). Follow the instructions on the web page.

Intended use

This product is a small intelligent protocol conversion product. The product uses 8V to 28V wide voltage power sup-ply, integrates 1 CAN-BUS interface, 1 RS485 interface, 1 RS232 interface and 1 RS422 interface, which can realize two-way conversion between CAN and RS485/RS232/RS422 different protocol data. The product supports serial AT command configuration and host computer configuration device parameters and working modes, and supports five data conversion modes including transparent conversion, transparent conversion with logo, protocol conversion, Modbus RTU conversion, and user-defined (user). At the same time, ECAN-401S intelligent protocol converter has the characteristics of small size, easy installation. It has a very high cost performance in the development of CAN-BUS products and data analysis applications. It is an engineering application and project debugging. And reliable assistants for product development.

- It is intended to be mounted on a DIN rail.
- The product is intended for indoor use only. Do not use it outdoors. Contact with moisture must be avoided under all circumstances.
- Using the product for purposes other than those described above may damage the product. Improper use can result in short circuits, fires, or other hazards.
- This product complies with statutory, national and European regulations. For safety and approval purposes, you must not rebuild and/or modify the product.
- Read the operating instructions carefully and store them in a safe place. Always provide these operating instructions when giving the product to a third party.
-

Features and Applications

Features

- Bidirectional conversion between CAN and RS485/RS232/RS422 different protocol data
- Support transparent conversion, transparent conversion with logo, protocol conversion, Modbus RTU conversion, custom protocol conversion
- Support RS485/RS232/RS422 interface parameter configuration
- Support AT command parameter configuration
- Support the configuration of upper computer parameters
- Support AT command and host computer to restore factory settings
- With power indicator, status indicator and other status indicators
- Multi-master and multi-slave function

Applications

- CAN-BUS network such as industrial control
- Networking of automobiles and railway equipment
- Security and fire protection network
- Underground remote communication
- Public address system
- Parking equipment control
- Smart home, smart building

Delivery content

- CAN to RS485 / RS232 / RS422 converter
- Resistor 120 Ω
- Operating instructions

Description of symbols

The following symbols are on the product/appliance or are used in the text:

- 

  The symbol warns of hazards that can lead to personal injury.

Safety instructions

Read the operating instructions carefully and especially observe the safety information. If you do not follow the safety instructions and information on proper handling in this manual, we assume no liability for any resulting personal injury or damage to property. Such cases will invalidate the warranty/guarantee.

General information

- This product is not a toy. Keep it out of the reach of children and pets.
- Do not leave packaging material lying around carelessly. This may become dangerous playing material for children.
- Should you have any questions or concerns after reading this document, please contact our technical support or a professional technician.
- Maintenance, modifications and repairs must only be completed by a technician or an authorised repair centre.

Handling

- Please handle the product carefully. Jolts, impacts or a fall even from a low height can damage the product.

Operating environment

- Do not place the product under any mechanical stress.
- Protect the appliance from extreme temperatures, strong jolts, flammable gases, steam and solvents.
- Protect the product from high humidity and moisture.
- Protect the product from direct sunlight.
- Avoid using the product near strong magnetic or electromagnetic fields, transmitter aerials or HF generators. Otherwise, the product may not function properly.

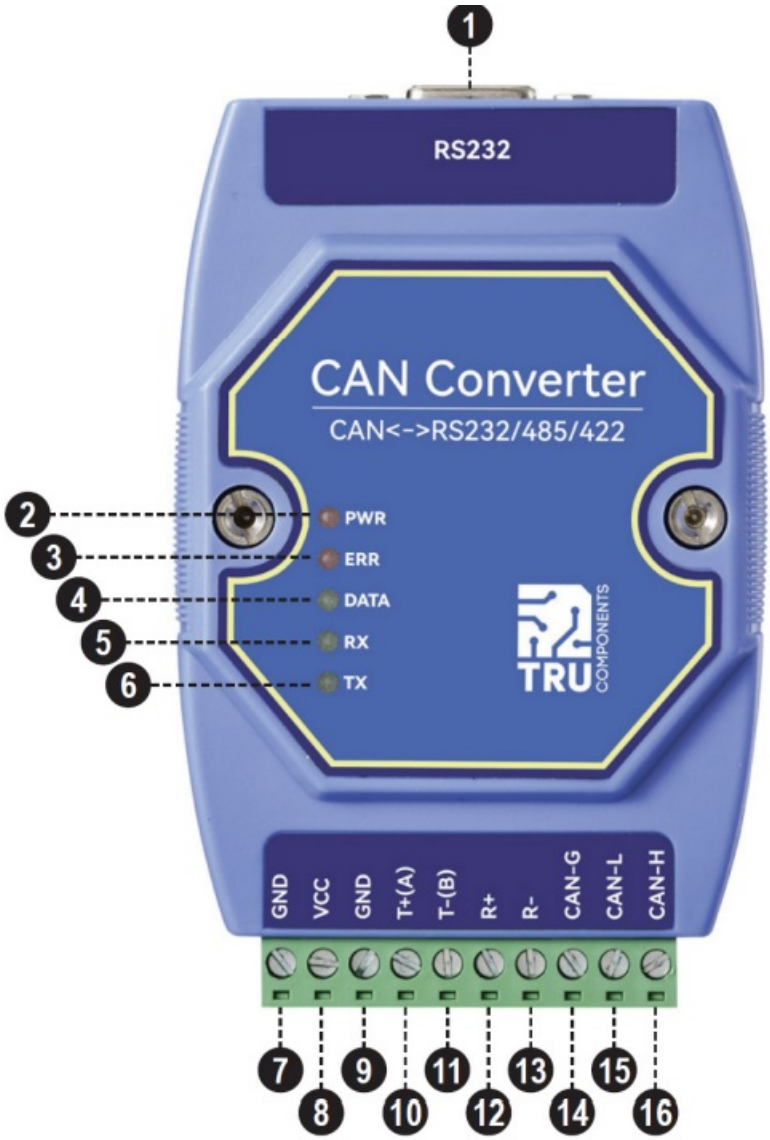
Operation

- Consult an expert when in doubt about the operation, safety or connection of the device.
- If it is no longer possible to operate the product safely, take it out of operation and protect it from any accidental use. DO NOT attempt to repair the product yourself. Safe operation can no longer be guaranteed if the product:
    - is visibly damaged,
    - is no longer working properly,
    - has been stored for extended periods in poor ambient conditions or
    - has been subjected to any serious transport-related stresses.

