

Multiplexer as a Remote Controller in Television and Tape Recorder

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Abstract

The article presents a concept of designing a “Multiplexer as a Remote Controller” in Television and Tape Recorder; supporting efficient and more reliable selection processes of input with some additional features of “Logical based selection criteria” and further that input uses by Television/Tape Recorder to display the selected input value via the monitor of Television as well as Magnetic Tape Recorder. The purpose of the system is to design and develop technique in making efficient Logical based selection criteria with added features and further support to develop Remote Controller to select input value with provision of selection lines. Basic purposes and assumptions regarding the design and development of this system as well as a description of its operation have been presented.

Keywords: AND array, function table, interfacing, multiplexer, selection lines, tape recorder, television

INTRODUCTION

In 21st Century, Traditional concept of selecting Remote Controller device for controlling purpose assumed to time consuming, one of the tedious process and comes under the categories of impracticable applications. Thus “Logical based Controller” circuit is an efficient solution for; to accomplish task of selection with added virtues. Circuit designers are faced with challenge of developing system with increasing

functionality and complexity while under demanding power and time-to-market constraints. Such system often requires multiplexer circuit to allow interfacing among multiple inputs, AND Array, selection lines, television, and tape recorder built from different process technologies. It helps to find exact solution you need. The choice of proper “Remote controller device concept” depends on many factors and will affect the performance and efficiency of the circuit.

METHODOLOGY OF DESIGN PROCESS

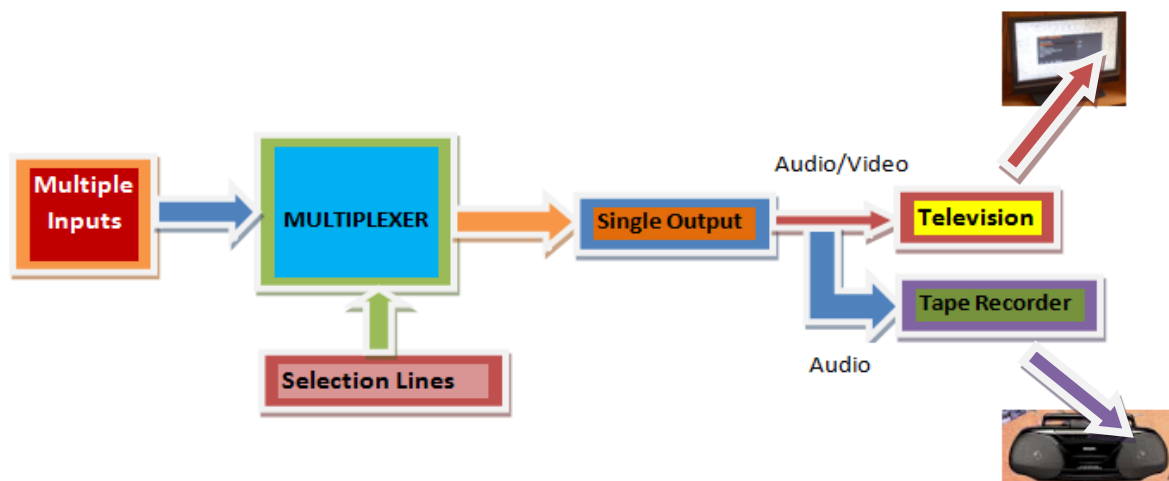


Figure 1: Methodology adopted in design process.

The methodology process involves in first phase; the circuit is designed that includes multiple inputs with provision of few selection lines and further the circuit select particular input out of many inputs and directs the selected input value to single output line. In second phase, the signal coming out from single output line acts as an input (Audio/Video) to television as well as a input (Audio) to tape recorder. A basic mechanism about television operation as well as tape recorder function is presented and illustrated via necessary diagram.

Concept of Developing a Multiple inputs, Few selection lines and a Single output

A concept is developed to generate multiple inputs, few selection lines and a single output line using the concept of multiplexer. As according to features of Multiplexer, it select only one input at a time out of many inputs based on specific virtue of selection lines and further directs selected input to single output line. The multiplexer basic operation mechanism is formulated in tabular form mentioned below:

Table I: Multiplexer operation mechanism.

