Designing of Automatic Traffic Light Controller in Roads and Railways Transport System for Controlling Purpose

By Mr. Prashant Kumar, "FARSE"

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Abstract- With the Traffic Light only the chances of roadside accident and human error based Railway Accidents are reduced to minimal amount these days. With the increasing number of roads and trains, the requirement for accuracy based controlling the traffic lights is increasing day by day in future generation. This paper is an attempt to introduce the reader into the world of Digital Electronics and Hardware Description Language based device. Traffic Light Controller plays a very important role in the Roads and Railways based Automatic Controlling System. The designing of Automatic Traffic Light Controller System for Roads and Railways Purpose through control the traffic of city, maintain the tracks andpublic places. The Automatic Traffic Light Controller in Railway System placed at Four Line Central Based Server which control the Railway Traffic through the Automatic Designing based System. This Traffic Light Controller plays the operation in Roads Service through controlling the Roads in the concept of Digital Electronics. This project is based on the construction and working of this Automatic Traffic Light Controller Chip Based System. This paper gives the Virtual Operation as Simulation and Integrated Circuit Performance which has to be designed in Hardware Description Language by using the concept of Digital Electronics.

Keywords: introduction, controlling system in roads, controlling system in railways, concept of digital electronics, using software in this controlling system, designing-programming and simulation, result and conclusion.

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DESIGNINGOFAUTOMATICTRAFFICLIGHTCONTROLLERINROADSANDRAILWAYSTRANSPORTSYSTEMFORCONTROLLINGPURPOSE

Strictly as per the compliance and regulations of :

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I. Introduction

Traffic Light plays the most important role in our life while dealing with huge traffic and increasing population. It also plays to develop the Automatic Controller System which enable for Error Free Controlling System. This traffic light controller enables for designing as Digital Designing Concepts by programming in VHDL and Verilog HDL as Hardware Description Language. This paper gives me the new way for developing the Automatic System Based Traffic Light Controller and marketing as launching this product in India. This Controller System enable for Roads and Railways Project with the Automatic Controller System. The Traffic Light Controller based on this designing language is enabling for producing the valuable information as location and other things in Railways System. This Controller can be used at Parking System, Vehicle Controlling Purpose, Educational Projects and other Public Places.

Controlling System in Roads- This controlling system is to design the Traffic Light Controller with the concepts of Four Directions Roads System. It controls the main city points as North, South, East and West Direction. This is the Automatic System Based Traffic Light Controller System.

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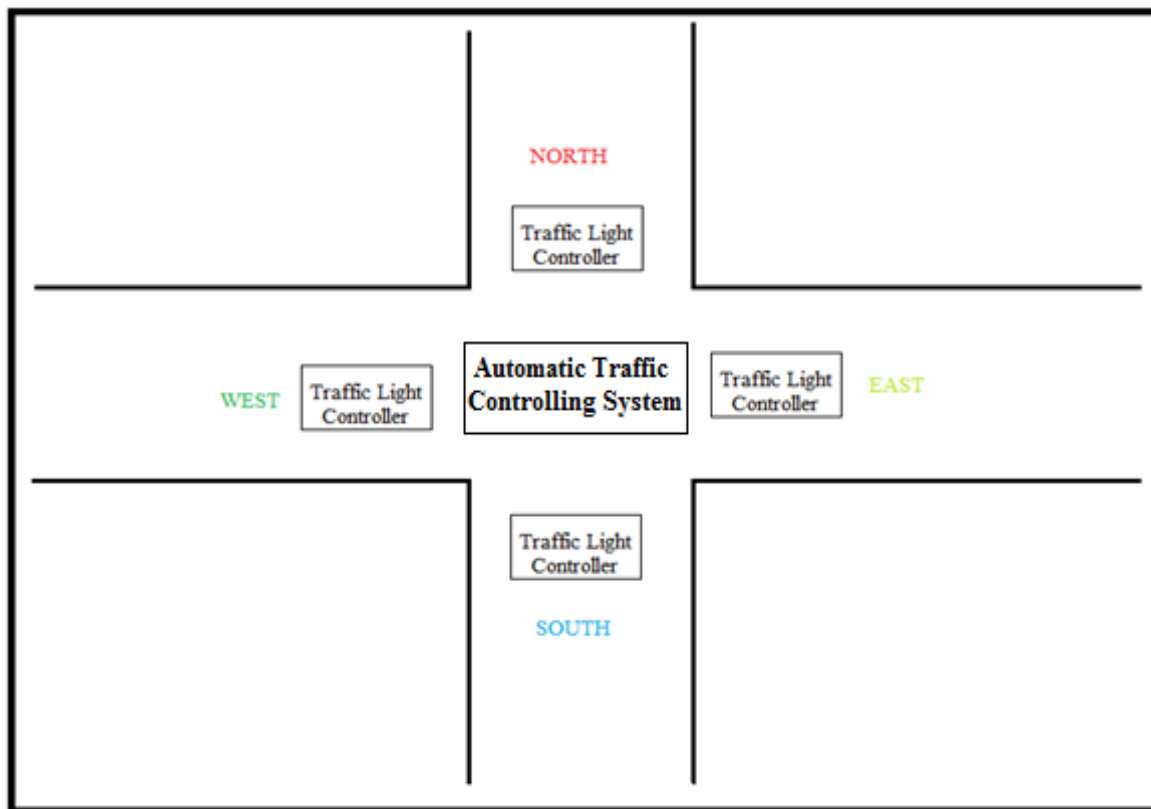
Traffic Light Controller in Roads System

