

Remote Management Card RMCARD205

Modbus TCP Register Map for 3-Phase UPS

The Remote Management Card allows a UPS system and environmental sensor to be managed, monitored, and configured.

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Introduction

The CyberPower Remote Management Card RMCARD205 supports Modbus TCP protocol with specific firmware version (TBD). The document describes the related setting and register roadmap.

Design Parameters

Design Parameters	Value	Remark
Role	Server	Response and execute the command
Port	TCP/502	Standard port and fixed
Mode	RTU	MODBUS TCP
Unit ID / Slave Address	Arbitrary	Can be any value. Recommend to be 0xFF or 0x00.

Exception Responses

The table below describes the exception codes along with their possible causes.

Code	Name	Meaning
01H	ILLEGAL FUNCTION	The function code received in the query is not an allowable action for the slave. If a Poll Program Complete command was issued, this code indicates that no program function preceded it.
02H	ILLEGAL DATA ADDRESS	The data address received in the query is not an allowable address for the slave.
03H	ILLEGAL DATA VALUE	A value contained in the query data field is not an allowable value for the slave.
04H	SLAVE DEVICE FAILURE	An unrecoverable error occurred while the slave was attempting to perform the requested action.

Available Modbus Function Codes

The table below describes implemented MODBUS functions:

Code	Original Modbus Function
03H	Read Holding Registers
10H	Write Multiple Registers

Modbus Data Formats

16 bit Integer Values

Values are stored in big-endian order per the MODBUS specification and consist of a single register. All integer values are documented a signed or unsigned. All signed values are represented using two's-compliment.

Modbus Register	1															
Byte	0								1							
Bits	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

String Values

Store variable length string values in a fixed size register range using a NULL (0 value) to terminate or pad the string. For example, up to 16 characters can be stored in 8 contiguous registers as follows

EX : "EXAMPLE STRING!"

Modbus Register	1		2		3		4		5		6		7		8	
Byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Character	E	X	A	M	P	L	E	spc	S	T	R	I	N	G	!	NULL

NOT_IMPLEMENTED value: all registers filled with NULL or 0x0000.

Communication Example

The following tables contain the general command descriptions and example with Modbus RTU framing.

Query:

Function code	Address of first word to read		word count	
1 byte	High byte	Low byte	High byte	Low byte

Answer:

Function code	Byte count	Bytes with contents of “n” words
1 byte	1 byte	n * 2 bytes

Systems Modbus Register Map

Holding Registers (Function Code 03h)

Address (Hex)	Address (Dec)	Parameter	Format	Units/Scale	Description
0	0	Bypass voltage Phase A	0.1V	Uint16	Used for compatibility
1	1	Bypass voltage Phase A	0.1V	Uint16	
2	2	Bypass voltage Phase B	0.1V	Uint16	
3	3	Bypass voltage Phase C	0.1V	Uint16	
4	4	Bypass current Phase A	0.1A	Uint16	
5	5	Bypass current Phase B	0.1A	Uint16	
6	6	Bypass current Phase C	0.1A	Uint16	
7	7	Bypass frequency Phase A	0.01Hz	Uint16	
8	8	Bypass frequency Phase B	0.01Hz	Uint16	
9	9	Bypass frequency Phase C	0.01Hz	Uint16	

A	10	Bypass PF Phase A	0.01	Uint16	
B	11	Bypass PF Phase B	0.01	Uint16	
C	12	Bypass PF Phase C	0.01	Uint16	
D	13	Input voltage Phase A	0.1V	Uint16	
E	14	Input voltage Phase B	0.1V	Uint16	
F	15	Input voltage Phase C	0.1V	Uint16	
10	16	Input current Phase A	0.1A	Uint16	
11	17	Input current Phase B	0.1A	Uint16	
12	18	Input current Phase C	0.1A	Uint16	
13	19	Input frequency Phase A	0.01Hz	Uint16	
14	20	Input frequency Phase B	0.01Hz	Uint16	
15	21	Input frequency Phase C	0.01Hz	Uint16	
16	22	Input PF Phase A	0.01	Uint16	
17	23	Input PF Phase B	0.01	Uint16	
18	24	Input PF Phase C	0.01	Uint16	
19	25	Output voltage Phase A	0.1V	Uint16	
1A	26	Output voltage Phase B	0.1V	Uint16	
1B	27	Output voltage Phase C	0.1V	Uint16	
1C	28	Output current Phase A	0.1A	Uint16	
1D	29	Output current Phase B	0.1A	Uint16	
1E	30	Output current Phase C	0.1A	Uint16	