Inputs	Selection lines	Output
2^2 (4)	2	1
2^3 (8)	3	1
2^4 (16)	4	1
.	.	.
2^n	n	1

Multiplexer

- A combinational circuit that selects binary information from one of many inputs lines and directs it to a single output line.
- The selection of particular input line is controlled by a set of selection lines.
- It transmits a large number of information over a smaller number of channels or lines.
- In Multiplexer, for 2^n input lines there becomes n-selection lines and single output line channel.

Table 2: Logic based selection mechanism.

S0	S1	S2	S3	Y (VIDEO/AODIO) for T.V./ (AUDIO) for Tape Recorder
0	0	0	0	I0 (Discovery Channel) / (Lata Mangkeshar Collecion)
0	0	0	1	I1 (National Geographic Channel) / (Kishor Kumar Collection)
0	0	1	0	I2 (Sony Channel) / (Nitin Mukesh Collection)
0	0	1	1	I3 (CNN Channel) / (Abhijeet Collection)
0	1	0	0	I4 (Star Plus Channel) / (Sonu Nigum Collection)
0	1	0	1	I5 (Star News Channel) / (Shreya Ghoshal collection)
0	1	1	0	I6 (Sony Max Channel) / (Asha Bosle collection)
0	1	1	1	I7 (SAB T.V. channel) / (Kumar sanu collection)
1	0	0	0	I8 (Nepal T.V. channel) / (Narayan Gopal collection)
1	0	0	1	I9 (Aaj Tak channel) / (Udit Narayan collection)
1	0	1	0	I10 (Kantipur T.V. channel) / (Shanker Mahadevan collection)
1	0	1	1	I11 (Colours T.V. channel) / (Preetam da collection)
1	1	0	0	I12 (Care World T.V. channel) / (Sukhabindar Singh collection)
1	1	0	1	I13 (Zee T.V. channel) / (Anuradha paudel)
1	1	1	0	I14 (Sports T.V. channel) / (Arijeet Singh)
1	1	1	1	I15 (Sagarmatha T.V. channel) / (A.R. Rahman collection)

