UMD 96, UMD 704

Multifunctional Panel Meters & Power Quality Analyzers & Power Factor Controllers
Protocol description for Mbus protocol

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For device firmware version 2.0.40+

PRELIMINARY TEXT

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1 Communication Options

Mbus configuration and behavior is similar to that of RS-485. The only differences are physical layer, which corresponds to Mbus standard, and ability to process commands *Readout Meter, Set Baud Rate, Set Time* and *Wakeup Message* according to EN1434-3 standard for slaves. Device is still able to respond even to PQ PLUS or Modbus messages on Mbus interface. This means that user can use Mbus master node for remote configuration and access to any PQ PLUS systems device on Mbus network using supplied configuration software. Protocol is recognised automaticaly between proprietary PQ PLUS messages, Modbus or Mbus commands.

In communication configuration device address, baud rate and parity bit must be specified (see user manual for details). Baud rate can be changed using *Set Baud Rate* Mbus command. A gap between bytes corresponding to maximum 1.5 characters (bytes) is allowed while receiving a command or transmitting a reply. The instrument sends back a reply within 200 ms time frame after receiving each command. Between each master and the instrument the communication must follow the single request-reply. Master should wait for each reply before submitting new request.

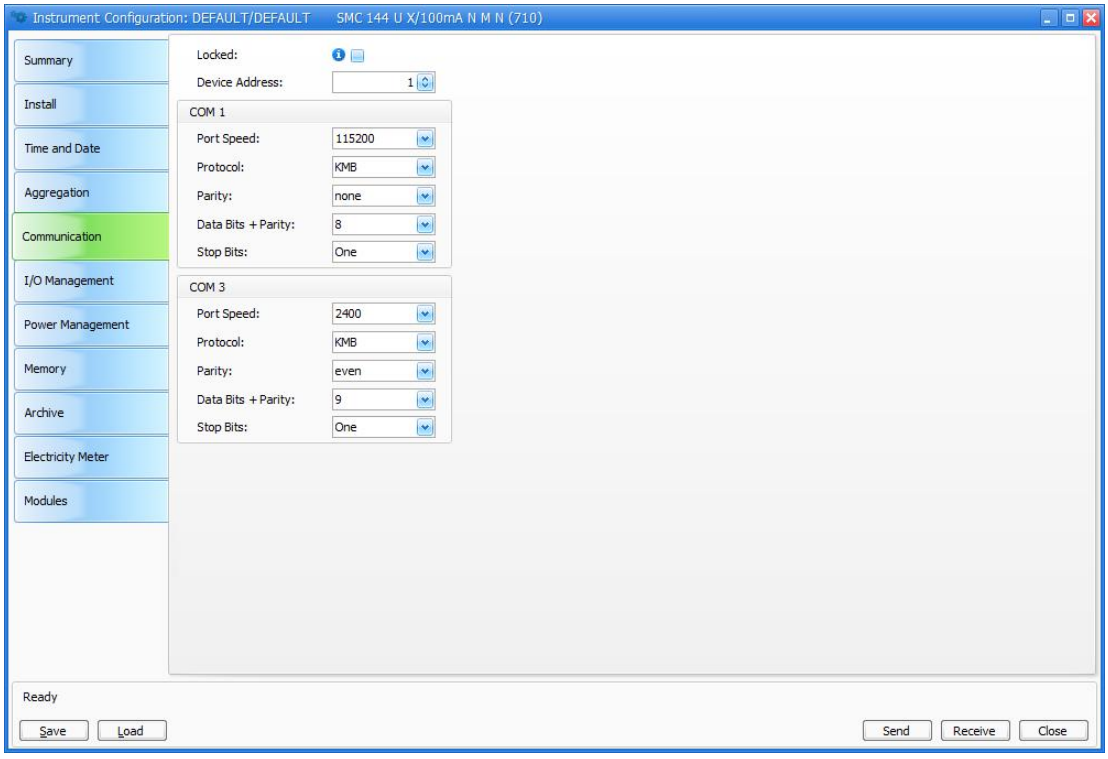
2 Description of Mbus Implementation

2.1 Physical Layer Configuration Options

Following table summarises parameters of Mbus serial port settings in PQ PLUS systems device.