Connected devices

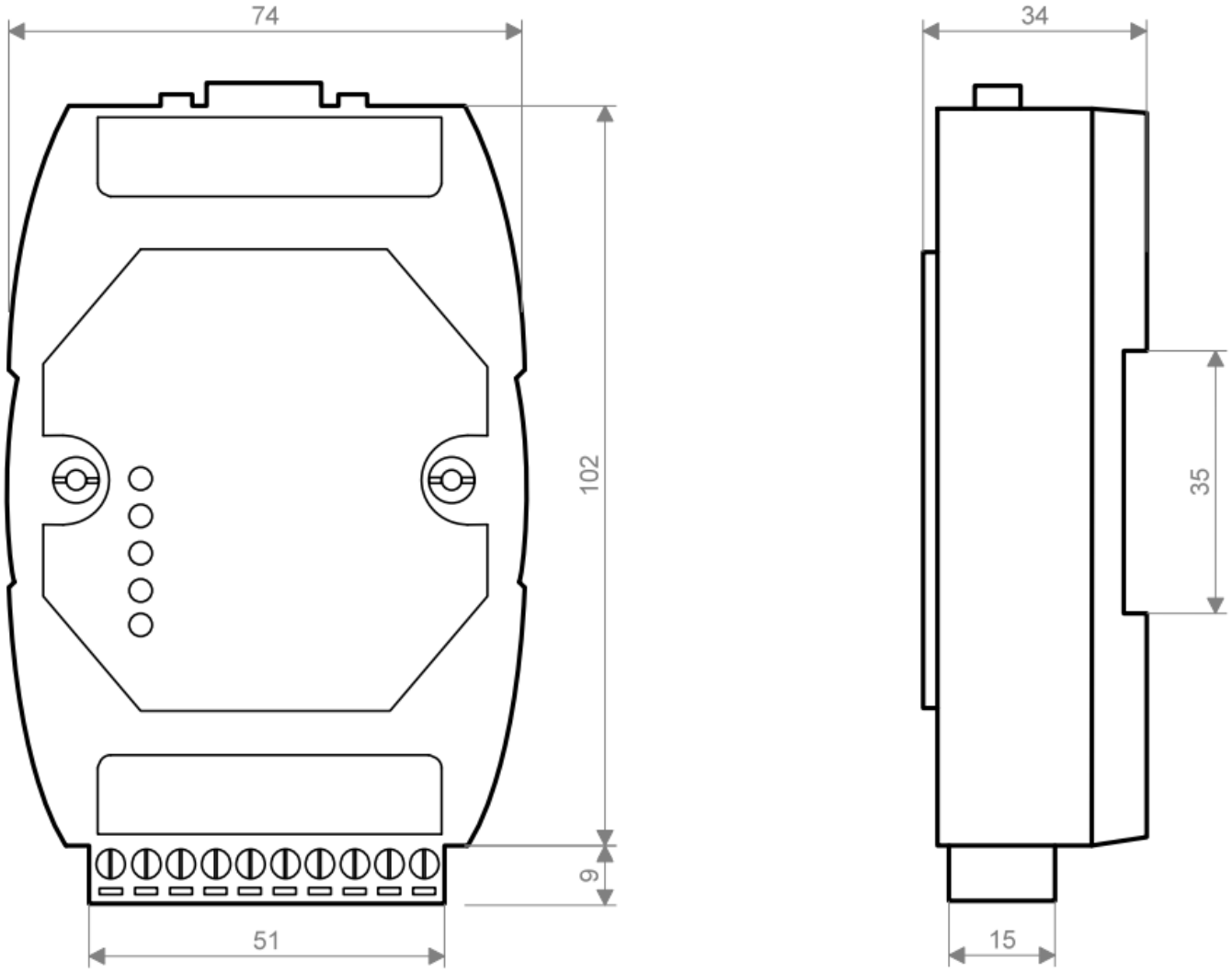
- Always observe the safety information and operating instructions of any other devices connected to the product.

Product overview



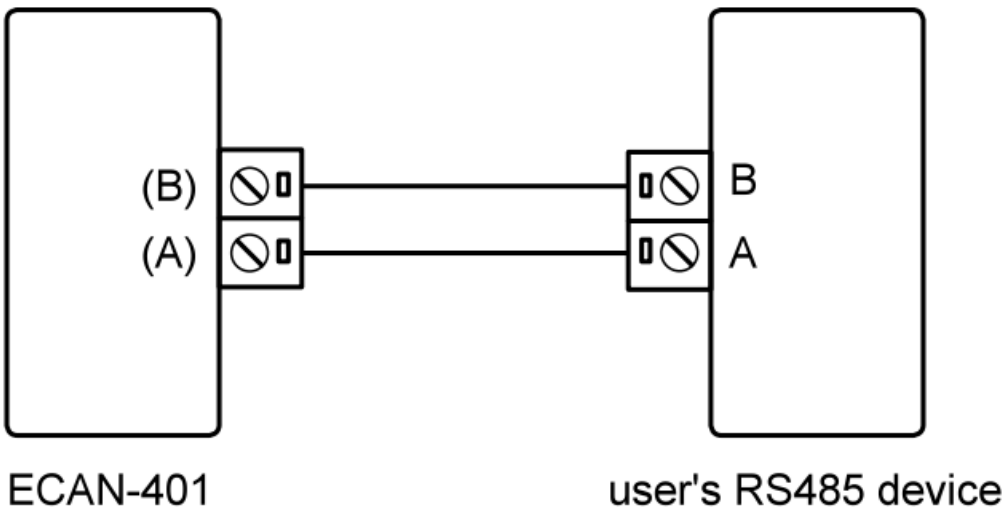
No.	Name	Description
1	RS232	D-SUB connector for RS232
2	PWR	Power LED
3	ERR	CAN bus error LED
4	DATA	Status LED for CAN bus data transmission
5	RX	Serial port receiving LED
6	TX	Serial port sending LED
7	V+	Positive terminal of power supply
8	V-	Negative terminal of power supply (GND)
9	GND	Earth (GND) for RS485/RS422
10	T+(A)	RS422 data bus T+/RS485 data bus A
11	T-(B)	RS422 data bus T-/RS485 data bus B
12	R+	RS422 data bus R+
13	R-	RS422 data bus R-
14	CAN_G	CAN Earth (GND)
15	CAN_L	CAN communication interface
16	CAN_H	CAN communication interface

