Marionette DAQ Board Pin Assignments

Or

Why You Want This Orange and Why We Are Giving You This Banana

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Below are four options that our team has come up with after analyzing the reserved and alternate functions of the STM32F407i Arm Processor pins. The different mappings for these pins can be seen in Marionette Connections spreadsheet located on our capstone website (<https://github.com/jalcok1/capstone/blob/master/Marionette_connections.xlsx?raw=true>). Given the constraints and the requirements of our sponsors we are offering the following options:

* High Speed USB ULPI with SDIO
* High Speed USB ULPI without SDIO
* RMII Ethernet with SDIO
* RMII Ethernet without SDIO

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| --- | --- |
| High Speed USB ULPI With SDIO | |
| ADC | 15 |
| DAC | 1 |
| SPI | 1 |
| I2C | 3 |
| UART | 1 |
| CAN | 1 |
| GPIO | 74 |
| HS USB ULPI | 1 |
| FS USB | 1 |
| Ethernet | 0 |
| SDIO | 1 |

|  |  |
| --- | --- |
| High Speed USB ULPI Without SDIO | |
| ADC | 15 |
| DAC | 1 |
| SPI | 2 |
| I2C | 3 |
| UART | 2 |
| CAN | 1 |
| GPIO | 79 |
| HS USB ULPI | 1 |
| FS USB | 1 |
| Ethernet | 0 |
| SDIO | 0 |

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| --- | --- |
| RMII Ethernet With SDIO | |
| ADC | 18 |
| DAC | 2 |
| SPI | 2 |
| I2C | 3 |
| UART | 0 |
| CAN | 2 |
| GPIO | 71 |
| HS USB ULPI | 0 |
| FS USB | 1 |
| Ethernet | 1 |
| SDIO | 1 |

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| --- | --- |
| RMII Ethernet Without SDIO | |
| ADC | 18 |
| DAC | 2 |
| SPI | 2 |
| I2C | 3 |
| UART | 2 |
| CAN | 2 |
| GPIO | 77 |
| HS USB ULPI | 0 |
| FS USB | 1 |
| Ethernet | 1 |
| SDIO | 0 |

For both ULPI options, the ADC inputs are divided between 8 maximum inputs for ADC3 and 7 maximum inputs for ADC1 or ADC2. Two of the I2C use SMBus (SMBA pins) and one is without. This is standard for all four configurations. RMII Ethernet without SDIO does not offer any UARTs and does not meet marketing requirements. The RMII option without SDIO offers the maximum amount of I/Os requested.