**6.1. Protocol (operation mode 0)**

All commands and responses are 9 bytes in size. Most of the commands have a response, but some -- don't. Response contains command code, both command and response contain checksum value.

Command format: 0xFF, 0x01, CMD, (5 bytes of parameters), CKSUM

Response format: 0xFF, CMD, (6 bytes of response), CKSUM

For short, hereinafter this response will be called "ACK": 0xFF, CMD, **0x01**, 0x00, 0x00, 0x00, 0x00, 0x00, CKSUM

In the following table in Request and Response fields only the meaningful bytes will be shown. For example, b[3] is the first parameter byte and b[3..4] is the first two parameter bytes forming a word. "???" means "isn't investigated yet", an empty field means "no parameters".

|  |  |  |  |
| --- | --- | --- | --- |
| **Command** | **Request** | **Response** | **Description** |
| 0x78 | b[3] | no response | Changes operation mode and performs MCU reset |
| 0x79 | b[3] | ACK | Turns ABC logic on or off (b[3] == 0xA0 - on, 0x00 - off) |
| 0x7D |  | r[7] | Returns ABC logic status (1 - enabled, 0 - disabled) |
| 0x7E | b[3], b[4..5] | r[2..3] | Sets timer cycle length (b[4..5]) in seconds and returns current value. b[3] should be 2 to update the length |
| 0x80..0x83 | b[3], b[4..7] | no response | Writes one double word to the 1024-byte configuration area (offset = b[3] + (CMD - 0x80) \* 256).  Command 0x80 with b[3]==0 clears the whole configuration area. On timeout this configuration area will be written to flash. |
| 0x84 |  | r[2..3], r[4..5], r[6..7] | Returns "raw" values. r[2..3] is a half of the raw light sensor value. r[4..5] is constant 32000.  r[6..7] is different in different versions of firmware: bit field or maximum light ADC value |
| 0x85 |  | r[2..3], r[4..5], r[6..7] | Returns "raw" values. b[2..3] is smoothed temperature ADC value. b[4..5] is CO2 level before clamping.  b[6..7] is minimum light ADC value |
| 0x86 |  | r[2..3], r[4], r[5], r[6], r[7] | r[2..3] - "final" CO2 level. r[4] - (temperature in C) + 40  r[6] and r[7] - if ABC turned on - counter in "ticks" within a calibration cycle and the number of performed calibration cycles. |
| 0x87 | b[5], b[6], b[7] | r[2], r[3..6] | ??? |
| 0x88 | b[3..4] | r[2..3]=b[3..4] | ??? |
| 0x8D |  | no response | MCU reset |
| 0x90..0x93 | b[3] | r[2..5] | Reads a double word from configuration area by offset (b[3] + (CMD - 0x90) \* 256) |
| 0x94 | b[3], b[4..6] | r[2..6] | Changes 3 bytes (b[4..6]) of "id string" with offset (3\*(b[3] - 1)) |
| 0x95 | b[3] | r[2], r[3], r[4..6] | Reads 3 bytes of "id string" (b[4..6]) with offset |
| 0x99 | b[4..7] | ACK | Sets sensor range. Note that parameter bytes differ from those in the datasheet. |
| 0x9A | b[4] | ACK | ??? |
| 0x9B |  | r[2..5], r[6], r[7] | Returns sensor range (r[2..5]) |
| 0x9C |  | r[2..5], r[6]=1 | ??? |
| 0x9F | b[3] | ACK | ??? |
| 0xA0 |  | r[2..5] | Firmware version string? "0430" and "0443" observed |
| 0xA1 | b[3] | ACK | ??? |
| 0xA2 | b[3] | r[2], r[3..6] | ??? |
| 0xA3 |  | r[2..3] | ??? |
| 0xA4 | b[3..4], b[5..6] | r[2] | Setting bounds for DAC output, r[2]==1 on success |
| 0xA5 |  | r[2..3], r[4..5] | Reading bounds for DAC output |
| 0xAA | b[3], b[4] | r[2], r[3] | ??? |
| 0xAB | b[3], b[4] | r[2], r[3] | ??? |
| 0xAC | b[3] | r[2], r[3..6] | ??? |