

## Remote Management Card

### RMCARD205

## Modbus TCP Register Map

*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 firmware version 1.3.7 and above. 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 as signed or unsigned. All signed values are represented using two's-complement.

| 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                    |
|---------------|---------------|------------------------------------------------------|--------|--------------|--------------------------------|
| 2000          | 8192          | Hardware fault happen                                |        | Uint16       | 1:Yes. 0:No                    |
| 2001          | 8193          | reserved                                             |        | Uint16       |                                |
| 2002          | 8194          | reserved                                             |        | Uint16       |                                |
| 2003          | 8195          | Battery-test Last Result                             |        | Uint16       | 0: Pass, 1: Fail, 2:processing |
| 2004          | 8196          | reserved                                             |        | Uint16       |                                |
| 2005          | 8197          | Battery capacity is lower than Low Battery Threshold |        | Uint16       | 1:Yes. 0:No                    |
| 2006          | 8198          | Utility power status                                 |        | Uint16       | 1:Failure, 0:Normal            |
| 2007          | 8199          | Utility voltage out of range                         |        | Uint16       | 1:Yes. 0:No                    |
| 2008          | 8200          | Utility frequency out of range                       |        | Uint16       | 1:Yes. 0:No                    |
| 2009          | 8201          | Inverter is off                                      |        | Uint16       | 1:Yes. 0:No                    |
| 200A~200D     | 8202~8205     | reserved                                             |        | Uint16       |                                |

|               |                 |                                                               |         |        |                                                                                                                               |
|---------------|-----------------|---------------------------------------------------------------|---------|--------|-------------------------------------------------------------------------------------------------------------------------------|
| 200E          | 8206            | battery not present                                           |         | Uint16 | 1:Yes. 0:No                                                                                                                   |
| 200F~<br>2010 | 8207~<br>8208   | reserved                                                      |         | Uint16 |                                                                                                                               |
| 2011          | 8209            | Battery is discharging                                        |         | Uint16 | 1:Yes. 0:No                                                                                                                   |
| 2012          | 8210            | Battery is charging                                           |         | Uint16 | 1:Yes. 0:No                                                                                                                   |
| 2013          | 8211            | reserved                                                      |         | Uint16 |                                                                                                                               |
| 2014          | 8212            | Battery is fully charged                                      |         | Uint16 | 1:Yes. 0:No                                                                                                                   |
| 2015~<br>201F | 8213~<br>8223   | reserved                                                      |         | Uint16 |                                                                                                                               |
| 2020          | 8224            | Buzzer is muted at present                                    |         | Uint16 | 1:Yes. 0:No                                                                                                                   |
| 2021          | 8225            | Remaining Runtime is lower than Low Battery Runtime Threshold |         | Uint16 | 1:Yes. 0:No                                                                                                                   |
| 2022          | 8226            | No output                                                     |         | Uint16 | 1:Yes. 0:No                                                                                                                   |
| 2023~<br>2229 | 8227~<br>12287  | Reserved                                                      |         |        |                                                                                                                               |
| 229C          | 8860            | Over Temperature                                              |         | Uint16 | 1:Yes. 0:No                                                                                                                   |
| 3000          | 12288           | Utility voltage                                               | 0.1V    | Uint16 |                                                                                                                               |
| 3001          | 12289           | Utility frequency                                             | 0.1Hz   | Uint16 |                                                                                                                               |
| 3002~<br>301F | 12290~<br>12319 | Reserved                                                      |         | Uint16 |                                                                                                                               |
| 3020          | 12320           | Output voltage                                                | 0.1V    | Uint16 |                                                                                                                               |
| 3021~<br>3026 | 12321~<br>12326 | Reserved                                                      |         | Uint16 |                                                                                                                               |
| 3027          | 12327           | Output load percent                                           | 1%      | Uint16 |                                                                                                                               |
| 3028~<br>3081 | 12328~<br>12417 | Reserved                                                      |         | Uint16 |                                                                                                                               |
| 3082          | 12418           | Battery capacity                                              | 1%      | Uint16 |                                                                                                                               |
| 3083          | 12419           | Remaining Runtime.LowWord                                     | 0.1min. | Uint16 | If Remaining Runtime.HighWord=2. Remaining Runtime.LowWord=18 then Remaining Runtime=(HighWord*65536+LowWord)*0.1min=13109min |
| 3084          | 12420           | Remaining Runtime.HighWord                                    | 0.1min. | Uint16 |                                                                                                                               |

