

# Straddling Bus for Traffic Management

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**Abstract:** In today's world where population is increasing day by day, in the same way the number of vehicles on the road increasing day by day, but we have limited infrastructure resource. There are basically three main type of public transportation in our nation. First one is buses. The buses use fewer resources but produce noise as well as air pollution. As the major vehicles on road is cars and the buses eats the traffic jam on roads. The second one is metro and mono rail. Both of them create less noise and air pollution but they are too costly. The third one is local train. It is not costly that much of mono and metro but it creates noise pollution. There is solution to above mentioned problem. The solution is Straddling Bus (train bus). Basically straddling bus a double decker bus in which lower deck is hollow and upper deck is used for passengers to seat. If any vehicle whose height is more than the height of lower deck then, there is IR sensor placed in the lower deck which will glow and indicate the vehicle to change the lane or path otherwise accidents will occur. On the same way, if any vehicle which comes closer to the wall of straddling bus will also get indication.

**Keywords:** Straddling bus, Land air bus, Train bus side (TBS).

## I. INTRODUCTION:

Train Bus Side (TBS), the Land Airbus- a giant car swallowing bus that could actually hit the streets. . The vehicle is longer than previous versions, it can bend around corners, and travels along rails to enable smaller vehicles to pass underneath.

This innovative urban transportation solution has a high-tech interior that is entered via a glass elevator that drops down at air lift stations. While passengers are getting on and off the vehicle, there is no hold up in traffic cars just keep going under the Land Airbus.

The Straddling bus that shows the vehicle navigating streets as a structure that steps across two traffic lanes with a hollow lower part that lets cars pass through. TBS claims that compared to Metro, the new public transportation vehicle would cost less; have a shorter construction almost match passenger capacity. It is an economical and safe way of commuting that eliminates spending hours stuck in traffic.

Literature Survey:

Metro:

Each train car will be provided with four sets of electric bi-parting and sliding plug doors on both sides.

- i. Train will draw power supply from third rail, equipped with 750V DC.
- ii. Ballast-less track & Flange lubrication system to minimize vibration, noise and air pollution.
- iii. Train speed will be reduced automatically by ATP/ATC system on curves which will further reduce sound during turning.
- iv. Temperature controlled coaches, each car is provided with roof mounted air conditioning system.
- v. Train will regenerate power and re-feed the line during braking .Regenerative braking technology will help reduce carbon emissions and will earn valuable carbon credits under UN's Clean Development Mechanism.

Advantages of Metro Rail:

- i. The metro rail is considered to be the best
- ii. solution to heavy road traffic congestion.
- iii. The subway system supplements the exiting transport means and also creates less noise and less air pollution.
- iv. Metro rail, as a mass rapid transit system was designed to cater the transportation needs of a large population keeping in mind the issue of decongestion. Metro railway was considered to be a key solution in easing out city traffic.
- v. The metro rail requires one fifth energy per passenger km compared to road transport
- vi. Making it a very environmentally friendly.
- vii. It is secure transit system giving citizens world class facilities at a cost effective rate.
- viii. The subway system also brings down travel time and in effect offers a comfortable travel experience
- ix. The metro system also connects well the existing fleet of transportation and with services like Metro Feeder Bus Network.
- x. It is very easy for commuters to connect between different modes of transport.

Disadvantages of Metro Rail:

- i. Its main disadvantage is the accidents which are held minimum once in two months.
- ii. We face problem if part of our body is in when the door is closing. It should open automatically but it fails also.
- iii. High capital cost.

**Mono Rail:**

- i. Modern mono rails are based on a single solid beam that supports and guides the train; the carriages are either suspended beneath the track, or sit on top, with their wheels straddling electricity, which is carried on a 'third rail' either within, or connected to, the main beam.
- ii. Conductive shoes on the carriages then transmit the current to the train. The straddle beam design is the most widely used.
- iii. The carriages have pneumatic rubber tires, which drive along the top of an 'I' shaped beam.
- iv. To prevent side-to-side swaying of the train, a series of small tires clamp around the beam, providing general stability and also helping to guide the carriages.

**Advantages of Mono Rail:**

- i. The primary advantage of mono rail is due to the smaller size of a beam compared to rails. This may translate to cost reduction due to less material needed for support pillars. Also, compared to elevated trains, the beam blocks less sky and may be less aesthetically displeasing.
- ii. In the most common mono rail design, the train wraps around the beam, making it impossible to derail. This is why most high speed, magnetic levitation "bullet trains" use a mono rail design.
- iii. The most common modern designs use electrically powered trains with rubber tires. Compare with railroad trains with steel rails. This can make a big difference in residential areas.
- iv. The mono rail is normally elevated, above traffic, above congestion, above pedestrians and vehicles.

**Disadvantages of Mono Rail:**

- i. The primary disadvantage of mono rail is their incompatibility with other rail systems, and often between mono rail systems by differing manufactures.
- ii. On a standard railway there are many lines a train on a mono rail it is limited to one. If a section of track needs to be replaced, the entire system needs to be shut down resulting in no service rather than reduced service.
- iii. Although mono rail need less regular maintenance, they can be more expensive to build initially. This is because the system requires the elevated track and support, which are more costly than a basic railroad.

**II. SYSTEM IMPLEMENTATION:**

**Solar Panel:-**

A solar cell (also called a photovoltaic cell) is an electrical device that converts the energy of light directly into electricity by the photovoltaic effect. It is a form of photoelectric cell (in that its electrical characteristics—e.g. current, voltage, or resistance—vary when light is incident upon it) which, when exposed to light, can

generate and support an electric current without being attached to any external voltage source.

**Battery:-**

12v 1.3amp maintenance free lead acid battery.