Dimensions

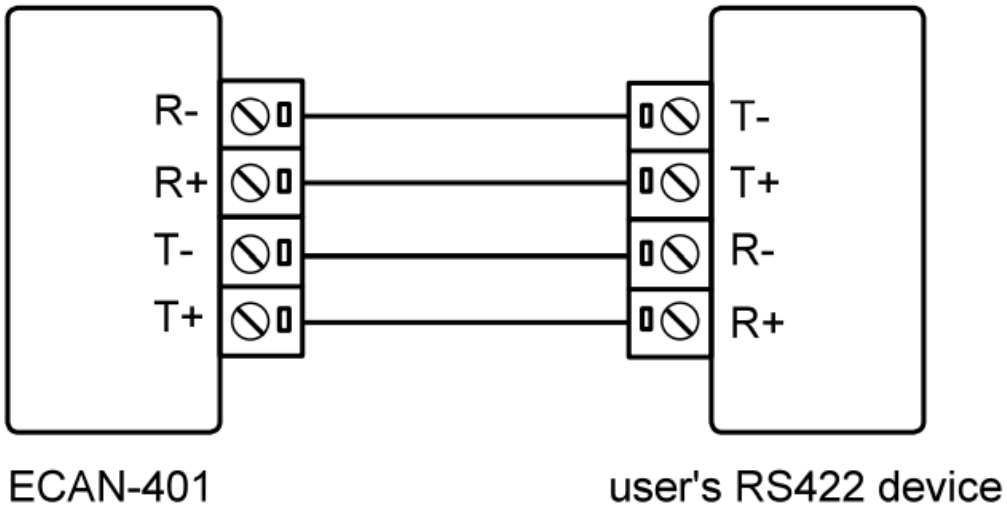


Connection method

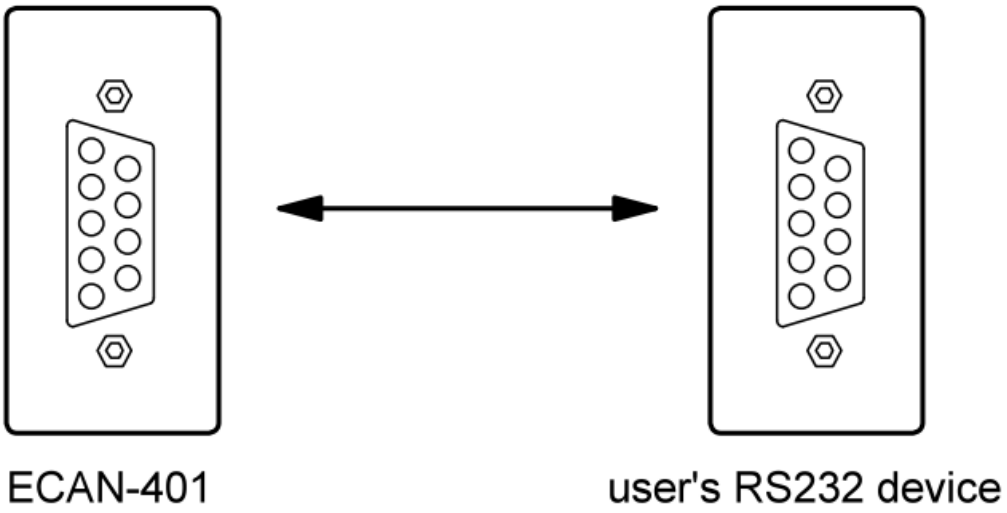
RS485 connection method



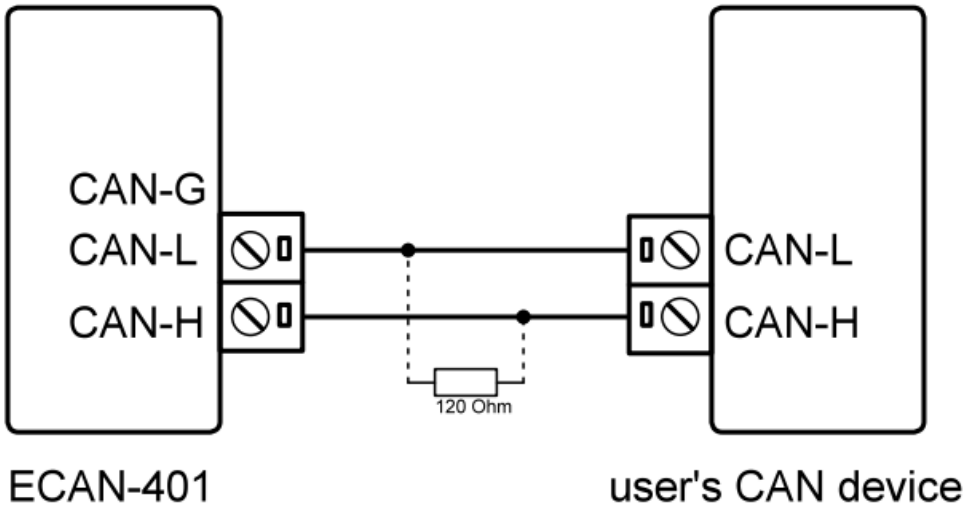
RS422 connection method



RS232 connection method



CAN connection method



The linear topology is the most commonly used in the CAN bus wiring specification. That is, the two lines of the main trunk branch out branch lines to each node. Both ends of the backbone are equipped with suitable terminal resistors to achieve impedance matching (usually 120 ohms within 2km).

Mode Description

In “transparent conversion” and “format conversion”, one byte of frame information is used to identify some informa-tion of the CAN frame, such as type, format, length, etc. The frame information format is as follows.

Table 1.1 Frame information

Frame information description							
Bit7	**Bit6**	**Bit5**	**Bit4**	**Bit3**	**Bit2**	**Bit1**	**Bit0**
FF	RTR	NO	NO	DLC3	DLC2	DLC1	DLC0

- **FF:** the identification of standard frame and extended frame, 0 is standard frame, 1 is extended frame
- **RTR:** identification of remote frame and data frame, 0 is data frame, 1 is remote frame
- **NO:** not used
- **NO:** not used
- **DLC3~DLC0:** Identifies the data length of the CAN message

Data conversion method
ECAN-401S device supports five data conversion methods: transparent conversion, transparent conversion with logo, protocol conversion, MODBUS conversion and custom protocol conversion. Support two-way conversion between CAN and RS485/RS232/RS422.