|               |                 |                   |       |        |  |
|---------------|-----------------|-------------------|-------|--------|--|
| 3085~<br>3092 | 12421~<br>12434 | Reserved          |       | Uint16 |  |
| 3093          | 12435           | battery threshold | 1%    | Uint16 |  |
| 3094          | 12436           | Runtime threshold | 1sec  | Uint16 |  |
| 3085~<br>30B6 | 12421~<br>12470 | Reserved          |       | Uint16 |  |
| 30B7~<br>30C0 | 12471~<br>12480 | UPS Model name    | ASCII | Uint16 |  |
| 30C1          | 12481           | Reserved          |       | Uint16 |  |
| 30C5          | 12485           | Reserved          |       | Uint16 |  |
| 30C6~<br>30CB | 12486~<br>12491 | UPS version       | ASCII | Uint16 |  |
| 30CC~<br>30DB | 12492~<br>12507 | Reserved          |       | Uint16 |  |
| 30DC~<br>30E7 | 12508~<br>12519 | Company name      | ASCII | Uint16 |  |

## Write Multiple Registers (Function Code 10h)

| Address<br>(Hex) | Address<br>(Dec) | Parameter                              | Format | Units<br>/Scale | Description                                                                                                            |
|------------------|------------------|----------------------------------------|--------|-----------------|------------------------------------------------------------------------------------------------------------------------|
| 4022             | 16418            | setup Low Battery<br>Threshold         | 1%     | Uint16          | Accept value 10、<br>20...80、90 only.<br>(depending on UPS<br>model)                                                    |
| 4023~<br>40F3    | 16419~<br>16627  | Reserved                               |        |                 |                                                                                                                        |
| 40F4             | 16628            | setup Low Battery<br>Runtime threshold | 1sec   | Uint16          | Amount of time the UPS<br>threshold value of<br>remaining runtime<br>critical low.<br>Max time : 30 min                |
| 40F5~<br>416F    | 16629~<br>16751  | Reserved                               |        |                 |                                                                                                                        |
| 4170             | 16752            | Time to execute a<br>battery test.     | 0.1min | Uint16          | Amount of time the UPS<br>Battery Test Duration.<br>Max time : 10 min<br><br><b>Note.</b><br>If duration >= 1 min then |

|      |       |                              |        |        |                                                                               |
|------|-------|------------------------------|--------|--------|-------------------------------------------------------------------------------|
|      |       |                              |        |        | only accept multiples of 10.                                                  |
| 4171 | 16753 | Reserved                     |        | Uint16 |                                                                               |
| 4172 | 16754 | Reserved                     |        | Uint16 |                                                                               |
| 4177 | 16759 | Reserved                     |        | Uint16 |                                                                               |
| 4178 | 16760 | Time to enter sleep mode.    | 0.1min | Uint16 | Amount of time the UPS waits before it enter sleep mode.<br>Max time : 10 min |
| 4179 | 16761 | Reserved                     |        | Uint16 |                                                                               |
| 417A | 16762 | Reserved                     |        | Uint16 |                                                                               |
| 417F | 16767 | Reserved                     |        | Uint16 |                                                                               |
| 4180 | 16768 | Time to enter shutdown mode. | 0.1min | Uint16 | Amount of time the UPS waits before it shutdown.<br>Max time : 10 min         |
| 4181 | 16769 | Reserved                     |        | Uint16 |                                                                               |
| 4182 | 16770 | Reserved                     |        | Uint16 |                                                                               |
| 4187 | 16775 | Reserved                     |        | Uint16 |                                                                               |
| 4188 | 16776 | Time to restore output.      | 0.1min | Uint16 | Amount of time the UPS waits before it restores.<br>Max time : 10 min         |
| 4189 | 16777 | Reserved                     |        | Uint16 |                                                                               |



# CyberPower

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