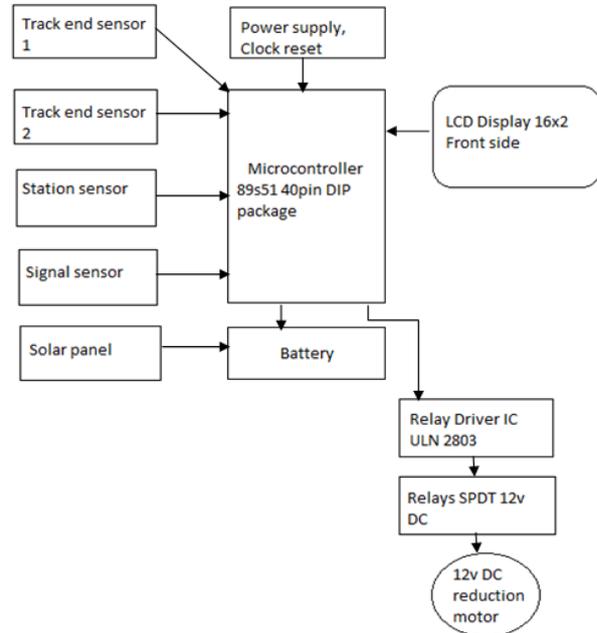


Figure 1: Block diagram of Straddling Bus

**Microcontroller 89s51:**

The AT89s51 is a low-power, high-performance CMOS 8-bit microcomputer with 4Kbytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set and pin out.

**Relay Driver IC ULN2803:-**

The eight NPN Darlington connected transistors in this family of arrays are ideally suited for interfacing between low logic level digital circuitry (such as TTL, CMOS or PMOS/NMOS) and the higher current/voltage requirements of lamps, relays, printer hammers or other similar loads for a broad range of computer, industrial and consumer applications. All devices feature open collector outputs and freewheeling clamp diodes for transient suppression. The ULN2803 is designed to be compatible with standard TTL families while the ULN2804 is optimized for 6 to 15 volt high level CMOS or PMOS.

**Relay:-**

The basis for relays is the simple electromagnet. The simple relay is the single pole, single throw (spst) relay. It is nothing more than an electrically controlled on-off switch. Its biggest property is the ability to use a very small current, to control a much larger current. This is desirable because we can now use smaller diameter wires, to control

the current flow through a much larger wire, and also to limit the wear and tear on the control switch.

LCD:-

A liquid crystal display (LCD) is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals. The basic function of the LCD is to display the action performed by the microcontroller. The LCD used here is 16x2 character LCD display. The figure shows the pin diagram and pin description.

Power Supply:-

This unit will supply the various requirements of each unit. This will be consists of transformer, rectifier, filter and regulator. The rectifier used here will be bridge rectifier. It will convert 230V AC into desired 5V/12V DC.

Motors:-

A DC motor is a mechanically commutated electric motor powered from direct current (DC). The stator is stationary in space by definition and therefore it's current. The current in the rotor is switched by the commutation to also be stationary in space, this is how the relative angle between the stator and rotor magnetic flux is maintained near 90 degrees, which generates the maximum torque.

DC motors have a rotating armature winding (winding in which a voltage is included) but non-rotating armature magnetic field and a static field winding (winding that produce the main magnetic flux) or permanent magnet. Different connections of the field and armature winding provide different inherent speed/torque regulation characteristics. The speed of a DC motor can be controlled by changing the voltage applied to the armature or by changing the field current. The introduction of variable resistance in the armature circuit or field circuit allowed speed control. Modern DC motors are often controlled by power electronics systems called DC drives.

The introduction of DC motors to run machinery eliminated the need for local steam or internal combustion engines, and line shaft drive systems. DC motors can operate directly from rechargeable batteries, providing the motive power for the first electric vehicles. Today DC motors are still found in applications as small as toys and disk drives, or in large sizes to operate steel rolling mills and paper machines.

### III. CIRCUIT IMPLEMENTATION:

The circuit is divided into two parts

1. Transmitter
2. Receiver

For transmitter section, the different commands signals are transmitted via RF transmitter module of 433 MHz it has 4 pins of antenna, Vcc, Gnd, & serial data input. Antenna, +5v & Gnd are connected to respective places and serial data input is generated from encoder IC HT12E. This

encoder IC's function is to convert parallel data into serial data address lines of encoder are grounded because they are not used. Data lines are fed with command signals since four lines are available 16 different commands can be generated. The output modulating frequency is decided by resistor connected at OSC pin of the encoder. Currently because of 1.2Mohms resistor, It is 30 KHz. The output of encoder is fed to RF transmitter module is currently Roughly 100 sq. Ft.

On receiver side the data is received by RF receiver module of 433 MHz. This demodulated signal is fed to decoder for further decoding. If address send from encoder IC GND matches with decoder address then valid tone (VT) signal on decoder goes high, which indicates receives signal. The decoded by decoder is fed to uC for further control of relay. It requires mainly three things for operation. Which are power supply clock & reset. Power supply provided to uC is +5v & GND on pin40 & pin20 respectively. On osc pin18 &19,a crystal oscillator is connected which generates clock for program execution for reset on pin9 & 10k resistor &10k capacitor is connect which reset controller on power up.

Controller receives data from decoder & after decoding of commands it gives proper command to relay driver IC ULN2803, which amplifies signal coming from controller & controls as per controller instruction. Relay used of 12v, 400ohms SPDT type. For making motor on/off single relay is required for changing direction of motor two relays are required .direction of motor can be changed by changing the direction of supply of motor.

### IV. CONCLUSION:

As our project makes use of array of the solar cells which basically converts light energy into electrical energy. This in turn helps us to save the electrical energy consumption. In addition to this we may use a pendulum which can be implemented to use the electrical energy generated by solar cells.

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