This is the Digital System Based Traffic Light Controller which comes about an idea from the Digital electronics. The implementation of idea is based on VHDL and Verilog HDL as Hardware Description Language in XLINIX 9.2, DSCH 3.1, Microwind 3.1 and Altera Quartus II Software.

Controlling System in Railways-The maintaining of Traffic Light Controller System in Railways is based on the Central HUB Server which controls the four zonal direction of Railways. There are certain problems and for solving the problem of hazard and human accidental case in railways, I have to design the Restart and Clock Control System which comes from the concept of Sequential Circuit. This Restart and Clock System creates the following action when hazard and human accidental problem has started and then this system will manually restart that zone direction of Traffic Light Controller System.

The Indian Railways System is the busy and hazards creating system. This hazard shows the accidents and human errors which automatically fail the concept of Moore Machine as present state in Automatic Traffic Light Controller System. The main purpose for designing this Automatic Traffic Light Controller System is too developed in this innovative way to handle this situation at the time of Hazard Problems. The Four Direction Zone Railway System is based on the UP and DOWN Trains and Railway Lines

as per Railway System in India and other countries. The Clock System is based on the Running Train Location and Operating this Automatic Traffic Light Controller System.
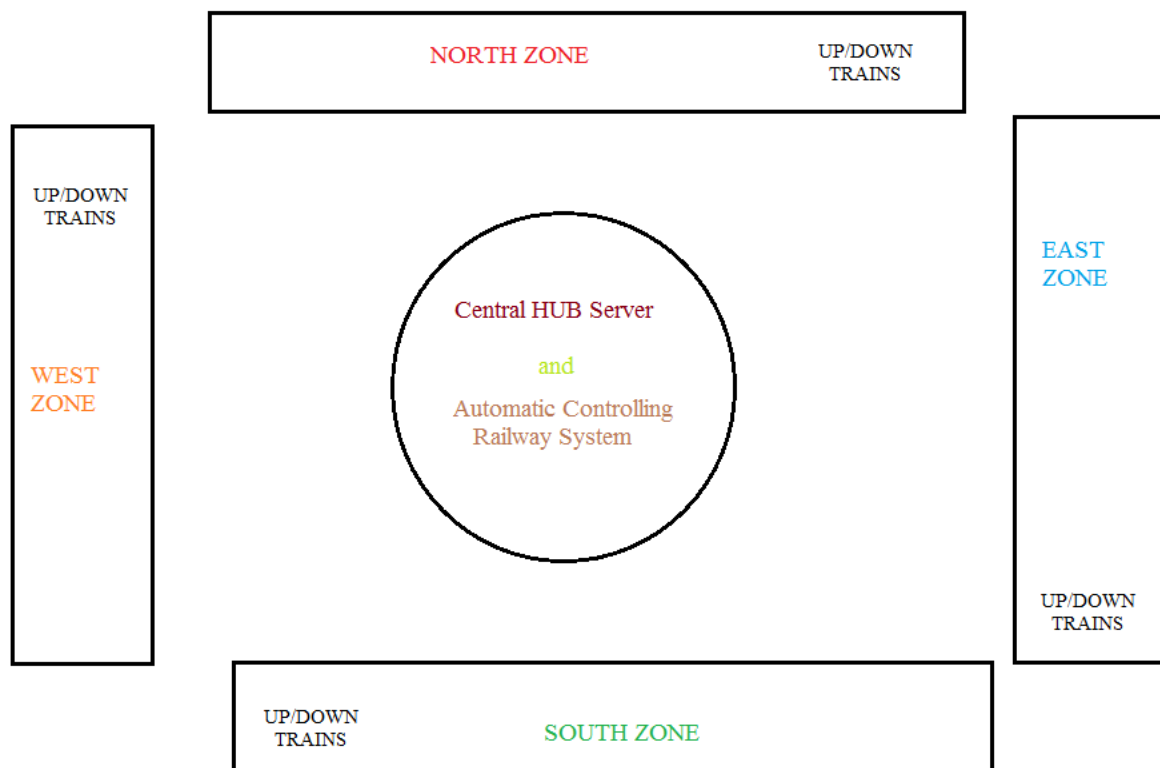
Traffic Light Controller in Railway System

