

M-bus Communication Protocol

1、Initialization slave

Format:

Start	C Field	A Field	Check Sum	Stop
10	40	XX	CS	16

XX=1 to FF

Analysis of primary address XX:

The address field serves to address the recipient in the calling direction, and to identify the sender of information in the receiving direction. The size of this field is one Byte and can therefore take values from 0 to 255. The addresses 1 to 250 can be allocated to the individual slaves, up to a maximum of 250. Unconfigured slaves are given the address 0 at manufacture, and as a rule are allocated one of these addresses when connected to the M-Bus. The addresses 254 (FE) and 255 (FF) are used to transmit information to all participants (Broadcast). With address 255 none of the slaves reply, and with address 254 all slaves reply with their own addresses. The latter case naturally results in collisions when two or more slaves are connected and should only be used for test purposes. The address 253 (FD) indicates that the addressing has been performed in the Network Layer instead of Data Link Layer, The FD used when using the second level address. The remaining addresses 251 and 252 have been kept for future applications.

1.1 How to initialize a meter which you don't know the address?

Master to slave :10 40 fe 3e 16

Slave to master: e5 (success)

1.2 Remove secondary address matching flags for all energy meters on the bus.

Master to slave: 10 40 fd 3d 16

Slave: No answer

1.3 How to initialize all meters on the bus line by using FF as broadcast address?

Master to slave: 10 40 ff 3f 16

Slave: No answer

1.4 How to Initialize a Slave with specific address? For example, ID 01.

Master to slave: 10 40 01 41 16

Slave to master: e5

2、How to set baud rate ?

2.1 Point to point baud-rate setting, (command format: Control Frame)

Start	L Field	L Field	Start	C Field	A Field	CI Field	Check Sum	Stop
68H	03	03	68H	53/73	fe	B9	CS	16

L Field----- Byte length

C Field----- Control Field, Function Field

A Field ----- Address Field

CI Field ----- Control information field

Check Sum-----The Check Sum is calculated from the arithmetical sum of the data mentioned above, without taking carry digits into account.

Data-xx:

B8-----300

B9-----600

BA-----1200

BB-----2400

BC-----4800

BD-----9600

Example:

- (1) How to change baud rate to 2400bps?

Master to slave: 68 03 03 68 53 fe bB cs 16

Slave to master: e5

- (2) How to change baud rate to 9600?

Master to slave: 68 03 03 68 53 fe bD cs 16

Slave to master: e5

2.2 How to use Broadcast command to set baud rate?

Command Format:

Start	L Field	L Field	Start	C Field	A Field	CI Field	Check Sum	Stop
68H	03	03	68H	53/73	ff	B9	CS	16

Slave to master: no answer

Data-xx:

B9-----600

BA-----1200

BB-----2400

BC-----4800

BD-----9600

For example:

Change all the meters' baud rate to 2400bps?

Master to slave: 68 03 03 68 53 ff bB cs 16

Slave to Master: No answer

3、 How to Set primary address?

3.1 How to change the primary address to 01?

Command format:

Start	L Field	L Field	Start	C Field	A Field	CI Field	DIF	VIF	Address Data	Check Sum	Stop
68H	06	06	68H	53/73	fe	51	01	7A	XX	CS	16

For example:

Master to slave: 68 06 06 68 53 fe 51 01 7a 01 1e 16

Slave to master: e5

3.2 How to use Broadcast Command to set primary address to 01?

Master to slave: 68 06 06 68 53 ff 51 01 7a 01 1f 16

Start	L Field	L Field	Start	C Field	A Field	CI Field	DIF	VIF	Address Data	Check Sum	Stop
68H	06	06	68H	53/73	ff	51	01	7A	XX	CS	16

Slave: no answer

3.3 How to change Address from 01 to 02?

Command Format

Start	L Field	L Field	Start	C Field	A Field	CI Field	DIF	VIF	Address Data	Check Sum	Stop
68H	06	06	68H	53/73	XX	51	01	7A	YY	CS	16

XX-- current primary Address

YY-- Primary address that needs to be changed

Master to slave: 68 06 06 68 73 01 51 01 7A 02 42 16

Slave to master: e5

3.4 How to Set primary address to 01 by using secondary address (for example: secondary address:12345678)

Step1 Initialize the slave

Master to slave : 10 40 fe 3e 16

Slave to master: e5

Step2 Verify the secondary address. After the master station issues the following command, the slave station will verify that its secondary address is the same as the secondary address in this command.

Master to slave:68 0B 0B 68 73 FD 52 78 56 34 12 FF FF FF FF D2 16

FD----The device number to use when reading parameters with a serial number.

