STM Implement Communication Protocol

The STM communication protocol defines the structure of messages exchanged with the microcontroller.

Command list

Start

Selected in main menu. Starts the game, generates the layout and all tiles. Starts timer from 0:00:00

PC -> STM

CMD	DATA	CRC
0x00	0xFF	XOR

STM -> PC

CMD	DATA	CRC
0x00	0xFF	XOR

Reset

Selected in-game, generates new layout. Starts timer from 0:00:00

PC -> STM

CMD	DATA	CRC
0x01	0xFF	XOR

STM -> PC

CMD	DATA	CRC
0x01	0xFF	XOR

Shuffle

Shuffles existing tiles, not changing the current layout itself. Can be used 5 times per game, before getting blocked.

PC -> STM

CMD	DATA	CRC
0x02	0x0A	XOR

STM -> PC

CMD	DATA	CRC
0x02	0x0A	XOR

Select

Selects one tile.

PC -> STM

CMD	DATA	CRC
0x03	0x0A	XOR

STM -> PC

CMD	DATA	CRC
0x03	0x01	XOR

Match

Selects other tile, comparing them between each other

PC -> STM

CMD	DATA	CRC
0x04	0x0A	XOR

STM -> PC

CMD	DATA	CRC
0x04	0x01	XOR

Set difficulty

Sets game difficulty in main menu.

PC -> STM

CMD	DATA	CRC
0x05	0x02	XOR

STM -> PC

CMD	DATA	CRC
0x05	0x	XOR

Get State

Gets game state (WIN, LOSE, OUT OF MOVES, RUNNING)

PC -> STM

CMD	DATA	CRC
0x06	0x0A	XOR

STM -> PC

CMD	DATA	CRC
0x06	0xFF	XOR

Set State

Sets in-game state, following set of conditions

PC -> STM

CMD	DATA	CRC
0x07	0xFF	XOR

STM -> PC

CMD	DATA	CRC
0x07	0x0A	XOR

Checksum calculation

Calculation: CRC = CMD ⊕ DATA[0] ⊕ DATA[1] ⊕ DATA[2] ⊕ ...

XOR truth table:

A	B	A ⊕ B
0	0	0
0	1	1
1	0	1
1	1	0

If the CRC verification fails, the message must be discarded and an error response should be returned.