Concepts of Digital Electronics-This AutomaticTraffic Light Controller System is based on the concept of Digital Electronics which shows the Roads Traffic Light System as Combinational Circuit. This system has arisen the concept of Four Direction Roads and the controlling of Roads in a Sequence Manner. This system is based on the designing of this four direction based Traffic Light Controller.

It also shows the Railway Traffic Light Controller System as Sequential Circuit which can be restart as Hazard and Accidental Problems. The main purpose for designing this circuit is that the system has arisen on four direction zone which shows if any hazard problem created on any direction as based on the designing of Traffic Light Controller. This System can restart that zone due to Hazard Problems as maintaining the Railway System in Automatic Controlling Based Traffic Light Controller System.

- *Abbreviations used in Truth Table*
A, B, C: CLOCK SWITCHES USED TO GENERATE INPUT PULSES.
NG: NORTH GREEN.   SS
NY: NORTH YELLOW.
NR: NORTH RED.
WG: WEST GREEN.
WY: WEST YELLOW.
WR: WEST RED.
SG: SOUTH GREEN.
SY: SOUTH YELLOW.

SR: SOUTH RED.
EG: EAST GREEN.
EY: EAST YELLOW.
ER: EAST RED.

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A	B	C	NG	NY	NR	WG	WY	WR	SG	SY	SR	EG	EY	ER
O	O	O	I	O	O	O	O	I	O	O	I	O	O	I
O	O	I	O	I	O	O	I	O	O	O	I	O	O	I
O	I	O	O	O	I	I	O	O	O	O	I	O	O	I
O	I	I	O	O	I	O	I	O	O	I	O	O	O	I
I	O	O	O	O	I	O	O	I	I	O	O	O	O	I
I	O	I	O	O	I	O	O	I	O	I	O	O	I	O
I	I	O	O	O	I	O	O	I	O	O	I	I	O	O
I	I	I	O	I	O	O	O	I	O	O	I	O	I	O

Automatic Traffic Light Controlling in Roads System

A	B	C	NG	NY	NR	WG	WY	WR	SG	SY	SR	EG	EY	ER
O	O	O	O	I	O	O	I	O	O	I	O	O	I	O
O	O	I	I	O	O	I	O	O	I	O	O	I	O	O
O	I	O	O	I	O	O	I	O	O	I	O	O	I	O
O	I	I	O	O	I	O	O	I	O	O	I	O	O	I
I	O	O	O	I	O	O	I	O	O	I	O	O	I	O
I	O	I	I	O	O	I	O	O	I	O	O	I	O	O
I	I	O	O	I	O	O	I	O	O	I	O	O	I	O
I	I	I	O	O	I	O	O	I	O	O	I	O	O	I