78 56 34 12 ---Select the meter with serial number 12 34 56 78

Master to slave :e5 (success)

Step3 Change the selected meter level address to 01

Master to slave :68 06 06 68 73 FD 51 01 7A 01 3D 16

01---- Current address needs to be set

Slave to master: e5

4、 Set the complete identification of the slave

(ID=12345678, Man=4024h (PAD), Gen=1, Med=02 (energy))

Start	L Field	L Field	Start	C Field	A Field	CI Field	DIF	VIF	Identification No	Manufacturer ID	Generation	Medium	Check Sum	Stop
68H	0D	0D	68H	53/73	FE	51	07	79	4byte	2byte	1byte	1byte	CS	16

Master to slave: 68 0D 0D 68 53 FE 51 07 79 78 56 34 12 24 40 01 02 9D 16

Slave to master: e5

5、 How to read out of Energy information

5.1 Use device number 01 to read the energy data

Format:

Master to slave: 10 7B/5B adr cs 16

Slave to master: Variable data structure

Example: 10 7B 01 7C 16

5.2 How to read out a meter's Energy information by using broadcast address 254 (FE)?

Master to slave: 10 7b/5b fe cs 16

Slave to master: Variable data structure

Example: 10 5B FE 59 16

5.3 How to read out the meter's Energy information by using secondary Address?

For example: Secondary address:12 34 56 78

Step1 Initialize the slave

Master to slave:10 40 ff 3f 16

Slave to master: No answer

Step2 Check the secondary address. After receiving the command, the Slave will check if the secondary address in the command is same with its secondary address or not.

Master to slave:68 0b 0b 68 73 fd 52 78 56 34 12 FF FF FF FF d2 16

Slave to master: E5

Step3 Read the Energy information

Master to slave :10 7b fd 78 16

Slave to master:

DIF=====Coding of t e Data Information Field

VIF=====Codes for Value Information Field

Byte		data structure	Notice
4	Header Telegram	68 AE AE 68	eider of RSP_UD telegram
3		08 A 72	C field =08 address A CI field 72
4		78 65 34 12	Identification number =12345678
2		24 40	Manufacturer ID 4024
1		01	Generation 1
1		02	Energy Meter
1		55	ACCESS NO
1		00	STATUS
2		00 00	Signature 18
6	Current Total Active Energy	0C	DIF: 8digit BCD , Current Value
		04/05	VIF: (0.01Kw/0.1kw)
		78 56 34 12	123456.78kwh
8	Voltage L1	0b	DIF: 6digit BCD
		Fd	VIF:fd
		C8	VIFE: 0.1V
		FF 01	LINE 1
		56 34 12	12345.6V
8	Voltage L2	0b	DIF: 6digit BCD
		Fd	VIF:fd
		C8	VIFE: 0.1V
		FF 02	LINE 2 43
		56 34 12	12345.6V
8	Voltage L3	0b	DIF: 6digit BCD
		Fd	VIF:fd
		C8	VIFE: 0.1V
		FF 03	LINE 3
		56 34 12	12345.6V

8	Current L1	0b	DIF: 6digit BCD
		Fd	VIF:fd
		DA 2	VIFE: 10mA(xxx.xxA)
		FF 01	LINE 1
		56 34 12	123456mA(1234.56A)
8	Current L2	0b	DIF: 6digit BCD
		Fd	VIF:fd
		DA	VIFE: 10mA(xxx.xxA)
		FF 02	LINE 2
		56 34 12	123456mA(1234.56A)
8	Current L3	0b	DIF: 6digit BCD
		Fd	VIF:fd
		DA	VIFE: 10mA(xxx.xxA)
		FF 03	LINE 3
		56 34 12	123456mA(1234.56A)
5	Total Active Power	0b	DIF: 6digit BCD
		2B	VIF:1W(xxx.xxxkw)
		56 34 12	123456w(123.456kw)
7	Active Power L1	0b	DIF: 6digit BCD
		AB	VIF:1W(xxx.xxxkw)
		FF 01	LINE 1
		56 34 12	123456w(123.456kw)
7	Active Power L2	0b	DIF: 6digit BCD
		AB	VIF:1W(xxx.xxxkw)
		FF 02	LINE 2
		56 34 12	123456w(123.456kw)
7	Active Power L3	0b	DIF: 6digit BCD
		AB	VIF:1W(xxx.xxxkw)
		FF 03	LINE 3
		56 34 12	123456w(123.456kw)
6	Total Power Factor	0a	DIF: 4digit BCD
		Fd	VIF:fd
		3a	VIFE: dimensionless / no VIF
		00 05	0.500
7	Power Factor L1	0a	DIF: 4digit BCD
		Fd	VIF:fd
		3a	VIFE: dimensionless / no VIF
		FF 01	LINE 1
		00 05	0.500
7	Power Factor L2	0a	DIF: 4digit BCD
		Fd	VIF:fd
		3a	VIFE: dimensionless / no VIF
		FF 02	LINE 2
		00 05	0.500
7	Power Factor L3	0a	DIF: 4digit BCD
		Fd	VIF:fd
		3a	VIFE: dimensionless / no VIF
		FF 03	LINE 3
		00 05	0.500
5	Frequency	0a	DIF: 4digit BCD
		Fd	VIF:fd
		3a	VIFE: dimensionless / no VIF
		00 50	50.00 Hz
6	Current Total Active Energy	0C	DIF: 8digit BCD , Current Value
		04/05	VIF: (0.01Kw/0.1kw)
		78 56 34 12	123456.78kwh
1	End	CS	
1		16	