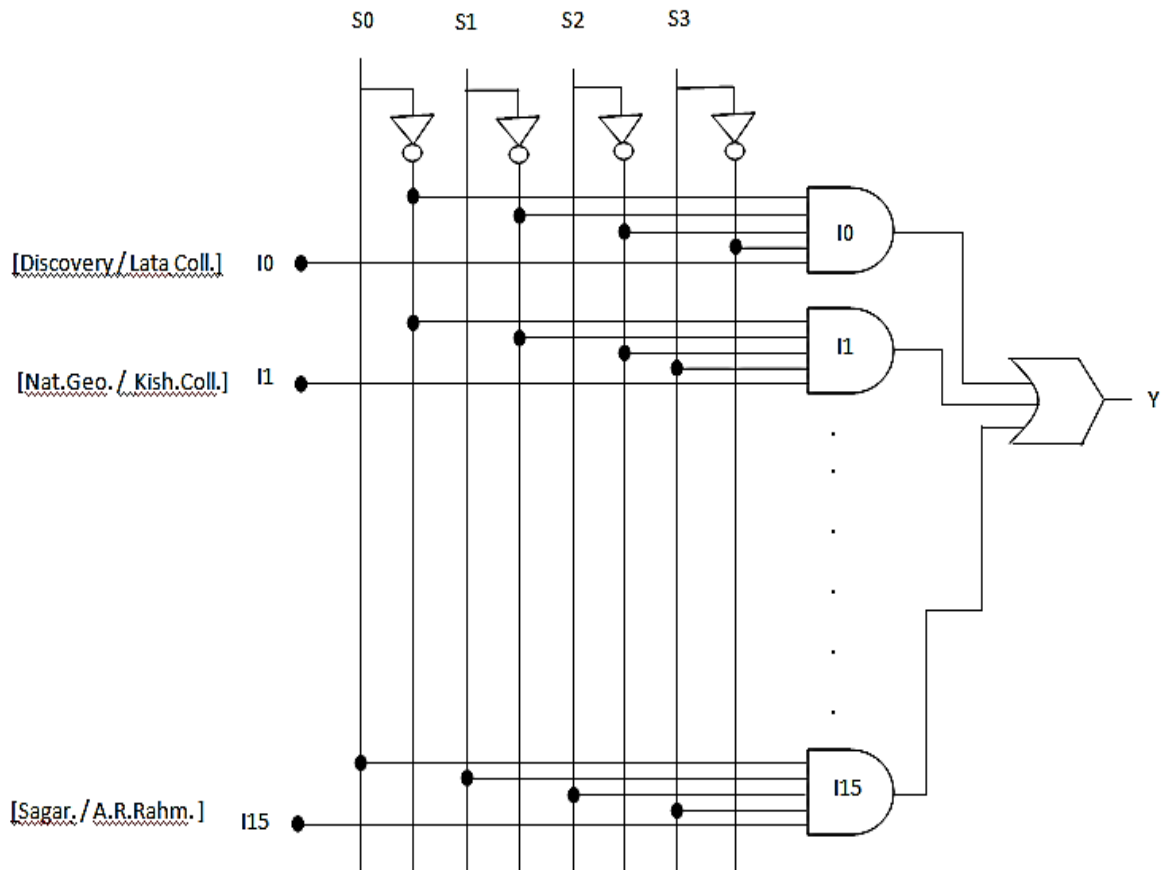


Figure 2: MUX circuit including multiple inputs, few selection lines and single output.

Fundamental Concept about Television Operation Mechanism

A fundamental concept about television

operation mechanism for black & white as well as color T.V. is presented and illustrated via diagram mentioned below.

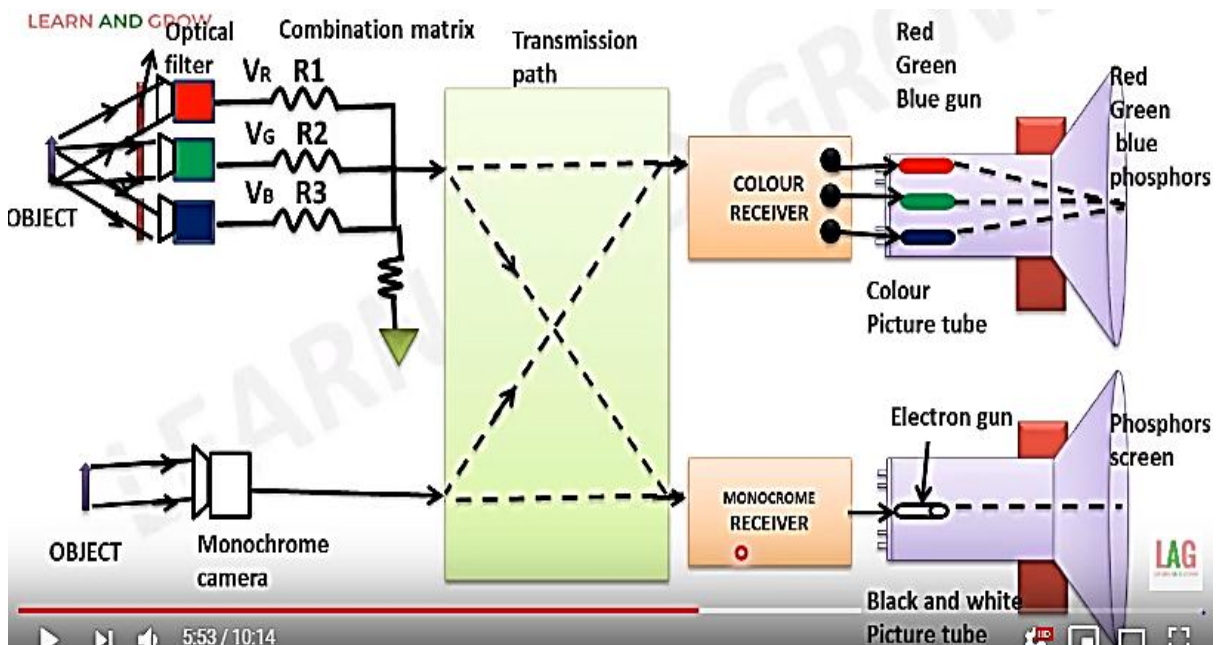


Figure 3: Fundamental concept about “black & white” and color T.V.