Data conversion method	Switch direction
Transparent conversion	CAN and RS485 bidirectional conversion
Transparent band information conversion	CAN and RS485 bidirectional conversion
Protocol conversion	CAN and RS485 bidirectional conversion
MODBUS conversion	CAN and RS485 bidirectional conversion

- **Transparent conversion mode**
  Transparent conversion: The converter converts the bus data in one format as it is to the data format of another bus without adding or modifying the data. In this way, the data format is exchanged without changing the data content. For the bus at both ends, the converter is like “transparent”, so it is a transparent conversion.
  The ECAN-401S device can convert the valid data received by the CAN bus to the serial bus output intact. Similarly, the device can also convert the valid data received by the serial bus to the CAN bus output intact. Realize the trans-parent conversion between RS485/RS232/RS422 and CAN.
  - **Convert serial frame to CAN message**
    All the data of the serial frame are sequentially filled into the data field of the CAN message frame. After the module detects that there is data on the serial bus, it immediately receives and converts it. The converted CAN message frame information (frame type part) and frame ID come from the user’s prior configuration, and the frame type and frame ID remain unchanged during the conversion process.
  - **Convert serial frame into CAN message (transparent mode)**

Serial frame			CAN Message	
			Frame information	User configuration
0	data 1		Frame ID	User configuration
1	data 2			User configuration
2	data 3		Data field	data 1
3	data 4			data 2
4	data 5			data 3
5	data 6			data 4
6	data 7			data 5
7	data 8			data 6
				data 7
				data 8

Conversion example:

The serial frame is converted into a CAN message (transparent mode).

Assuming that the configuration CAN frame information is “standard frame”, frame ID: “0x0213, serial frame data is 0x01 ~ 0x0C, then the conversion format is as follows. The frame ID of the CAN message is 0x0213 (user configura-tion), frame type: standard Frame (user configuration), the data part of the serial frame will be converted to the CAN message without any modification.

- Convert serial frame into CAN message (transparent mode)

Serial frame			CAN Message 1	CAN Message 2
0x01		Frame information	0x08	0x04
0x02		Frame ID	0x02	0x02
0x03			0x13	0x13
0x04		Data field	0x01	0x09
0x05			0x02	0x0A
0x06			0x03	0x0B
0x07			0x04	0x0C
0x08			0x05	
0x09			0x06	
0x0A			0x07	
0x0B			0x08	

- CAN message to serial frame

During the conversion, all the data in the CAN message data field are sequentially converted into the serial frame. If you check “Enable Frame Information” during configuration, the module will directly fill the “Frame Information” byte of the CAN message into the serial frame. If you check “Enable Frame ID”, then all the “Frame ID” bytes of the CAN message are also filled into the serial frame.

Note: If you want to receive CAN frame information or frame ID on the serial interface, you need to enable the cor-responding function. Only then can you receive the corresponding information.

CAN Message			Serial frame	
Frame information	User configuration		Frame information	User configuration
Frame ID	User configuration		Frame ID	User configuration
	User configuration			User configuration
Data field	data 1		0	data 1
	data 2		1	data 2
	data 3		2	data 3
	data 4		3	data 4
	data 5		4	data 5
	data 6		5	data 6
	data 7		6	data 7
	data 8		7	data 8

Conversion example:

The CAN message “frame information” is enabled and “frame ID” is enabled in this example configuration. Frame ID1: 0x123, frame type: standard frame, frame type: data frame. Conversion direction: two-way. The data is 0x12, 0x34, 0x56, 0x78, 0xab, 0xcd, 0xef, 0xff. The data before and after conversion is as follows:

- CAN message is converted into serial frame (transparent mode)

CAN Message			Serial frame
Frame information	0x08		0x08
Frame ID	0x01		0x01
	0x23		0x23
Data field	0x12		0x12
	0x34		0x34
	0x56		0x56
	0x78		0x78
	0xAB		0xAB
	0xCD		0xCD
	0xEF		0xEF
	0xFF		0xFF

- **Transparent transmission with logo mode**

  Transparent conversion with identification is a special usage of transparent conversion. The serial frame carries the ID information of the CAN message, and CAN messages with different IDs can be sent as needed. It is helpful for users to construct their own network more conveniently through the module, and use self-defined application protocol. This method automatically converts the ID information in the serial frame into the frame ID of the CAN bus. As long as the module is told in the configuration that the ID information is at the start position and length of the serial frame, the module extracts the frame ID and fills it in the frame ID field of the CAN

message when converting, as the CAN when the serial frame is forwarded The ID of the message. When the CAN message is converted into a serial frame, the ID of the CAN message is also converted to the corresponding position of the serial frame.

- **Convert serial frame to CAN message**

  The start address and length of the “frame ID” of the CAN message contained in the serial frame in the serial frame can be set by configuration. The starting address ranges from 0 to 7, and the length ranges from 1 to 2 (standard frame) or 1 to 4 (extended frame). During the conversion, the CAN message “frame ID” in the serial frame is converted into the frame ID field of the CAN message according to the prior configuration (if the number of frame IDs is less than the number of frame IDs of the CAN message, then The high byte of the frame ID in the CAN message is filled with 0.), other data is converted in order, if a CAN message has not been converted to the serial frame data, the same ID is still used as the frame of the CAN message ID continues to convert until the serial frame conversion is completed.

  Note: If the ID length is greater than 2, the frame type sent by the device will be set as an extended frame. At this time, the frame ID and frame type configured by the user are invalid and are determined by the data in the serial frame. The frame ID range of the standard frame is: 0x000-0x7ff, which are respectively represented as frame ID1 and frame ID0, where frame ID1 is the high byte, and the frame ID range of extended frames is: 0x00000000-0x1fffffff, which are represented as frame ID3, frame ID2, and Frame ID1, frame ID0, among which frame ID3 is the high byte.

- **Serial frame is converted into CAN message (transparent transmission with identification)**

Serial frame				CAN Message	CAN Message x
0	Data 1(ID1)		Frame information	User configuration	User configuration
1	Data 2(ID0)		Frame ID	Data 1(ID1)	Data 1(ID1)
2	Data 3			Data 2(ID0)	Data 2(ID0)
3	Data 4		Data field	Data 3	Data ...
4	Data 5	→		Data 4	Data N-1
5	Data 6			Data 5	Data N
6	Data 7			Data 6	
7	Data 8			Data 7	
…	…			Data 8	
N	Data N			Data 9	
Address N	Data N			Data 10	

Conversion example:

Serial frame to CAN message (transparent with logo).

