

# USB Interface

## Connection parameter

USB serial interface (COM Port)

- Baud rate: 57600
- Parity: None
- Stop bits: 1

## Host -> HILMux

Send control command to HILmux via USB serial interface.

### Syntax

Request:

<HEADER> <CMD>

Response:

<HEADER> <STATUS>

Header: ASCII "HMUX" => 0x48 0x4d 0x55 0x58

CMD:

- CMD\_SET\_U1\_MODE = 0x00
- CMD\_SET\_U2\_MODE = 0x01
- CMD\_SET\_LOCK\_MODE = 0x02
- CMD\_GET\_U1\_MODE = 0x03
- CMD\_GET\_U2\_MODE = 0x04
- CMD\_GET\_LOCK\_MODE = 0x05
- CMD\_GET\_ALIVE\_FACTORY\_SETTING = 0x06
- CMD\_ENTER\_BOOTLOADER = 0x07
- CMD\_LAST\_ELEMENT = 0x08
- CMD\_BOOTLOADER\_ENTER\_LOADER = 0xFF

STATUS:

- UC\_STATE\_DISCONNECTED = 0x00
- UC\_STATE\_XETK = 0x01
- UC\_STATE\_LB = 0x02
- UC\_STATE\_INVALID = 0x03

examples set UC1 modes:

- CMD\_SET\_U1\_MODE UC\_STATE\_XETK: 0x48 0x4d 0x55 0x58 0x00 0x01 => 48 4d 55 58 00 01
- CMD\_SET\_U1\_MODE UC\_STATE\_LB: 0x48 0x4d 0x55 0x58 0x00 - 0x02 => 48 4d 55 58 00 02
- CMD\_SET\_U1\_MODE UC\_STATE\_DISCONNECTED: 0x48 0x4d 0x55 0x58 0x00 0x00 => 48 4d 55 58 00 00

examples set UC2 modes:

- CMD\_SET\_U2\_MODE UC\_STATE\_XETK: 0x48 0x4d 0x55 0x58 0x01 0x01 => 48 4d 55 58 01 01
- CMD\_SET\_U2\_MODE UC\_STATE\_LB: 0x48 0x4d 0x55 0x58 0x01 0x02 => 48 4d 55 58 01 02
- CMD\_SET\_U2\_MODE UC\_STATE\_DISCONNECTED: 0x48 0x4d 0x55 0x58 0x01 0x00 => 48 4d 55 58 01 00

examples set lock states:

- CMD\_SET\_LOCK\_MODE LOCK\_STATE\_UNLOCKED: 0x48 0x4d 0x55 0x58 0x02 0x00 => 48 4d 55 58 02 00
- CMD\_SET\_LOCK\_MODE LOCK\_STATE\_LOCKED: 0x48 0x4d 0x55 0x58 0x02 0x01 => 48 4d 55 58 02 01

## HILMux -> Host:

Receive status from HILmux via USB serial interface

Header: ASCII "HMUX" => 0x48 0x4d 0x55 0x58

enum STATUS:

- STATUS\_U1\_MODE = 0x00

- STATUS\_U2\_MODE = 0x01
- STATUS\_LOCK\_MODE = 0x02
- STATUS\_ALIVE\_FACTORY\_SETTING = 0x03
- STATUS\_LAST\_ELEMENT = 0x04
- STATUS\_BOOTLOADER\_ALIVE\_FACTORY\_SETTING = 0xFF

examples get UC1 modes:

- CMD\_SET\_U1\_MODE UC\_STATE\_XETK: 0x48 0x4d 0x55 0x58 0x00 0x01 => 48 4d 55 58 00 01
- CMD\_SET\_U1\_MODE UC\_STATE\_LB: 0x48 0x4d 0x55 0x58 0x00 - 0x02 => 48 4d 55 58 00 02
- CMD\_SET\_U1\_MODE UC\_STATE\_DISCONNECTED: 0x48 0x4d 0x55 0x58 0x00 0x00 => 48 4d 55 58 00 00

examples get UC2 modes:

- CMD\_SET\_U2\_MODE UC\_STATE\_XETK: 0x48 0x4d 0x55 0x58 0x01 0x01 => 48 4d 55 58 01 01
- CMD\_SET\_U2\_MODE UC\_STATE\_LB: 0x48 0x4d 0x55 0x58 0x01 0x02 => 48 4d 55 58 01 02
- CMD\_SET\_U2\_MODE UC\_STATE\_DISCONNECTED: 0x48 0x4d 0x55 0x58 0x06 0x00 => 48 4d 55 58 01 00

examples get lock states:

- CMD\_SET\_LOCK\_MODE LOCK\_STATE\_UNLOCKED: 0x48 0x4d 0x55 0x58 0x02 0x00 => 48 4d 55 58 02 00
- CMD\_SET\_LOCK\_MODE LOCK\_STATE\_LOCKED: 0x48 0x4d 0x55 0x58 0x02 0x01 => 48 4d 55 58 02 01

examples get serial number:

- CMD\_GET\_SERIAL\_NUMBER: 0x48 0x4d 0x55 0x58 0x06 => 48 4d 55 58 06

examples enter bootloader:

- CMD\_ENTER\_BOOTLOADER: 0x48 0x4d 0x55 0x58 0x07 => 48 4d 55 58 07

STATUS\_(BOOTLOADER\_)ALIVE\_FACTORY\_SETTING Data:

| Field                   | Type    | Comment                                                                              |
|-------------------------|---------|--------------------------------------------------------------------------------------|
| REVISION                | u8      | Currently only 0x01. Future revisions might have different data and size after this. |
| INVALID                 | u8      | 0xEE if it's a production unit. Anything else is a development unit (usually 0xDD).  |
| COMMIT_SHORT_SHA1       | 4 bytes | First 4 bytes of commit sha ([0][1][2][3] » e.g. 4c2c5654)                           |
| SERIAL_NUMBER           | 4 bytes | Serialnumber in hex (HILmux-[0][1][2][3] » e.g. HILmux-0A0BCCDD)                     |
| PRODUCTION_DATE.YEAR    | u16     | In little Endian. e.g. 2024                                                          |
| PRODUCTION_DATE.MONTH   | u8      | 1 to 12                                                                              |
| PRODUCTION_DATE.DAY     | u8      | 1 to 31                                                                              |
| PRODUCTION_TIME.HOUR    | u8      | 1 to 23                                                                              |
| PRODUCTION_TIME.MINUTE  | u8      | 1 to 59                                                                              |
| PRODUCTION_TIME.SECOND  | u8      | 1 to 59                                                                              |
| PRODUCTION_TIME.PADDING | 1 byte  | Not defined, but should be 0x00 in practice. Pads ProductionTime to 4 bytes.         |

Example:

- STATUS\_ALIVE\_FACTORY\_SETTING: 48 4D 55 58 03 01 ee f00dabfd 02020012 e807 05 01 17 30 32 00
  - => HMUX STATUS\_ALIVE\_FACTORY\_SETTING Rev1 Prod commit-f00dabfd HILmux-02020012 2024-05-01 23:48:50
- python3 -i hilmux\_proto.py : FactorySetting.decode(bytes.fromhex("01eef00dabfd02020012e807050117303200"))
  - => FactorySettingRev1(invalid=0xEE, git\_commit\_short=f00dabfd, serialnumber=02020012, production\_date=2024-05-01, production\_time=23:48:50)

Comments