

DPM86xx Series Power Supply Simple Communication Protocol

Autor and Version

Alois Hockenschlohe, Version 221028

Introduction and overview

The power supplies of the DPM86xx series provide two communication protocols: the classical modbus protocol and a so-called “Simple Communication Protocol”, which is a proprietary development of the manufacturer.

This summary describes the “Simple Communication Protocol” as far as it is possible for me at the present time. The information given here is based on various documents I found in the internet and on my own experiences.

Corrections are welcome. This document is “work in progress”. Please watch out for the latest version. Feel free to contribute any improvements. Don’t rely on any of the information presented in this document. You have been warned. :-)

Many thanks goes to MSe, which helped me to improve this document and did some final work.

The “Simple Communication Protocol”

The “Simple Communication Protocol” is a stateless, straight forward, point-to-point client-server, command-response protocol based on a serial connection. It is used to write and read numerical values between 0 and 65535 (a word) from/to the power supply.

Multiple power supplies can be controlled from a single client by addressing the commands to a specific power supply. Therefore, each power supply has a address between 1 (default) and 99, which can be configured via its physical interface. The protocol implements this feature via the corresponding field in each frame.

Each power supply provides various state information and accepts various commands via so called functions. Each function has its own function number which is addressed by the corresponding field in the command frames.

The protocol supports 100 functions (function codes 0 to 99). For each read command addressing a valid function, the power supply provides a response. Addressing a function above 99 results in a timeout (no response returned by the power supply).

Only a subset of the functions are documented.

Frames

There are two types of command frames and two type of response frames known:

- write command (client → power supply, for writing values to the power supply)
- read command (client → power supply, for reading values from the power supply)
- status (power supply → client, response to a write command)
- value (power supply → client, response to a read command)

It is unclear at the moment if command frames can be nested, while it is proven that multiple responses can be sent back in one answer.

Write command frame

start symbol	address	access	function	equal symbol	value	feedback	end of command
:	01..99	w	00..99	=	0..65535	,/./,,	\r\n

Field name	Comment/description
start symbol	Each command starts with a ':'.
address	Address of the power supply.
access	Access is 'w' indicating a write access.
function	Number of a specific function (see section "Functions").
equal symbol	The character "=" separates the field "function" from the field "value".
value	Value which will be written to the specified function. See section "Data Types".
feedback	The "feedback" field indicates if the power supply should return the (queued) responses immediately (".", or ",",) or if the feedback should be queued (",") until a command with the feedback field "." or "," shows up.
end code	The official documentation states: "Each command is terminated by the string '\r\n' (this is actually a return character followed by a newline character in ASCII, hexadecimal representation is 0x0d, 0x0a)." It seems as if a command can be also terminated by a single '\n' (0x0a).

Read command frame

start symbol	address	access	function	equal symbol	nr. of additional functions to read	feedback	end of command
:	01...99	r	00...99	=	0...99	,/./,,	\r\n

Field name	Comment/descriptionSee section "Write command format".
start symbol	See section "Write command format".
address	See section "Write command format".
access	Access is 'r' indicating a read access.
function	See section "Write command format".
equal symbol	See section "Write command format".
nr. of additional functions to read	One or more consecutive functions can be read with a single read command. The field "additional functions to read" indicates how many additional functions will be read. The value '00' indicates that only the function 'function number' will be read. A value of 01 and above will read the function 'function number' and the specified number of consecutive functions.
feedback	See section "Write command format".
end code	See section "Write command format".

Status frame

start symbol	address	status	end of answer	end of response
:	01...99	"ok"	.	\r\n

Field name	Comment/descriptionSee section "Write command format".
start symbol	See section "Write command format".
address	See section "Write command format".
status	"ok" indicates that the operation was successful.
end of answer	Responses can be queued by the power supply until they are requested by the corresponding value in the feedback field of a command frame. Multiple responses are delivered in a single answer. In this case the responses are separated from each other by the end code. The last response is marked by an additional ".".
end code	See section "Write command format".

Response frame

start symbol	address	access	function	equal symbol	value	end of answer	end of response
:	01...99	r	00...99	=	0...65335	.	\r\n

Field name	Comment/descriptionSee section "Write command format".
start symbol	See section "Write command format".
address	See section "Write command format".
access	Access is 'r' indicating a response to a read command.
function	The function number of the corresponding read command.
equal symbol	See section "Write command format".
value	Response to the read command. See section "Data Types".
feedback	See section "Status frame".
end code	See section "Status frame".

Data Types

The field "value" (found in the write and the response frame) transports various data types from and to the power supply:

data type	description	example	range
voltage	Voltage (volt). Four-digit integer, first two digits positions interpreted as before, last two digits interpreted as position after the decimal point.	1234 → 12.34 V	0...6000 (0..60 V)
current	Current (ampere). Four-digit integer, first digit interpreted as the position before, last three digits interpreted as the positions after the decimal point	1234 → 1.234 A	DPM-8605: 0..5000 (0..5A) DPM-8608: 0..8000 (0..8A) DPM-8616: 0..16000 (0..16A) DPM-8624: 0..24000 (0..24A) Hint: Maximum value can be read via function 01.
boolean	Boolean (true/false)	0 → off	0/1
temperature	Temperature (celsius). Two-digit-integer.	23 → 23° C	0..100 (?)
slot	Address of memory slots	-	1..12

Functions

Documented Functions

function	R	W	description	data type	comment/hint
00	X		Read the max output voltage (V). Will always be 6000 (60V).	voltage	0 → power supply not ready yet (?) 6000 → 60V
01	X		Read the max output current (A).	current	5000 → 5A → DPM-8605 8000 → 8A → DPM-8608 16000 → 16A → DPM-8616 24000 → 24A → DPM 8624
10	X	X	Read/set output voltage target.	voltage	
11	X	X	Read/set output current target.	current	
12	X	X	Read/set output status.	boolean	0 → off, 1 → on
20		X	Set output voltage and current target.	voltage, current	"1234,5678" → 12,34 V and 5,678 A
30	X		Read current output voltage.	voltage	
31	X		Read current output current.	current	
32	X	X	Read/set constant mode (current or voltage).	boolean	0 → constant voltage 1 → constant current
33	X		Read the temperature of the power supply.	temperature	23 → 23° C

Undocumented Functions

The following functions are not part of the available documentation:

function	R	W	description	data type	comment/hint
21		X	This function provides four different features: <ul style="list-style-type: none">Save the actual configured current and voltage to a slot.Define the actual configured current and voltage as the lower or upper limit.Remove upper and lower limit.	slot	Slot 1..9: Save current and voltage to the slot Slot 10: Set upper limit. Slot 11: Set lower limit. Slot 12: Remove upper and lower limit.
22		X	Set current and voltage from a slot.	slot	Slot 1..9: Read current and voltage from slot
41	X		Unknown config. Can be set via the SET menu (L-Ui). Can not be manipulated via a write frame. Seems to be something related to voltage.	unknown	
42	X		Unknown config. Can be set via the SET menu (H-Ui). Can not be manipulated via a write frame. Seems to be something related to voltage.	unknown	

Unknown functions

During a quick read scan, the following responses had been seen:

function	documented	undocumented returns "0"	undocumented returns values <> "0"
00-01	X		
02-03			X
04-09		X	
10-12	X		
13-19		X	
20	X		
23-29		X	
30-33	X		
34-37			X
38-49		X	
50-57			X
58-70		X	
71-72			X
73-99		X	