Automatic Traffic Light Controlling in Railways System

When Rst = '1' in West Zone Direction

A	B	C	NG	NY	NR	WG	WY	WR	SG	SY	SR	EG	EY	ER
O	O	O	O	I	O	O	O	I	O	I	O	O	I	O
O	O	I	I	O	O	O	O	I	I	O	O	I	O	O
O	I	O	O	I	O	O	O	I	O	I	O	O	I	O
O	I	I	O	O	I	O	O	I	O	O	I	O	O	I
I	O	O	O	I	O	O	O	I	O	I	O	O	I	O
I	O	I	I	O	O	O	O	I	I	O	O	I	O	O
I	I	O	O	I	O	O	O	I	O	I	O	O	I	O
I	I	I	O	O	I	O	O	I	O	O	I	O	O	I

Controlling the Hazard Conditions as West Zone in Railways System

Similarly as per Measuring Scale using this concepts in Hazards and Human Accident Condition.
When Rst= '1' in All Zone Direction

A	B	C	NG	NY	NR	WG	WY	WR	SG	SY	SR	EG	EY	ER
O	O	O	O	O	I	O	O	I	O	O	I	O	O	I
O	O	I	O	O	I	O	O	I	O	O	I	O	O	I
O	I	O	O	O	I	O	O	I	O	O	I	O	O	I
O	I	I	O	O	I	O	O	I	O	O	I	O	O	I
I	O	O	O	O	I	O	O	I	O	O	I	O	O	I
I	O	I	O	O	I	O	O	I	O	O	I	O	O	I
I	I	O	O	O	I	O	O	I	O	O	I	O	O	I
I	I	I	O	O	I	O	O	I	O	O	I	O	O	I

Controlling the Hazard Conditions as All Zones in Railways System

Using Software in this Controlling System- The software using in this designing of Controlling System are DSCH 3.1, XLINIX 9.2, Microwind 3.1 and Altera Quartus II Software which plays the important role as

DSCH 3.1 and XLINIX 9.2 for this designing of Automatic Traffic Light Controlling System enables:

XILLINX ISE-Xlinix ISE is a complete ECAD (Electronic computer-aided design) application. It has the added and provided value of being produced by the world's largest supplier of programmable logic devices and being free. This application also enable the helps you design, test and debugging integrated circuits.

If you ever tried to design and implement any kind of electronic circuits, digital concepts, connecting cables, LED's and chips, as soon as we know that pretty soon all you end up with a big and confusing pile of small colour cables. There are some applications which available that we shall help to keep things in perspective and respective manner for transposing the logic and circuit to your screen. This will benefit in a lot of ways as soon that we can forget about implementing the bread boards malfunctions or looking for hours through burned (forgotten) chip. Xilinx ISE simply takes this idea to the next level (several levels above in VLSI Design). We will have access to hundreds of industrial standard chips, from the standard AND or NOT gates that it can get all the way to the more complex ones (including multiplexers, counters etc.). If we do not find that what you need you will be able to design it and use it just as another chip from the library.

After the Design and Logic Circuit Phase, we can test our design by changing inputs and checking the results in this software. This will take few time in each circuit has to be completely compiled and completed before the test can be done. As we might have already concluded, this is not program for the beginner. The user interface has although clean and full of nice buttons but cannot hide the complexity of the underlying process. We shall most probably need the user manual of this software. This is very advanced program in HDL Language to be used by engineers at production and industrial level in VLSI Design by designing the chips in IC Fabrication.

One word of advice that however, we save our work frequently. Xilinx will crash repeatedly when compiling our work in HDL Language. It will not recognize our save files and it will not be able to read our data. If we try to save everything in a simple folder in the root of our disk, no characters besides letters, no special words and no spaces as soon as possible. I have always managed to get my work back but I surely would not like to have to work with this application on a daily basis.

Advantages
1. Free
2. Very complete libraries of components
3. Multiple testing, designing and debug possibilities.
4. Lots of aid tools.

Disadvantages
1. Very unstable

DSCH 3.1 C-The DSCH program is a logic editor, digital circuit design and simulator. DSCH is always used to validate the architecture of the logic circuit and digital design before the microelectronics design is started. DSCH also provides a user-friendly environment for hierarchical logic and digital design, fast simulation with delay and logic analysis, which allows the design and compilation of complex logic structures. DSCH also features the symbols of logic gates, models and assembly support for 8051 and other Micro Controllers. Designers can create the logic circuits for interfacing with these controllers and verify software programs using DSCH.