Parameter	Default	Range
Device address	1	1÷250
Baud rate	9600	1200÷9600
Parity	8	None, Even, Odd
Data bits + parity	9	8, 9
Stop bits	1	1, 2

In case there is need for different than default settings, software ENVIS.Daq can be used (over alternate communication interface or even over Mbus, but with PQ PLUS protocol). If device is equiped with more serial interfaces (RS-485 + Mbus), there will be more than one settings available. Higher COM number will then correspond to Mbus interface as illustrated on the following screenshot (COM 3).



2.2 Supported Functions

Following functions are implemented according to EN1434-3 standard for slaves.

Code	Function
0x40	Wake up
0x7B	Data request
0x5B	Data request
0x68	Set Baud Rate

2.3 Readout Meter Implementation

Request (in hexadecimal)

10 7B 01 7C 16

10 Read

7B Read registers

01 Device address

7C Checksum

16 Stop sign

Reply

68 F1 F1 68 08 01 72 C6 02 00 00 A2 2D 00 02 00 00 00 00 02 FD C8 FF 01 00 00 02 FD C8 FF
02 00 00 02 FD C8 FF 03 00 00 02 FD C8 FF 04 00 00 02 FD DA FF 01 00 00 02 FD DA FF

02 00 00 02 FD DA FF 03 00 00 02 FD DA FF 04 00 00 02 AB FF 01 00 00 02 AB FF 02 00 00
02 AB FF 03 00 00 02 AB FF 04 00 00 02 AB FF 00 00 00 82 40 AB FF 01 00 00 82 40 AB FF

02 00 00 82 40 AB FF 03 00 00 82 40 AB FF 04 00 00 82 40 AB FF 00 00 00 07 83 FF 01 00 00
00 00 00 00 00 00 07 83 FF 02 00 00 00 00 00 00 00 00 07 83 FF 03 00 00 00 00 00 00 00 00 07

83 FF 04 00 00 00 00 00 00 00 00 07 83 FF 00 00 00 00 00 00 00 00 00 84 40 83 FF 01 00 00 00
00 84 40 83 FF 02 00 00 00 00 84 40 83 FF 03 00 00 00 00 84 40 83 FF 04 00 00 00 00 84 40 83

FF 00 00 00 00 00 4B 16

Reply data structure description

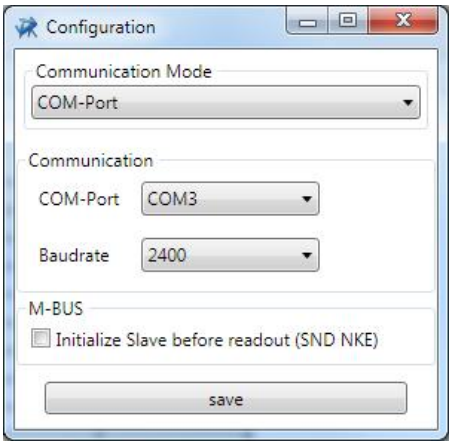
Mbus „register" name	Quantity	Unit	Description
Primary Address			Device Address
Mbus „register" name	Quantity	Unit	Description
Secondary Address			Not implemented
Manufacturer			„PQ PLUS"
Version			Not implemented (0)
Medium			Electricity
Access counter			Not implemented (0)
Status			Not implemented (0)
Power phase L1	U_1	V	Voltages
Power phase L2	U_2	V	
Power phase L3	U_3	V	
Power Manufacturer specific	U_4	V	
Current phase L1	I_1	A	Currents
Current phase L2	I_2	A	
Current phase L3	I_3	A	
Current Manufacturer specific	I_4	A	
Active power phase L1	P_1	W	Active power
Active power phase L2	P_2	W	
Active power phase L3	P_3	W	
Active power Manufacturer	P_4	W	
Active power Manufacturer	$3P$	W	
Active power phase L1	Q_1	var	Reactive power
Active power phase L2	Q_2	var	
Active power phase L3	Q_3	var	
Active power Manufacturer	Q_4	var	
Active power Manufacturer	$3Q$	var	
Active energy phase L1	$EP1+$	Wh	Active energy import
Active energy phase L2	$EP2+$	Wh	
Active energy phase L3	$EP3+$	Wh	
Active energy Manufacturer	$EP4+$	Wh	
Active energy Manufacturer	$3EP+$	Wh	
Active energy phase L1	$EQL1$	varh	Reactive inductive energy
Active energy phase L2	$EQL2$	varh	
Active energy phase L3	$EQL3$	varh	
Active energy Manufacturer	$EQL4$	varh	
Active energy Manufacturer	$3EQL$	varh	