CAN configuration parameters configured in this example. Conversion mode: Transparent conversion with logo, start-ing address 2, length 3. Frame type: extended frame, frame ID: no configuration required, conversion direction: two-way. The data before and after conversion is as follows.

Serial frame			CAN Message 2		CAN Message 2
01		Frame information	88	Frame information	85
02		Frame ID	00	Frame ID	00
03			03		03
04			04		04
05			05		05
06		Data field	01	Data field	
07			02		
08			06		
09			07		
0A			08		
0B			09		
0C			0A		
0D			0B		
0E					
0F					
10					

- **CAN message to serial frame**

  For CAN messages, a frame is immediately forwarded after a frame is received. Each time it is forwarded, the ID in the received CAN message is corresponding to the position and length of the CAN frame ID configured in advance in the serial frame. Conversion. Other data are forwarded in order. It is worth noting that the frame format (standard frame or extended frame) of both serial frame and CAN message in application should meet the pre-configured frame format requirements, otherwise it may cause the communication to be unsuccessful.

- **Convert CAN messages to serial frames**

CAN Message			Serial frame
Frame information	Frame information		ID1
Frame ID	ID1		ID0
	ID0		Data 1
Data field	Data 1		Data 2
	Data 2		Data 3
	Data 3		Data 4
	Data 4		Data 5
	Data 5		Data 6
	Data 6		Data 7
	Data 7		Data 8
	Data 8		

Conversion example:

CAN configuration parameters configured in this example.

- **Conversion mode:** Transparent conversion with logo, starting address 2, length 3.
- **Frame type:** extended frame, frame type: data frame.
- **Conversion direction:** two-way. Send identifier: 0x00000123, then the data before and after conversion is as follows.

  Example of CAN message conversion to serial frame (transparent with information conversion)

CAN Message			Serial frame
Frame information	88		99
Frame ID	00		88
	00		00
	01		01
	23		23
Data field	99		77
	88		66
	77		55
	66		44
	55		33
	44		22
	33		

- **Protocol mode**

  The fixed 13 bytes of CAN format conversion represent a CAN frame data, and the content of 13 bytes includes CAN frame information + frame ID + frame data. In this conversion mode, the CANID set is invalid, because the identifier (frame ID) sent at this time is filled with the frame ID data in the serial frame of the above format. The configured frame type is also invalid. The frame type is determined by the frame information in the format serial frame. The format is as follows:

CAN fixed format serial frame (13 bytes)		
Frame information	Frame ID	Frame Data
1Byte	4Byte	8Byte

The frame information is shown in Table 1.1

The length of the frame ID is 4 bytes, the standard frame valid bit is 11 bits, and the extended frame valid bit is 29 bits.

Extended frame ID number 0x12345678					Standard frame ID number 0x3FF			
0x12	0x34	0x56	0x78		0x00	0x00	0x03	0xFF

- **Convert serial frame to CAN message**

  In the process of converting a serial frame to a CAN message, in a serial data frame aligned with a fixed byte (13 bytes), if the data format of a certain fixed byte is not standard, the fixed byte length will not be converted. Then con-vert the following data. If you find that some CAN messages are missing after conversion, please check whether the fixed byte length serial data format of the corresponding message does not conform to the standard format.

- **Convert serial frame to CAN message**

  When the frame data is converted in CAN format, the length is fixed to 8 bytes. The effective length is determined by the value of DLC3~DLC0. When the effective data is less than the fixed length, it needs to be filled with 0 to the fixed length.

  In this mode, it is necessary to pay attention to the serial data format in strict accordance with the fixed byte format to successfully convert. The CAN mode conversion can refer to the example (CAN format conversion standard frame example). When converting, first ensure that the frame information is correct and the data length indicates No errors, otherwise no conversion will be performed.

  Conversion example:

  Serial frame to CAN message (protocol mode).

Serial frame		CAN Message	
88		Frame information	88
17		Frame ID	17
65			65
43			43
21			21
99		Data field	99
88			88
77			77
66			66
55			55
44			44
33			33
22			22

  CAN configuration parameters configured in this example.

  Conversion mode: protocol mode, frame type: extended frame, conversion direction: two-way. Frame ID: No need to configure, the data before and after conversion is as follows.

- **Serial frame to CAN message (protocol mode)**

- **Modbus mode**

  Modbus protocol is a standard application layer protocol, which is widely used in various industrial control occasions. The protocol is open, with strong real-time performance, and good communication verification mechanism. It is very suitable for occasions with high communication reliability requirements. The module uses the standard Modbus RTU protocol format on the serial port side, so the module not only supports the user to use the Modbus RTU protocol, but also the module. It can directly interface with other devices that support Modbus RTU protocol. On the CAN side, a simple and easy-to-use segmented communication format is developed to realize Modbus communication. A method for segmenting and reorganizing information with a length greater than the maximum data length of a CAN message. “Data 1” is used to segment identification data. , The transmitted Modbus protocol content can start from the “data 2” byte, if the protocol content is greater than 7 bytes, then the remaining protocol content will continue to be converted according to this segmented format until the conversion is completed. When there is no other data on the CAN bus, the frame filter may not be set. The communication can be completed. When there are other data on the bus, a filter

needs to be set. Distinguish the source of data received by the device. According to this approach. It can realize the communication of multiple hosts on a bus. The data transmitted on the CAN bus does not require a CRC validation method. Data validation on the CAN bus already has a more complete validation method. In this mode, the device supports Modbus verification and forwarding, not the Modbus master or slave, and the user can communicate ac-cording to the Modbus protocol.

- **Segmented transmission protocol**

  A method for segmenting and reorganizing information with a length greater than the maximum data length of a CAN message. In the case of a CAN message, “Data 1” is used to segment identification data. The format of the segment message is as follows, and the content of the transmitted Modbus protocol is sufficient. Starting from the “data 2” byte, if the protocol content is greater than 7 bytes, the remaining protocol content will continue to be converted in this segmented format until the conversion is completed.

Segment mark	Segment type		Segment counter				
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0

  - **Segmented message tag:** indicates whether the message is a segmented message. If this bit is 0, it means a sepa-rate message, and it is 1 it means Belongs to a frame in the segmented message.
  - **Segment type:** Indicate whether it is the first paragraph, the middle paragraph or the last paragraph.

Place value	meaning	illustrate
0	First segment	If the segment counter contains the value 0, then this is the first segment in the segment series
1	Middle segment	Indicates that this is an intermediate segment
2	Last segment	Mark the last segment

  - **Segment counter:** The mark of each segment indicates the sequence number of the segment in the entire message. If it is the number of segments, the value of the counter is the number. In this way, it is possible to verify whether any segments are missing when receiving. 5Bit is used in total, and the range is 0~31.

