

# ClientAPI

## Protocol Description

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# 1. Preface

ClientAPI uses a request-reply oriented binary protocol. Each command ( request ) is represented as series of bytes.

Each command should have at least single byte: The command identifier.

Depending on command type, there can also be several additional bytes as parameters.

The reply also presented as series of bytes. The first byte is always contains the command identifier. The last byte represents the checksum (CRC8) value of whole reply.

The normal command execution flow is:

- ClientAPI client sends the command byte (and any additional parameters)
- Client waits for reply from server ( typically the microcontroller board )
- Server sends reply
- ClientAPI checks that the number of received bytes is exactly as expected (see command description for information about reply for each command)
- ClientAPI checks that the first byte of reply has the same command identifier that was in original request
- ClientAPI checks that CRC8 checksum of received bytes (excluding the last one) matches the CRC8 value stored in last byte of response.

## **2. Command Set**

ClientAPI supports following commands:

**READ ANALOG CHANNEL**

**WRITE PORT**

**READ PORT**

**SET BIT**

**CLR BIT**

These commands are described in more detail below.

## 2.1 READ ANALOG CHANNEL

This command returns the current analog (ADC) value of specified ADC channel.

### Request Format

Byte #	Value	Description
1	0x01	ID of command
2		Device Type – one from predefined device types
3	[0..11]	Channel Number. Allowed values are from 0 to 11
4		CRC8

### Reply Format

Byte #	Value	Description
1	0x01	ID of command
2		0 is success. Any other value for error.
3	Low byte	Low byte of ADC value
4	High byte	High byte of ADC value
5	CRC	CRC8

### Example of request:

0x01 0x08 0x00 0x09

0x01 – Command ID  
0x08 – ID of device ( for example TLC2543 ADC )  
0x00 – Channel #0  
0x09 – CRC8 of command

### Example of reply:

0x01 0x00 0x10 0x01 0x0x12

0x01 – ID of command  
0x00 – status is SUCCESS  
0x10 – low byte of ADC value  
0x01 – high byte of ADC value  
0x12 – CRC8 of response

ADC value is: 0x0110

CRC calculated as:  $(0x01 + 0x00 + 0x10 + 0x01) \text{ AND } 0xFF = 0x12$

### List of available Device Types

Device Name	ID
TLC2543	0x08

## 2.2 WRITE PORT

Write value to IO port

### Request Format

Byte #	Value	Description
1	0x04	ID of command
2		Device Type – one from predefined device types
3	[0..3]	Port Number. Allowed values are from 0 to 3
4		Value
5		CRC8

### Reply Format

Byte #	Value	Description
1	0x04	ID of command
2	Status	0 is success. Any other value for error.
3	CRC	CRC8

### Example of request:

0x04 0x06 0x00 0x03 0x0D

0x04 – ID of command  
0x06 – ID of 8051 device  
0x00 – Port number (PORT0)  
0x03 – new port value  
0x0D – CRC of response

CRC calculated as:  $(0x04 + 0x06 + 0x00 + 0x03) \text{ AND } 0xFF = 0x0D$

### Example of reply:

0x04 0x00 0x04

0x04 – ID of command  
0x00 – status is SUCCESS  
0x04 – CRC8 of response

CRC calculated as:  $(0x04 + 0x00) \text{ AND } 0xFF = 0x04$

### List of available Device Types

Device Name	ID
8051	0x06

## 2.3 READ PORT

Reads current value from specified port.

### Request Format

Byte #	Value	Description
1	0x03	ID of command
2		Device Type – one from predefined device types
3	[0..3]	Port Number. Allowed values are from 0 to 3
4		CRC8

### Reply Format

Byte #	Value	Description
1	0x03	ID of command
2	Status	0 is success. Any other value for error.
3		Current value of port
4	CRC	CRC8

### Example of request:

0x03 0x06 0x01 0x0A

0x03 – ID of command  
0x06 – ID of 8051 device  
0x01 – Port number (PORT1)  
0x0A – CRC of response

CRC calculated as:  $(0x03 + 0x06 + 0x01) \text{ AND } 0xFF = 0x0A$

### Example of reply:

0x03 0x00 0xA1 0xA4

0x03 – ID of command  
0x00 – status is SUCCESS  
0xA1 – current port value  
0xA4 – CRC8 of response

CRC calculated as:  $(0x03 + 0x00 + 0xA1) \text{ AND } 0xFF = 0xA4$

### List of available Device Types

Device Name	ID
8051	0x06



## 2.4 SET BIT

Sets single bit in specified port.

### Request Format

Byte #	Value	Description
1	0x07	ID of command
2		Device Type – one from predefined device types
3	[0..3]	Port Number. Allowed values are from 0 to 3
4	[0..7]	Bit number
5		CRC8

### Reply Format

Byte #	Value	Description
1	0x07	ID of command
2	Status	0 is success. Any other value for error.
3	CRC	CRC8

### Example of request:

0x07 0x06 0x00 0x03 0x0D

0x07 – ID of command  
0x06 – ID of 8051 device  
0x00 – Port Number (PORT0)  
0x03 – Bit number  
0x10 – CRC of response

CRC calculated as:  $(0x07 + 0x06 + 0x00 + 0x03) \text{ AND } 0xFF = 0x10$

### Example of reply:

0x07 0x00 0x07

0x07 – ID of command  
0x00 – status is SUCCESS  
0x07 – CRC8 of response

CRC calculated as:  $(0x07 + 0x00) \text{ AND } 0xFF = 0x07$

### List of available Device Types

Device Name	ID
8051	0x06

## 2.5 CLR BIT

Clears single bit in specified port.

### Request Format

Byte #	Value	Description
1	0x08	ID of command
2		Device Type – one from predefined device types
3	[0..3]	Port Number. Allowed values are from 0 to 3
4	[0..7]	Bit number
5		CRC8

### Reply Format

Byte #	Value	Description
1	0x08	ID of command
2	Status	0 is success. Any other value for error.
3	CRC	CRC8

### Example of request:

0x08 0x06 0x00 0x03 0x0D

0x08 – ID of command  
0x06 – ID of 8051 device  
0x00 – Port Number (PORT0)  
0x03 – Bit number  
0x10 – CRC of response

CRC calculated as:  $(0x08 + 0x06 + 0x00 + 0x03) \text{ AND } 0xFF = 0x11$

### Example of reply:

0x08 0x00 0x08

0x08 – ID of command  
0x00 – status is SUCCESS  
0x08 – CRC8 of response

CRC calculated as:  $(0x08 + 0x00) \text{ AND } 0xFF = 0x08$

### List of available Device Types

Device Name	ID
8051	0x06