2.4 Mbus evaluation

EMU MB-Connect is a tool available free of charge for download at http://www.emuag.ch/wp- content/uploads/M-Bus-Auslesesoftware-Read-out-software-EMU-MB-Connect.zip. We promote this 3rd-party tool for reference testing of our Mbus implementation.

COM port configuration

Configuration menu opens dialog, where it is possible to choose *COM-Port*, where Mbus master driver/node/converter is connected. Also, it is possible to select *Baudrate* from 300[1], 1200, 2400, 4800 or 9600 options.



Redout meter

In *Actions* panel select *Readout meter*, switch addressing mode to *Primary*, set device address and click on the button *Send*. New row should appear in *Meter data* panel. Details of received data can be seen after expanding the row by clicking on a triangle next to the *Meter DATE TIME* caption. It is possible to observe communication in detail in *Telegram* frame.

[1]Baudrate 300 bps is not supported by PQ PLUS systems devices.

EMU MB-Connect

File Configuration Telegrams About

Meters

	Name	Primary Address	Secondary Address	Manufacturer	Medium	Baudrate

Meter data

Meter 30.9.2015 13:50:31

Name	Value	Tariff
Primary Address	1	
Secondary Address	000002C6	
Manufacturer	KMB	
Version	0	
Medium	Electricity	
Access counter	0	
Status	No error	
Power phase L1	0,0 V	
Power phase L2	0,0 V	
Power phase L3	0,0 V	
Power Manufacturer specific	0,0 V	
Current phase L1	0,00 A	
Current phase L2	0,00 A	
Current phase L3	0,00 A	
Current Manufacturer specific	0,00 A	
Active power phase L1	0 W	
Active power phase L2	0 W	
Active power phase L3	0 W	
Active power Manufacturer specific	0 W	
Active power Manufacturer specific	0 W	
Active power phase L1	0 W	
Active power phase L2	0 W	
Active power phase L3	0 W	
Active power Manufacturer specific	0 W	
Active power Manufacturer specific	0 W	
Active energy phase L1	0 Wh	
Active energy phase L2	0 Wh	
Active energy phase L3	0 Wh	
Active energy Manufacturer specific	0 Wh	
Active energy Manufacturer specific	0 Wh	
Active energy phase L1	0 Wh	
Active energy phase L2	0 Wh	
Active energy phase L3	0 Wh	
Active energy Manufacturer specific	0 Wh	
Active energy Manufacturer specific	0 Wh	

Telegrams

30.9.2015 13:50:30:203
> 10 7B 01 7C 16
30.9.2015 13:50:31:470
< 68 F1 F1 68 08 01 72 C6 02 00 00 A2 2D 00 02 00 00 00 00 02 FD C8 FF 01 00 00 02 FD C8 FF 02 00 00 02 FD C8 FF 03 00 00 02 FD

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