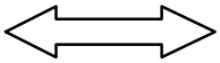
No	7	6	5	4	3	2	1	0
Frame information	FF	RTR	EDL	BRS	DLC (Data length)			
Frame ID3	X	X	X	ID.28 - ID.24				
Frame ID2	ID.23 - ID.16							
Frame ID1	ID.15 - ID.8							
Frame ID0	ID.7 - ID.0							
Data 1	Segment mark	Segment type		Segment counter				
Data 2	DATE							
Data 3	DATE							
Data 4	DATE							
Data 5	DATE							
Data 6	DATE							
Data 7	DATE							
Data 8	DATE							

- **Convert serial frame to can message**

The serial interface adopts the standard Modbus RTU protocol, so the user frame only needs to comply with this protocol. If the transmitted frame does not conform to the Modbus RTU format, the module will discard the received frame without converting it.

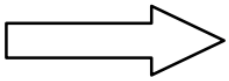
- **CAN message to serial frame**

  For the Modbus protocol data of the CAN bus, there is no need to do cyclic redundancy check (CRC16), the module receives according to the segmentation protocol, and automatically adds the cyclic redundancy check (CRC16) after receiving a frame analysis, and converts it into Modbus RTU frame to send To the serial bus. If the received data does not conform to the segmentation protocol, the group of data will be discarded without conversion.

<table>
<tr><th>Modbus RTU Frame</th><td rowspan="11">  </td><th>CAN Message</th><th>CAN Message 1</th><th>CAN Message x</th></tr>
<tr><td>Address domain</td><td>Frame Information</td><td>Frame Information</td><td>Frame Information</td></tr>
<tr><td>function code</td><td>Frame ID3</td><td>0x00</td><td>0x00</td></tr>
<tr><td rowspan="3">Data field</td><td>Frame ID2</td><td>0x00</td><td>0x00</td></tr>
<tr><td>Frame ID1</td><td>0x00</td><td>0x00</td></tr>
<tr><td>Frame ID0</td><td>Frame ID
(user setting)</td><td>Frame ID
(user setting)</td></tr>
<tr><td>CRC field</td><td>Data 1</td><td>[Use of Segmented Protocol]</td><td>[Use of Segmented Protocol]</td></tr>
<tr><td rowspan="7"></td><td>Data 2</td><td>Address field</td><td rowspan="7">Data field</td></tr>
<tr><td>Data 3</td><td rowspan="6">Data field</td></tr>
<tr><td>Data 4</td></tr>
<tr><td>Data 5</td></tr>
<tr><td>Data 6</td></tr>
<tr><td>Data 7</td></tr>
<tr><td>Data 8</td></tr>
</table>

Conversion example:

Modbus RTU Frame	Serial frame
Address field	55
function code	0F
Data field	00
	00
	00
	04
	02
	00
	00
CRC Field	29
	13



CAN Message	CAN Message 1	CAN Message 2
Frame Information	08	02
Frame ID3	00	00
Frame ID3	00	00
Frame ID1	00	00
Frame ID0	Frame ID	Frame ID
Data 1	81	C2
Data 2	55	00
Data 3	0F	00
Data 4	00	
Data 5	00	
Data 6	00	
Data 7	04	
Data 8	02	

- **Custom protocol mode**

  It must be a complete serial frame format that conforms to the custom protocol, and it must contain all the serial frames in the mode configured by the user.

  There is content, except for the data field, if the content of other bytes is wrong, this frame will not be sent success-fully. The content of the serial frame: frame header, frame length, frame information, frame ID, data field, frame end.

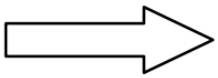
  Note: In this mode, the frame ID and frame type configured by the user are invalid, and the data will be forwarded ac-cording to the format in the serial frame.

  - **Convert serial frame to CAN message**

    The serial frame format must conform to the specified frame format. Because the CAN frame format is based on messages, the serial frame format is based on byte transmission. Therefore, in order to allow users to use CAN-bus conveniently, the serial frame format is moved closer to the CAN frame format, and the start and end of a frame are specified in the serial frame, that is, the “frame head” and “frame end” in the AT command. , Users can configure by themselves. Frame length refers to the length from the beginning of the frame information to the end of the last data, excluding the end of the serial frame. Frame information is divided into extended frames and standard frames. The standard frame is fixed as 0x00, and the extended frame is fixed as 0x80, which is different from transparent con-version and transparent conversion with identification. In custom protocol conversion, regardless of the data length contained in the data field of each frame How much, the content of the frame information is fixed. When the frame type is a standard frame (0x00), the last two bytes of the frame type represent the frame ID, with the high order first; when the frame information is an extended frame (0x80), the last 4 bytes of the frame type represent the frame ID, where High ranking first

    Note: In the custom protocol conversion, regardless of the data length contained in the data field of each frame, the frame information content is fixed. It is fixed as standard frame (0x00) or extended frame (0x80). The frame ID needs to conform to the ID range, otherwise the ID may be wrong.

Serial frame	
Serial frame header	User configuration
Frame length	Frame length
Frame information	Frame information
Frame ID	Frame ID1
	Frame ID0
Data field	Data 0
	Data 1
	…
	Data 6
	Data 7
	Data 8
Serial end of frame	User configuration



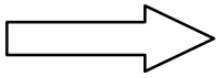
CAN Message	
Frame information	Frame information
Frame ID	Frame ID1
	Frame ID0
Data field	Data 1
	Data 2
	Data 3
	Data 4
	Data 5
	Data 6
	Data 7
	Data 8

- **Convert CAN message to serial frame**

  CAN bus message receives a frame and then forwards a frame. The module will convert the data in the CAN message data field in turn, and at the same time add frame header, frame length, frame information and other data to the serial frame, which is actually a serial frame Transfer the reverse form of CAN message.

  Convert CAN messages to serial frames

CAN Message	
Frame information	Frame information
Frame ID	Frame ID1
	Frame ID0
Data field	Data 1
	Data 2
	Data 3
	Data 4
	Data 5
	Data 6
	Data 7
	Data 8



Serial frame	
Serial frame header	User configuration
Frame length	Frame length
Frame information	Frame information
Frame ID	Frame ID1
	Frame ID0
Data field	Data 0
	Data 1
	…
	Data 6
	Data 7
Serial end of frame	User configuration

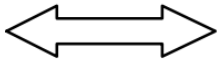
Conversion example:

Serial frame to CAN message (custom protocol).