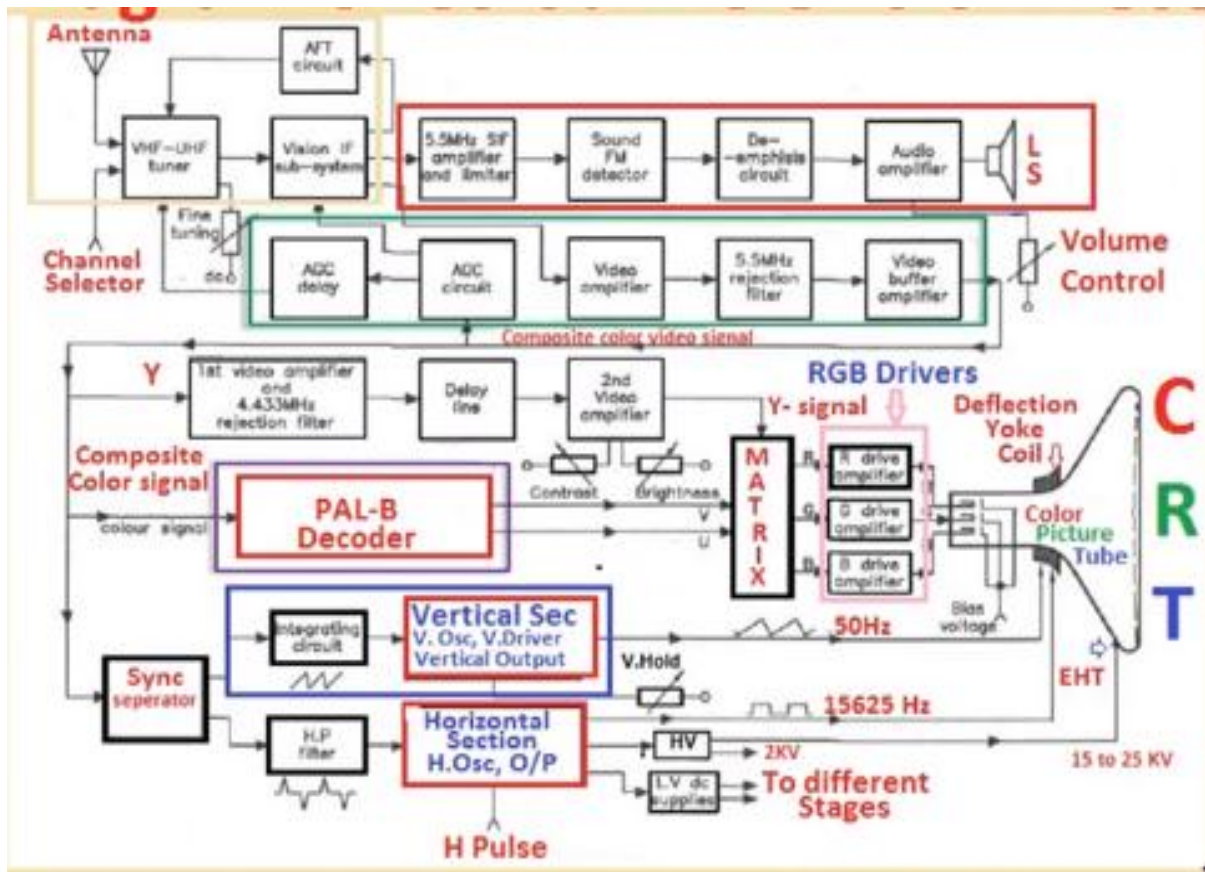


Figure 4: Color T.V. receiver block diagram.