6、How to read password?

Start	L Field	L Field	Start	C Field	A Field	CI Field	C eck Sum	Stop
68	3	3	68	11	addr	03	CS	16

The main device sends, Master to Slave: 68 03 03 68 11 addr 03 cs 16

Meter reply, Slave to Master: 68 05 05 68 11 addr 03 password H password L cs 16

7、How to write password?

Change to a new Password:

Start	L Field	L Field	Start	C Field	A Field	CI Field	Data	C eck Sum	Stop
68	5	5	68	11	Addr	04	Password Password L	CS	16

The main device sends, Master to Slave: 68 05 05 68 11 addr 04 password H password L cs 16

Meter reply, Slave to Master: E5

8、How to reset meter?

How to reset all resettable energy data?

Start	L Field	L Field	Start	C Field	A Field	CI Field	C eck Sum	Stop
68	3	3	68	11	addr	0d	CS	16

The main device sends, Master to Slave: 68 03 03 68 11 01 0d 1f 16

Meter reply, Slave to Master: e5

Annex-1: (The following protocol is defined by Forlong)

1> Write ID

68 06 06 68 53 (FE/FF/ADDR) 51 01 7A DATA CS 16

Meter reply: E5

2> Write baud rate:

68 03 03 68 53 (FE/FF/ADDR) b9 cs 16

B9-----600

BA-----1200

BB-----2400

BC-----4800

BD-----9600

Meter reply: E5

3> Write the display time of each screen

68 04 04 68 53 (FE/FF/ADDR) 31 DATA cs 16

Meter reply: E5

4> Write energy decimal digits

68 04 04 68 53 (FE/FF/ADDR) 32 DATA cs 16

Meter reply: E5

5> Set CT ratio

68 04 04 68 53 (FE/FF/ADDR) 34 DATA cs 16

Meter reply: E5

6> Set display screen item

68 1F 1F 68 53 (FE/FF/ADDR) 35 DATA.....DATA cs 16

Meter reply: E5

7> Set parity

68 04 04 68 53 (FE/FF/ADDR) 36 DATA cs 16

Meter reply: E5

DATA=0 Even

DATA=1 Odd

DATA=2 None

Meter reply: E5

8> Write Serial number

68 07 07 68 53 (FE/FF/ADDR) 37 DATA1-DATA4 cs 16

Meter reply: E5

9> Read kWh

10 7B/5B adr cs 16

10> Read Voltage and Current

68 03 03 68 53 (FE/FF/ADDR) b1 CS 16

11> Read ID

68 05 05 68 11 (FE/FF/ADDR) 51 01 7A CS 16

Meter reply: 68 06 06 68 11 (FE/FF/ADDR) 51 01 7A DATA CS 16

12> Read time of cycle display screen

68 03 03 68 11 (FE/FF/ADDR) 31 cs 16

Meter: 68 04 04 68 11 (FE/FF/ADDR) 31 DATA cs 16

13> Read decimal digits of energy

68 03 03 68 11 (FE/FF/ADDR) 32 cs 16

Meter reply: 68 04 04 68 11 (FE/FF/ADDR) 32 DATA cs 16

14> Read CT ratio

68 03 03 68 11 (FE/FF/ADDR) 34 cs 16

Meter reply: 68 04 04 68 11 (FE/FF/ADDR) 34 DATA cs 16

15> Read display screen item

68 03 03 68 11 (FE/FF/ADDR) 35 cs 16

Meter reply: 68 1F 1F 68 11 (FE/FF/ADDR) 35 DATA cs 16

16> Read Parity

68 03 03 68 11 (FE/FF/ADDR) 36 cs 16

Meter reply: 68 04 04 68 11 (FE/FF/ADDR) 36 DATA cs 16

DATA=0 Even

DATA=1 Odd

DATA=2 None

17> Read serial number

68 03 03 68 11 (FE/FF/ADDR) 37 cs 16

Meter reply: 68 07 07 68 11 (FE/FF/ADDR) 37 DATA1-DATA4 cs 16