Highlights
1. User-friendly environment for rapid design of logic circuits.
2. Supports hierarchical logic design.
3. Handles both conventional pattern-based logic simulation and intuitive on screen mouse-driven simulation
4. Built-in extractor which generates a SPICE netlist from the schematic diagram (Compatible with PSPICE™ and WinSpice™).
5. Current and power consumption analysis.
6. Generates a VERILOG description of the schematic for layout conversion.
7. Immediate access to symbol properties (Delay, Fan Out).
8. Model and assembly support for 8051 and PIC 16F84 microcontrollers.
9. Sub-micron, deep-submicron, nanoscale technology support.

Programming-Designing and Simulation-The various steps done in the software while designing the traffic light controller chip is shown step by step using snapshots of the entire process with outputs at every level as working in DSCH 3.1 Software:
1. Creation of the schematic circuit using the truth table for traffic lights operation.
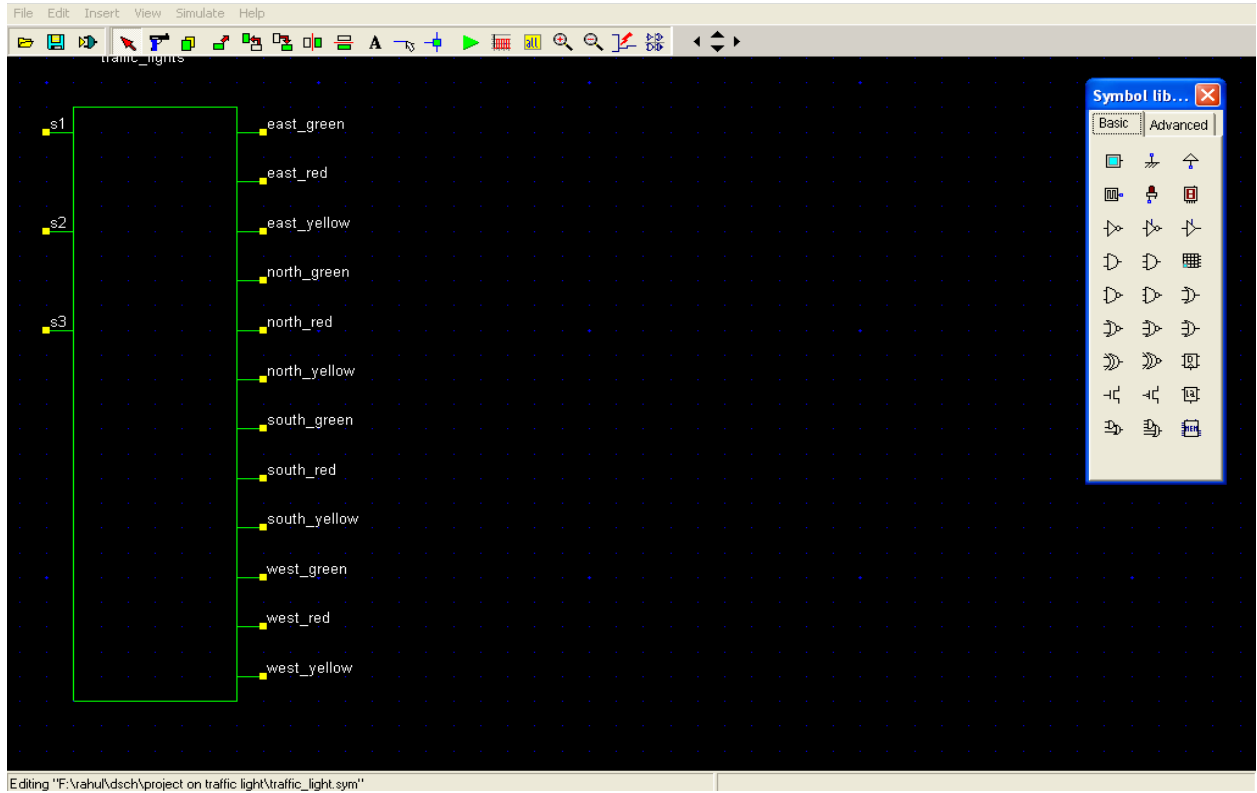2. Creating chip from the schematic circuit of the traffic light controller.

