Monorail Emulator

User Manual

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# Set Up

## Board Wiring

|  |  |
| --- | --- |
| Connect | To |
| PE2 | Mot |
| PL0:PL3 | C0:C3 |
| PL4:PL7 | R0:R3 |
| D0:D3 | PF0:PF3 |
| BE:R5 | PA4:PA7 |
| B4:B7 | PF4:PF7 |
| PB0 | ROX3 |
| PB1 | ROX4 |
| LED8:LED9 | PL6:PL7 |

# Configuration

## Stage 1: Number of Stations

When the board plugged into power and initialised, it will ask for the number of stations to run the emulation with, with the message:

*“Enter max number of stations:”*

Using the keyboard attached, enter a number between one and ten (inclusive), followed by the hash (#) key (See appendix A). If a number outside of the required range is entered (or any other input) a corresponding error message will appear after the hash key is pressed. Following this the above message will repeat, asking for a number of stations.

## Stage 2: Naming of Stations

Once the system knows the number of stations it will ask for a name for each station with the message:

*“Please type the name of station ”*

Where is the number of the station to name (for each number between one and the number of stations, inclusive). Names of stations must consist of solely letters. While entered numbers will be mirrored on the LCD Display, they are not saved as part of the string and are purely user feedback.

### Entering Letters

In order to enter a letter multiple keys are required. Locate the numbered key which has the desired letter printed on the top, and note which number letter it is on the key (e.g. the key 5 has the letters ‘j’, ‘k’ and ‘l’ along the top, so ‘j’ is the first key on 5, ‘k’ is the second and ‘l’ is the third). When a numbered key is pressed, the corresponding number will appear on the LCD (Purely as user feedback). After this press either key ‘A’, ‘B’ or ‘C’ to indicate the first, second or third letter on the numbered key respectively. When the lettered key is pressed, the number which previously appeared on the LCD will be replaced by the correct letter.

If a mistake is made with input the star (\*) key can be used to remove the previous letter as many times as required.

To enter a space, press the ‘D’ key.

Again, use the hash key to indicate the end of input for each station name.

See Appendix B for example input.

## Stage 3: Entering Timings

After the final station name is entered the LCD will display the message:

*“Time from Station 1 to Station 2 is:”*

And will wait for input. Please enter a time in seconds between one and ten (inclusive) for the travelling time from Station one to Station 2, using the same input method as Stage 1. The system will then ask for travel times for all other stations, including from the final station to the first station (Due to assuming a circular track).

See Appendix C for example input.

## Stage 4: Stop Time

The system will print:

*“The stop time of the monorail at any station is:”*

And wait for input. Using the same input method as previously, enter a number of seconds to stop for at each station.

See Appendix D for sample input.

# Running

After all configuration is complete, the message:

*“Configuration Complete. Please wait 5 seconds”*

Will appear on the screen. After a 5 second delay, the emulator will begin to run. While between stations, the display will show:

“*Next Station:* ”

Followed by the station name. When the monorail is stopped at a station, the LCD will display only the name of the station.

See Appendix E for sample LCD readings during operation

## Stopping the Monorail

To imitate a passenger wanting to get off the monorail at the next stop, press and release PB0. The monorail will then stop at the next station. Similarly, press and release PB1 to imitate a passenger wanting to get on the monorail at the next stop. The screen will then display the name of the station the monorail is stopped at for the duration of the stop. To further indicate that the monorail is stopped, two LED’s will flash at a rate of three times per second for the duration of the stop.

See Appendix F for sample LCD readings during button operation

## Emergency Stop

To imitate the driver of the monorail stopping the car between stations (for example, an emergency situation), press and release the hash key. The Monorail will cease operation until the hash key is again pressed and released to resume operation.

See appendix G for sample LCD readings during emergency stop operation

# Appendices

## Appendix A: Sample Input for Maximum Number of Stations

|  |  |
| --- | --- |
| Number of Stations | Input Required |
| 1 | 1# |
| 4 | 4# |
| 7 | 7# |
| 10 | 10# |

## Appendix B: Sample Input for Name of Station

|  |  |
| --- | --- |
| Name of Station | Input Required |
| D | 3A# |
| RYDE | 7B9C3A3B# |
| SAM BAY | 7C2A6AD2B2A9C# |
| CAPE COD | 2C2A7A3BD2C6C3A# |

## Appendix C: Sample Travel Time

|  |  |
| --- | --- |
| Travel Time to Next Station | Input Required |
| 1 second | 1# |
| 3 seconds | 3# |
| 7 seconds | 7# |
| 10 seconds | 10# |

## Appendix D: Stopping Time

|  |  |
| --- | --- |
| Time to stop for | Input Required |
| 1 second | 1# |
| 3 seconds | 3# |
| 7 seconds | 7# |
| 10 seconds | 10# |

## Appendix E: Sample LCD Readings During Operation

Next Station: Wynyard park

*Wait 3 seconds*

Next Station: Circular Quay

*Wait 2 seconds*

*(Repeat)*

## Appendix F: Sample LCD Readings During Button Operation

Next Station: Wynyard park

*PB0 Pressed*

*Wait 3 seconds*

Wynyard park

*Wait 5 seconds*

Next Station: Circular Quay

*PB1 Pressed*

*Wait 2 seconds*

Circular Quay

*Wait 5 seconds*

*(Repeat)*

## Appendix G: Sample LCD Readings During Emergency Stop

Next Station: Wynyard Park

*Wait 1 second*

*Hash Key Pressed*

*…….*

*Hash Key Pressed*

*Wait 2 seconds*

Wynyard Park