CAN configuration parameters configured in this example.

Conversion mode: custom protocol, frame header AA, frame end: FF, conversion direction: bidirectional. Frame ID: No need to configure, Frame type: No need to configure, the data before and after conversion is as follows. CAN message to serial frame: the reverse form of serial frame to CAN message.

Serial frame	
Serial frame header	AA
Frame length	07
Frame information	00
Frame ID	01
	23
Data field	11
	22
	33
	44
Serial end of frame	FF



CAN Message	
Frame information	00
Frame ID	01
	23
Data field	11
	22
	33
	44

AT Command

- Enter AT command mode: send +++ via serial port, send AT again within 3 seconds, the device will return AT MODE, then enter AT command mode.
- If there is no special instruction, all subsequent AT command operations need to add “\r\n”.
- All examples are performed with the command echo function turned off.
- After setting the parameters, you need to restart the device to make the set parameters take effect.

Error code table:

error code	instruction
-1	Invalid command format
-2	Invalid command
-3	Not yet defined
-4	Invalid parameter
-5	Not yet defined

Default parameters:

Parameter category	parameter name	Parameter value	Related instructions
Serial port	Baud rate	115200	AT+UART
	digit	8	
	Stop bit	1	
	Parity check	None	

1. **Enter AT command**

Command	AT
Function	Enter AT command mode
Send	AT
Back	<CR><LF>+OK<CR><LF>

Example:

Send: +++ // no line break

Send: AT // no line break

Response: <CR><LF>AT MODE<CR><LF>

2. **Exit AT command**

Command	EXAT
Function	Exit AT command mode
Setting	AT+EXAT<CR><LF>
Back	<CR><LF>+OK<CR><LF>

Example:

Send: AT+EXAT\r\n

Response: <CR><LF>+OK<CR><LF>

3. **Query version**

Command	VER?
Function	Query firmware version
Inquire	AT+VER?<CR><LF>
Back	<CR><LF> VER=x.x<CR><LF>
Remark	x.x version number

Example:

Send: AT+VER? \r\n

Response: <CR><LF> VER=x.x <CR><LF>

4. **Restore default parameters**

Command	RESTORE
Function	Restore the default parameters of the device (factory parameters)
Setting	AT+RESTORE<CR><LF>
Back	<CR><LF>+OK<CR><LF>
Remark	Need to restart the device for the parameters to take effect

Example:

Send: AT+RESTORE \r\n

Response: <CR><LF>+OK<CR><LF>

5. **Echo settings**

Command	E
Function	User command echo setting/query
Setting	AT+E=ON<CR><LF><CR><LF>
Back	<CR><LF>+OK<CR><LF>
Remark	ON OFF

Example:

set up:

Send: AT+E=OFF\r\n

Response: <CR><LF>+OK<CR><LF> Inquire:

Send: AT+E?\r\n

Response: <CR><LF>+OK<CR><LF>

6. **Serial port parameters**

Command	UART
Function	Set the serial communication parameters of the module
Setting	AT+UART=baud,date,stop,parity,flowcontrol
Back	<CR><LF>+OK=<snString><CR><LF>
Inquire	AT+UART?
Parameter	Baud (Serial port baud rate: 600, 1200, 2400, 4800, 9600, 14400, 19200, 38400, 43000, 57600, 76800, 115200, 128000, 230400, 256000, 460800, 921600 : bps date: 8 stop: 1, 2 parity: NONE, EVEN, ODD. flowcontrol : NFC(No flow control), FC(Flow Control)

Example:

set up:

Send: AT+UART=115200,8,1,EVEN,NFC\r\n

Response: <CR><LF>+OK<CR><LF>

Inquire:

Send: AT+UART?\r\n

Response: <CR><LF>+OK<CR><LF> AT+UART=115200,8,1,EVEN,NFC <CR><LF>

7. **Setting/Querying CAN Information**

Command	CAN
Function	Set CAN interface communication parameters
Setting	AT+CAN =baud,id,mode<CR><LF>
Back	<CR><LF>+OK<CR><LF>
Inquire	AT+CAN?
Parameter	Baud(CANBaud rate): 6K,10K,20K,50K,100K,120K,125K,150K,200K,250K, 400K, 500K, 600K, 750K, 1000K unit : bps id (Frame ID): 0~7FF(Standard frame) , 0~1FFFFFFF (Extended frame) mode:(Frame category) : NDTF(Standard frame), EDTF(Extended frame)

Example:

set up:

Send: AT+CAN=100,70,NDTF\r\n

Response: <CR><LF>+OK<CR><LF>

Inquire:

Send: AT+ CAN?\r\n

Response: <CR><LF>+OK<CR><LF> AT+CAN=100,70,NDTF <CR><LF>

8. **Setting/Querying Module Conversion Mode**

Command	MODE
Function	Set/query module conversion mode
Setting	AT+ MODE=mode<CR><LF>
Back	<CR><LF>+OK<CR><LF>
Inquire	AT+MODE?
Parameter	mode (Module working mode): TRANS(transparent), TPRTL(Transparent with logo), PROTOL(Protocol mode), USER(Custom protocol), MODBUS(MODBUS)

Example:

set up:

Send: AT+CANLT=ETF\r\n

Response: <CR><LF>+OK<CR><LF>

Inquire:

Send: AT+ CANLT?\r\n

Response: <CR><LF>+OK<CR><LF> AT+CANLT=ETF<CR><LF>

9. **Set/query the filtering mode of the CAN bus**

Command	CANLT
Function	Set/query the filtering method of CAN bus
Setting	AT+CANLT =mode<CR><LF>
Back	<CR><LF>+OK<CR><LF>
Inquire	AT+CANLT?
Parameter	mode (Filter mode): OFF(Receive all functions), ETF(Only receive extended frames), NTF(Only receive standard frames), USER (customize)

Example:

set up:

Send: AT+MODE=MODBUS\r\n

Response: <CR><LF>+OK<CR><LF>

Inquire:

Send: AT+ MODE?\r\n

Response: <CR><LF>+OK<CR><LF>AT+MODE=MODBUS <CR><LF>

10. **Set/query frame header and frame end data**

Command	UDMHT
Function	Set/query frame header and end data in custom mode
Setting	AT+UDMHT=head,tail<CR><LF>
Back	<CR><LF>+OK<CR><LF>
Inquire	AT+ UDMHT?
Parameter	head (Header data), tail (End-of-frame data). data range 0~0xFF