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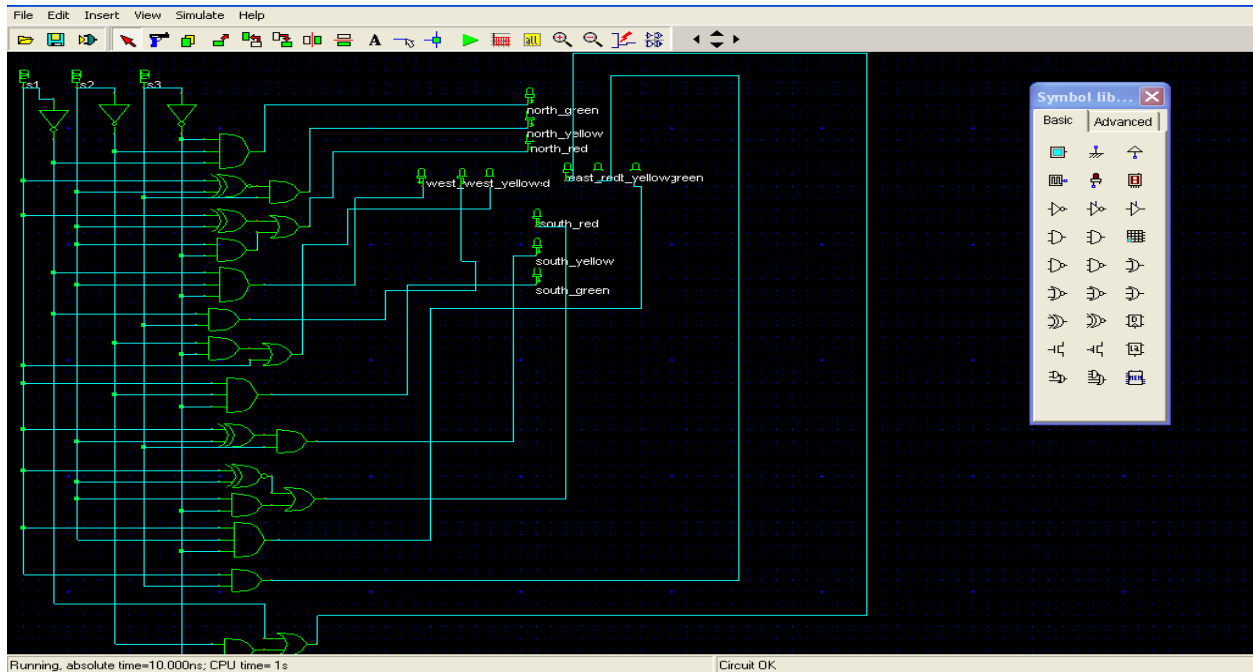
Observation of output after connecting the chip with the output LEDs and input clocks
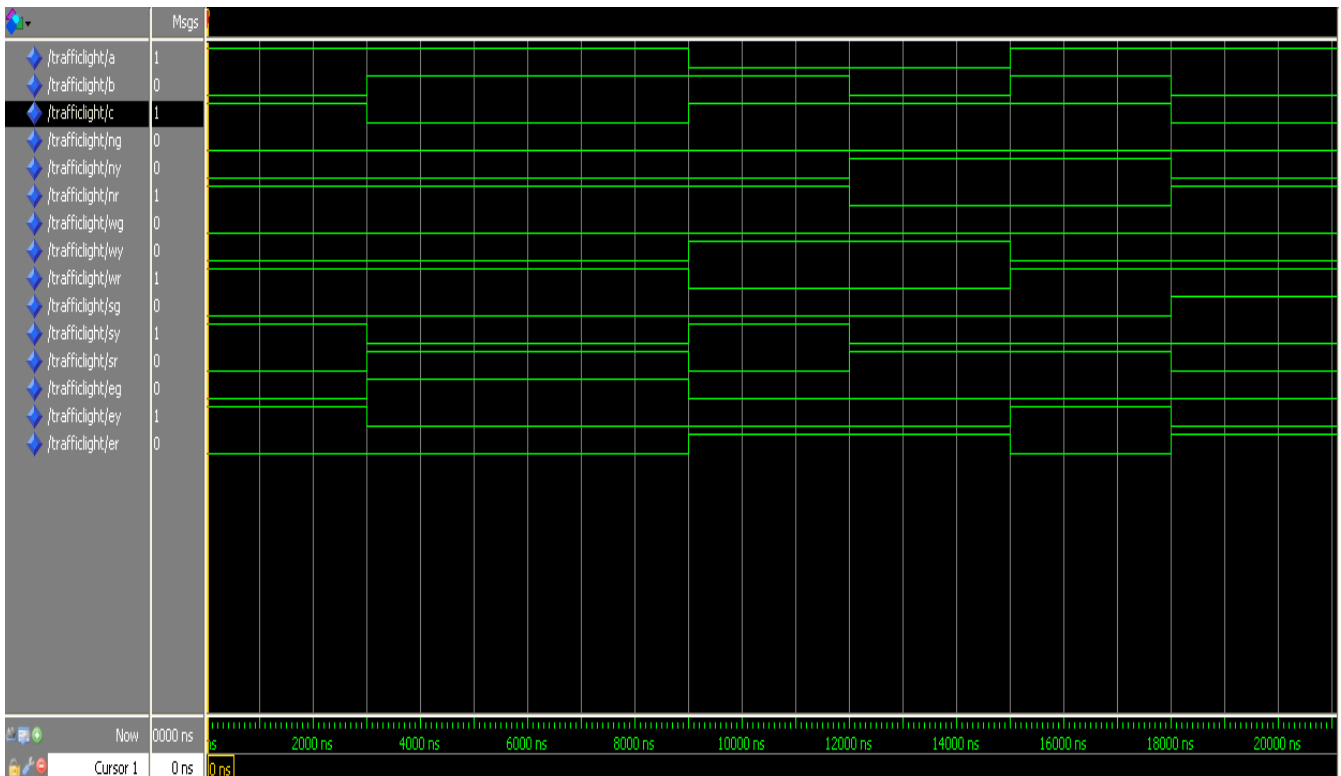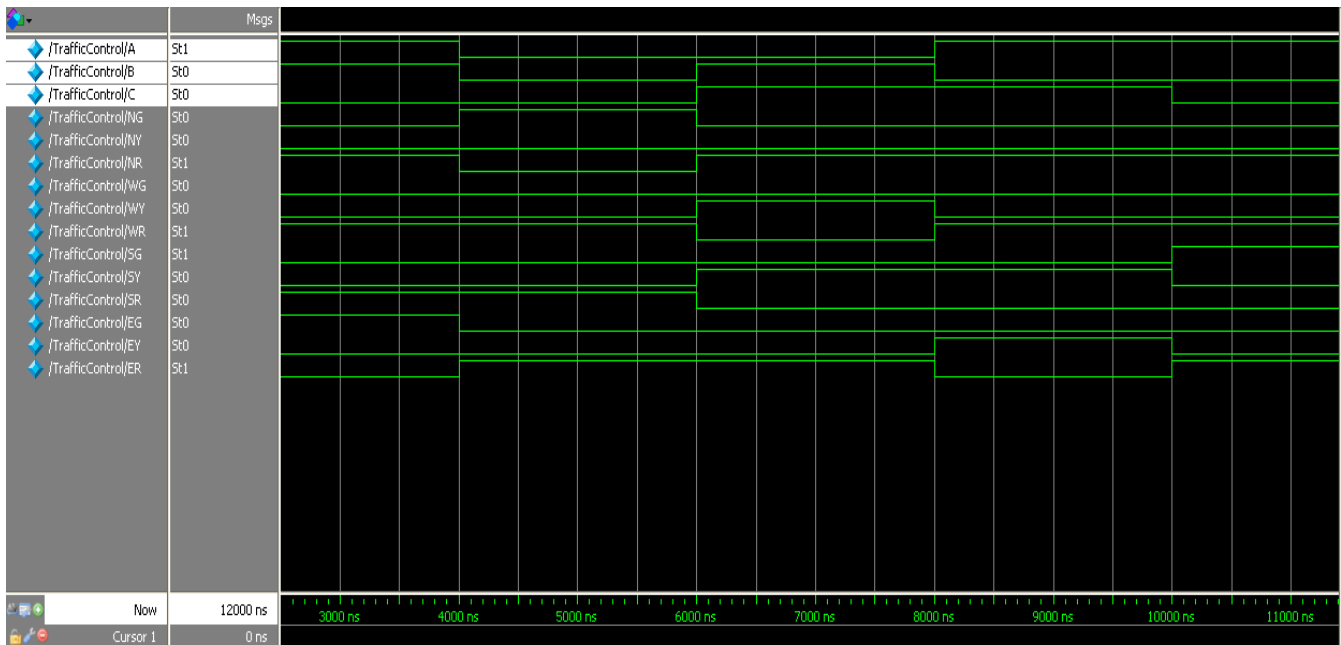
Circuit Designing Using DSCH 3.1 Software
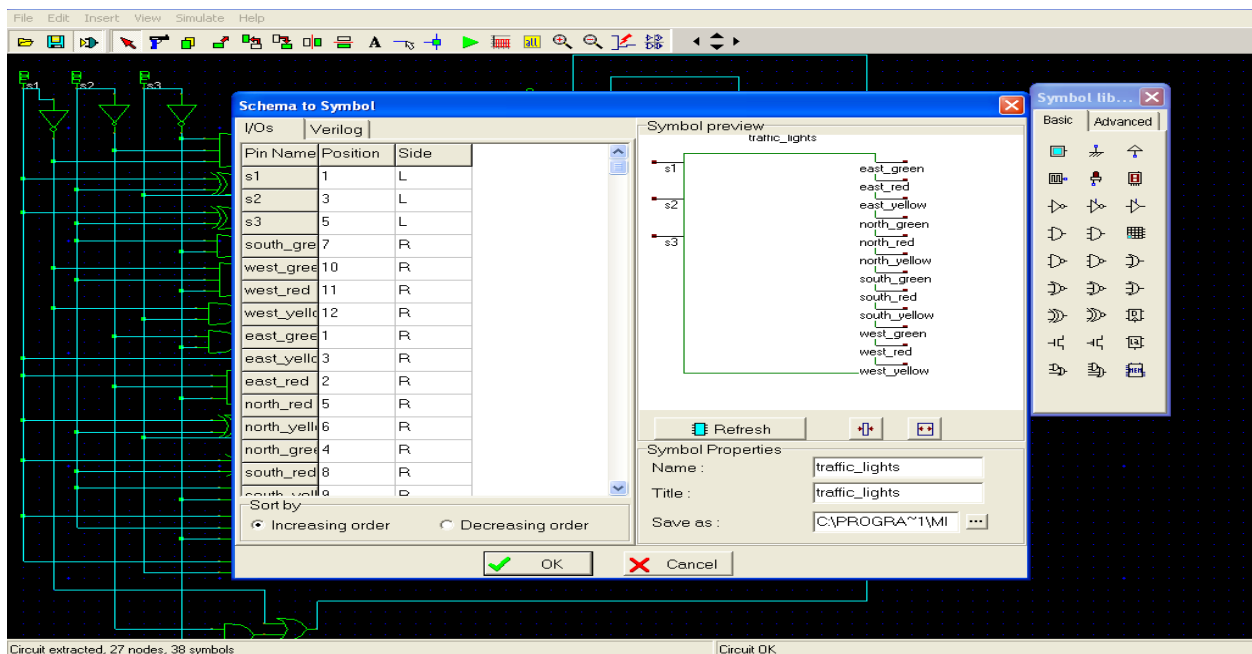
Simulation in DSCH 3.1 Software

Formation of Automatic Traffic Light Controller

VHDL Design Simulation

VERILOG HDL Design Simulation

II. Results and Conclusion

From here, I have now discussed the all points related to this Automatic Traffic Light Controller. This research and implementation of idea is based on the new device which provides flexibility and high economy for traffic solutions in our daily life. This Automatic Traffic Light Controller implements the true output state by applying the present Clock State. This controller can achieve the following aspects through automatic controlling purpose which become railway tracks and roads traffic faster and to minimize the hazard problems in our daily life.

This Automatic Traffic Light Controller is based on the State Designing and concept of Moore Machine which depends on the output and present state of machine. The design and waveform expression shows the proved explanation of Automatic Traffic Light Controller. This controller can be used in various applications like Air Traffic Control, Metro Railways System, Special Trains System, Railway Tracks and Roads System. This Automatic Traffic Light Controller is based on the Red, Yellow and Green Light as the concept of Moore Machine for creation of Controlling Device. This Traffic Light Controlling System becomes life more easily for controlling the things as automatic system with 100% accuracy purpose for designing and development of Automatic Enabling Controlling Device.

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