A screenshot of a cell phone

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**Smart Traffic-Lights**

System Design

T2-CB01

Valentin Stoyanov

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# Introduction:

To build up such a system, the following components were used:

**The selected software components to build up the system:**

* Arduino Framework

**The selected hardware components to build up the system:**

* 2 Arduino Nano (old bootloader) or 2 Arduino Uno
* 2 Green and 2 Red LED
* 4 1k Resistors
* 2 Push Buttons
* Jumper cables

# **Here is a detailed system design for each element of the system to demonstrates how it was built and how it works:**

## Wiring Diagram:

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## Communication Protocol:

In this communication protocol the master and slave are predetermined before the start-up of the program, but the roles are interchangeable.

This protocol is asynchronous protocol. The master is the one how leads the communication by sending command to the slave and waiting for a response. Depending on that was the last command send the master can determine the meaning of the response.

Whenever there is breach in the communications lines the Traffic lights become un-active (Lighting up both the red and green lights) thus signaling for not regulated area of the road. If the connection is recovered the Traffic-Lights will continue operating normally.

|  |  |  |  |
| --- | --- | --- | --- |
| Commands | Definition | Responses | Meaning |
| 0xFF (Master) | Start transmitting /  Report back | 0x1  0x2 | Reports for cars in lane (0x01 – not clear,  0x02 –clear) |
| 0xFD (Master) | Change Lights GREEN | 0x1  0x2 | Ack (Salve)  NAck (Slave) |
| 0xFC (Master) | Change Light to RED | 0x1  0x2 | Ack (Slave)  NAck (Slave) |

## State Diagrams:

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A close up of a device

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