1F	31	Output frequency Phase A	0.01Hz	Uint16	
20	32	Output frequency Phase B	0.01Hz	Uint16	
21	33	Output frequency Phase C	0.01Hz	Uint16	
22	34	Output PF Phase A	0.01	Uint16	
23	35	Output PF Phase B	0.01	Uint16	
24	36	Output PF Phase C	0.01	Uint16	
25	37	Output apparent power Phase A	0.1kVA	Uint16	
26	38	Output apparent power Phase B	0.1kVA	Uint16	
27	39	Output apparent power Phase C	0.1kVA	Uint16	
28	40	Output active power Phase A	0.1kW	Uint16	
29	41	Output active power Phase B	0.1kW	Uint16	
2A	42	Output active power Phase C	0.1kW	Uint16	
2B	43	Output reactive power Phase A	0.1kVar	Uint16	
2C	44	Output reactive power Phase B	0.1kVar	Uint16	
2D	45	Output reactive power Phase C	0.1kVar	Uint16	
2E	46	Load percent Phase A	0.1%	Uint16	
2F	47	Load percent Phase B	0.1%	Uint16	
30	48	Load percent Phase C	0.1%	Uint16	
31	49	Environment temperature	1°C	Uint16	
32	50	Battery voltage positive	0.1V	Uint16	Battery current: Charge>0,

33	51	Battery voltage negative	0.1V	Uint16	Discharge<0
34	52	Battery current positive	0.1A	Int16	
35	53	Battery current negative	0.1A	Int16	
36	54	Battery temperature	0.1°C	Uint16	
37	55	Battery remain time	1min	Uint16	
38	56	Battery capacity	1%	Uint16	
39~50	57~80	Reserved			
51	81	Load On Source		Uint16	0: None 1: UPS Supply 2: Bypass Supply
52	82	Battery Status		Uint16	0: Not Work 1: Float Charge 2: Boost Charge 3: Discharge
53	83	Battery Connect Status		Uint16	0: Not Connect, 1: Connect
54	84	Reserved			
55	85	EPO		Uint16	0: None, 1: EPO
56	86	Invertor Ready Capacity		Uint16	0: Enough, 1: Not Enough
57	87	Generator Input		Uint16	0: Disconnect, 1: Connected
58	88	Input Fail		Uint16	0: Normal, 1: Abnormal
59	89	Bypass Sequence Fail		Uint16	0: Normal, 1: Abnormal
5A	90	Bypass Voltage Fail		Uint16	0: Normal, 1: Abnormal
5B	91	Bypass Fail		Uint16	0: Normal, 1: Abnormal
5C	92	Bypass Over Load		Uint16	0: No, 1: Yes
5D	93	Bypass Over Load Timeout		Uint16	0: No, 1: Yes

5E	94	Bypass Untrack		Uint16	0: No, 1: Yes
5F	95	Reserved			
60	96	Output Shorted		Uint16	0: No, 1: Yes
61	97	Battery EOD		Uint16	0: No, 1: Yes
62	98	Reserved			
63	99	Battery Test Result		Uint16	0: No Test 1: Test Success 2: Test Fail 3: Testing
64	100	Reserved			
65	101	Battery Maintain Result		Uint16	0: No Maintain 1: Maintain success 2: Maintain Fail 3: Maintaining
66~ 69	102~ 105	Reserved			
6A	106	Manual Tx Bypass		Uint16	0: No, 1: Yes
6B	107	Battery Volt Low		Uint16	0: No, 1: Yes
6C~ 6F	108~ 111	Reserved			
70	112	Lost N+X Redundant		Uint16	0: No Lost, 1: Lost
71~ 73	113~ 115	Reserved			
74	116	Sensor status		Uint16	Corresponding bit is 1 indicate the sensor is disconnected, 0 means it is connected. Bit0: Battery temperature sensor Bit1: Environment temperature sensor Bit2-Bit15: Reserved
75~ 76	117~ 118	Reserved			

77	119	First Module Online Flag Bit		Uint16	Bit15: Module 32 Bit14: Module 31 Bit0: Module 17 Corresponding bit is 1 means the module on, 0 means the module off
78	120	Second Module Online Flag Bit		Uint16	Bit15: Module 16 Bit14: Module 15 Bit0: Module 1 Corresponding bit is 1 means the module on, 0 means the module off
79~F0	121~240	Reserved			
12D	301	Operation Mode		Uint16	1: Single 2: Parallel 4: Single ECO 6: Parallel ECO
12E~136	302~310	Reserved			
137	311	Battery Quantity in a String	1	Uint16	
138~141	312~321	Reserved	1	Uint16	
142	322	UPS Max Capacity	1kVA	Uint16	
143~146	323~326	Reserved			
147	327	Output Voltage	1V	Uint16	
148	328	Output Frequency	1Hz	Uint16	
149~1AA	329~426	Reserved			
1AB~1B7	427~439	UPS Model Name	ASCII	Uint16	
7D0h / 2000d~ Module Data					
7D0	2000	Current Module Number	1	Uint16	Record the module data from which module