Example:

Settings: Set the frame header data to FF and the frame end data to 55 Send: AT+UDMHT=FF,55 \r\n

Response: <CR><LF>+OK<CR><LF>

Inquire:

Send: AT+UDMHT?\r\n

Response: <CR><LF>+OK<CR><LF> AT+UDMHT=FF,55<CR><LF>

11. **Setting/Querying Identification Parameters**

Command	RANDOM
Function	Set/query query identification parameters
Setting	AT+RANDOM = idLength, idLocation <CR><LF>
Back	<CR><LF>+OK<CR><LF>
Inquire	AT+RANDOM?
Parameter	id Length (Frame header ID length), idLocation (Frame ID position), Data range: length range 0-4 position 0-7

Example:

Settings: Set the frame ID length to 4, position 2

Send: AT+RANDOM=4,2 \r\n

Response: <CR><LF>+OK<CR><LF>

Inquire:

Send: AT+ RANDOM?\r\n

Response: <CR><LF>+OK<CR><LF> AT+RANDOM=4,2 <CR><LF>

12. **Setting/Querying Identification Parameters**

Command	MSG
Function	Set/query frame ID frame information enable
Setting	AT+MSG =flag_id, flag_type<CR><LF>
Back	<CR><LF>+OK<CR><LF>
Inquire	AT+MSG?
Parameter	flag_id (frame header data), tail (frame tail data). Data range 0~0xFF

Example:

Settings: enable frame ID, frame information

Send: AT+MSG=1,1 \r\n

Response: <CR><LF>+OK<CR><LF>

Inquire:

Send: AT+ MSG?\r\n

Response: <CR><LF>+OK<CR><LF> AT+MSG=1,1<CR><LF>

13. **Set/query transmission direction**

Command	DIRECTION
Function	Set/query frame ID frame information enable
Setting	AT+DIRECTION= parameter<CR><LF>
Back	<CR><LF>+OK<CR><LF>
Inquire	AT+ DIRECTION?
Parameter	parameter (direction parameter), UART-CAN (serial port to can). CAN-UART (CAN to serial port) BOTHWAY (two-way)

Example:

Setting: Only convert serial port data to can bus

Send: AT+DIRECTION=UART-CAN\r\n

Response: <CR><LF>+OK<CR><LF>

Inquire:

Send: AT+ DIRECTION?\r\n

Response: <CR><LF>+OK<CR><LF> AT+DIRECTION=UART-CAN <CR><LF>

14. **Setting/Querying Filter Parameters**

Command	FILTER
Function	Set/query filter frame information
Setting	AT+FILTER=id_type,date<CR><LF>
Back	<CR><LF>+OK<CR><LF>
Inquire	AT+FILTER?
Parameter	type (frame type), date (frame data) type: NDTF represents this command is a standard ID, EDTF represents this command is an extended frame ID date: ID data.

Example:

Settings: Set frame filtering parameters: standard frame ID, 719

Send: AT+LFILTER=NDTF,719 \r\n

Response: <CR><LF>+OK<CR><LF>

Query: Will return all IDs that have been set

Send: AT+ FILTER?\r\n

Response: <CR><LF>+OK<CR><LF> AT+LFILTER=NDTF,719 <CR><LF>

15. **Delete the filter parameters that have been set**

Command	DELFILTER
Function	Set/query filter frame information
Setting	AT+DELFILTER=id_type,date<CR><LF>
Back	<CR><LF>+OK<CR><LF>
Inquire	AT+FILTER?
Parameter	type (frame type), date (frame data) NDTF: Represents this command as a standard ID, EDTF represents this command as an extended frame ID. date: ID data.

Example:

Setting: delete filter parameter: standard frame 719

Send: AT+DELFILTER=NDTF,719 \r\n

Response: <CR><LF>+OK<CR><LF>

Factory default parameters

RS485/RS232/RS422	Serial port baud rate	115200 bps
	Parity check	No
	Data bit	8
	Stop bit	1
	Flow Control	shut
CAN	CAN baud rate	100K bps
	CAN ID	0x00000000
Default working mode	Transparent transmission mode	Receive all data types

Cleaning and maintenance

Important:

- Never use aggressive detergents, rubbing alcohol or other chemical solutions, as these could damage the housing or even impair the functioning of the product.
- Do not immerse the product in water.

1. Disconnect the product from the power supply.
2. Clean the product with a dry, fibre-free cloth.

Disposal

 This symbol must appear on any electrical and electronic equipment placed on the EU market. This symbol indicates that this device should not be disposed of as unsorted municipal waste at the end of its service life. Owners of WEEE (Waste from Electrical and Electronic Equipment) shall dispose of it separately from unsorted municipal waste. Spent batteries and accumulators, which are not enclosed by the WEEE, as well as lamps that can be removed from the WEEE in a non-destructive manner, must be removed by end users from the WEEE in a non-destructive manner before it is handed over to a collection point.

Distributors of electrical and electronic equipment are legally obliged to provide free take-back of waste. Conrad provides the following return options free of charge (more details on our website):

- in our Conrad offices
- at the Conrad collection points
- at the collection points of public waste management authorities or the collection points set up by manufacturers or distributors within the meaning of the ElektroG

End users are responsible for deleting personal data from the WEEE to be disposed of.
It should be noted that different obligations about the return or recycling of WEEE may apply in countries outside of Germany.

Technical data

Power supply

- **Power supply**……8 – 28 V/DC; 12 or 24 V/DC power supply unit recommended
- **Power input**……18 mA at 12 V (Standby)
- **Isolation value**……..DC 4500V

Converter

- **Interfaces** ……CAN bus, RS485, RS232, RS422
- **Ports** …….. Power supply, CAN bus, RS485, RS422: Screw terminal block, RM 5.08 mm; RS232: D-SUB socket 9-pin
- **Mounting**……DIN rail

Miscellaneous

- **Dimensions (W x H x D)……..approx. 74 x 116 x 34 mm**
- **Weight** …… approx. 120 g

Ambient Conditions

- Operating/storage conditions……-40 to +80°C, 10 – 95% RH (non-condensing)

Documents / Resources

	**TRU COMPONENTS RS232 Multifunction Module** [pdf] Instruction Manual RS232 Multifunction Module, RS232, Multifunction Module, Module

References

- **Conrad Electronic » All parts of success**
- **Contact**
- **Download center**
- **User Manual**