Design manual

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## Flow chart

## Put here

## Data structure

Registers used

|  |  |  |
| --- | --- | --- |
| Name | Register | Description |
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|  |  |  |
| stepFlag | R12 | Flag to see config step currently at |
| passengers | R13 | Flag to stop the monorail at the next station |
| travelling | R15 | Flag to say monorail is moving |
| temp | R16 | Temporary register |
| keypad\_flag | R17 | Flag to see which letter set has been pressed |
| mask | R18 | Mask for column/row during scanning |
| temp2 | R19 | Temporary register |
| Row | R20 | Current row number |
| Col | R21 | Current column number |
| travellingCounter | R22 | Store the current station the monorail is up to |
| stationCount | R23 | Store total amount of stations |
| travelTime | R24 | Store the time to travel between two stations |
| stationTime | R25 | Stores the time to stop at each platform |
| XL | R26 | Pointer for temporary storage (low bit) |
| XH | R27 | Pointer for temporary storage (high bit) |
| YL | R28 | Pointer for travel time (low bit) |
| YH | R29 | Pointer for travel time (high bit) |
| ZL | R30 | Pointer for station names (low bit) |
| ZH | R31 | Pointer for station names (high bit) |

Addresses used

|  |  |  |
| --- | --- | --- |
| Name | Address | description |
| PORTLIDIR | 0xF0 | Use to set PL4-7 as output and PL0-3 as input |
| INITCOLMASK | 0xEF | Used to start scanning from left most column |
| INITROWMASK | 0x01 | Used to start scanning from top row |
| ROWMASK | 0x0F | Used to read the row bits |
| LCD\_RS | 7 | Different pins of the LCD |
| LCD\_E | 6 |
| LCD\_RW | 5 |
| LCD\_BE | 4 |
| HOB\_LABEL | 0b00100000 | High order bit for symbols |
| HOB\_NUM | 0b00110000 | High order bit for numbers |
| HOB\_CHAR | 0b01000000 | High order bit for characters |

Dram used

|  |  |  |  |
| --- | --- | --- | --- |
| name | bytes | location | description |
| Names | 10 | 0x00 | Dram to store the station names |
| travelTimes | 10 | 0x110 | Dram to store the time required to travel between two consecutive stations |
| datatemp | 10 | 0x130 | Temporary storage for storing variables |

## Functions