7D1	2001	Main Input Voltage Phase A	0.1V	Uint16	
7D2	2002	Main Input Voltage Phase B	0.1V	Uint16	
7D3	2003	Main Input Voltage Phase C	0.1V	Uint16	
7D4	2004	Main Input Current Phase A	0.1A	Uint16	
7D5	2005	Main Input Current Phase B	0.1A	Uint16	
7D6	2006	Main Input Current Phase C	0.1A	Uint16	
7D7	2007	Main Input Frequency Phase A	0.01Hz	Uint16	
7D8	2008	Main Input Frequency Phase B	0.01Hz	Uint16	
7D9	2009	Main Input Frequency Phase C	0.01Hz	Uint16	
7DA	2010	Input PF Phase A	0.01	Uint16	
7DB	2011	Input PF Phase B	0.01	Uint16	
7DC	2012	Input PF Phase C	0.01	Uint16	
7DD	2013	Reserved			
7DE	2014	Reserved			
7DF	2015	Positive Battery String Voltage	0.1V	Uint16	
7E0	2016	Negative Battery String Voltage	0.1V	Uint16	
7E1	2017	Reserved			
7E2	2018	Reserved			
7E3	2019	Positive Charger Current	0.1A	Uint16	
7E4	2020	Negative Charger Current	0.1A	Uint16	
7E5	2021	Positive Discharge Current	0.1A	Uint16	

7E6	2022	Negative Discharge Current	0.1A	Uint16	
7E7	2023	Reserved			
7E8	2024	Reserved			
7E9	2025	Reserved			
7EA	2026	Output Current Phase A	0.1V	Uint16	
7EB	2027	Output Current Phase B	0.1V	Uint16	
7EC	2028	Output Current Phase C	0.1V	Uint16	
7ED	2029	Output Frequency Phase A	0.01A	Uint16	
7EE	2030	Output Frequency Phase B	0.01A	Uint16	
7EF	2031	Output Frequency Phase C	0.01A	Uint16	
7F0	2032	Output PF Phase A	0.01	Uint16	
7F1	2033	Output PF Phase B	0.01	Uint16	
7F2	2034	Output PF Phase C	0.01	Uint16	
7F3	2035	Output Voltage Phase A	0.1V	Uint16	
7F4	2036	Output Voltage Phase B	0.1V	Uint16	
7F5	2037	Output Voltage Phase C	0.1V	Uint16	
7F6	2038	Bypass Voltage Phase A	0.1V	Uint16	
7F7	2039	Bypass Voltage Phase B	0.1V	Uint16	
7F8	2040	Bypass Voltage Phase C	0.1V	Uint16	

7F9	2041	Output Apparent Power Phase A	0.1kVA	Uint16	
7FA	2042	Output Apparent Power Phase B	0.1kVA	Uint16	
7FB	2043	Output Apparent Power Phase C	0.1kVA	Uint16	
7FC	2044	Output Active Power Phase A	0.1kW	Uint16	
7FD	2045	Output Active Power Phase B	0.1kW	Uint16	
7FE	2046	Output Active Power Phase C	0.1kW	Uint16	
7FF	2047	Output Reactive Power Phase A	0.1kVar	Uint16	
800	2048	Output Reactive Power Phase B	0.1kVar	Uint16	
801	2049	Output Reactive Power Phase C	0.1kVar	Uint16	
802	2050	Output Load Percentage Phase A	0.1%	Uint16	
803	2051	Output Load Percentage Phase B	0.1%	Uint16	
804	2052	Output Load Percentage Phase C	0.1%	Uint16	
805~ 868	2053~ 2152	Reserved			
BB8h / 3000d~ Module Status Data					
BB8~ BFE	3000~ 3070	Reserved			

BFF	3071	Module 1 Comprehensive Alarm		Uint16	<p>Bit0: Rectifier Fail</p> <p>Bit1: Invertor Fail</p> <p>Bit2: Rectifier Over Temperature</p> <p>Bit3: Fan Fail</p> <p>Bit4: Over Load</p> <p>Bit5: Over Load Timeout</p> <p>Bit6: Invertor Over Temperature</p> <p>Bit7: Invertor Protect</p> <p>Bit8: Manual Shutdown</p> <p>Bit9: Reserved</p> <p>Bit10: Reserved</p> <p>Bit11: Reserved</p> <p>Bit12: Reserved</p> <p>Bit13: Reserved</p> <p>Bit14: Reserved</p> <p>Bit15: Reserved</p>
C00	3072	Module 1 Comprehensive Alarm		Uint16	<p>Bit0: Invertor Bridge Fail</p> <p>Bit1: Reserved</p> <p>Bit2: Reserved</p> <p>Bit3: Reserved</p> <p>Bit4: Rectifier Soft Start Fail</p> <p>Bit5: Invertor Relay Connect Fail</p> <p>Bit6: Invertor Relay Short Circuit</p> <p>Bit7: Reserved</p> <p>Bit8: Reserved</p> <p>Bit9: Reserved</p> <p>Bit10: Reserved</p> <p>Bit11: Reserved</p> <p>Bit12: Reserved</p> <p>Bit13: Fan Expired</p> <p>Bit14: Reserved</p> <p>Bit15: Reserved</p>

C01	3073	Module 1 Comprehensive Alarm		Uint16	Reserved
C02	3074	Module 1 Comprehensive Alarm		Uint16	Reserved
C03~ C06	3075~ 3078	Module 2 Comprehensive Alarm		Uint16	Refer to 3071-3074
C07~ C72	3079~ 3186	Module 3~29 Comprehensive Alarm		Uint16	Refer to 3071-3074
C73~ C76	3187~ 3190	Module 30 Comprehensive Alarm		Uint16	Refer to 3071-3074



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