Concept of developing Magnetic Tape Recorder

It used to record analog data in such a way that can be retrieved in electrical form again.

Tape Transport Mechanism

- Move tape along recording head or reproduce head at constant speed.
- Handles tape during various modes of operation without wearing tape.
- Consists supply reel, record & reproduce head, tape, tape roller, take up reel etc.

Magnetic Tape

- Composed to coating of Iron Oxide (Fe_2O_3) particles on plastic ribbon.
- Typical size of tape is 12.7mm wide and 25.4 μ m thick.
- Magnetic particles conform to magnetic pattern get induced in them and retained in it.

Conditioning Device

Includes Amplifiers and Filters that needed for modify signal to a format recorded on a tape.

Recording Head

- Respond to electrical signal and creates magnetic pattern on a magnetizable medium.
- When recording current passed via coil, creates magnetic fluxes allow to pass via air gap (5-15 μ m) to come in contact with magnetic tape, thereby magnetizing Iron Oxide particles, thus actual recording takes place.

Reproduce Head

Detects magnetic patterns stored in them and convert it back to original electrical signal.

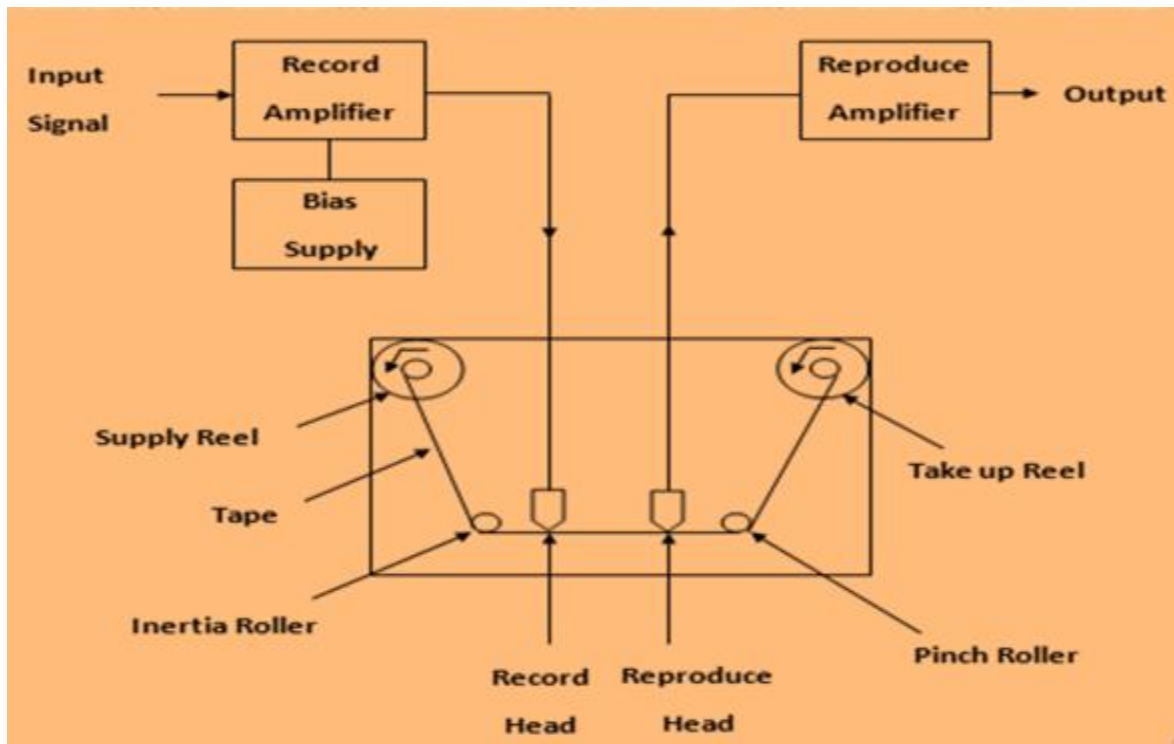


Figure 5: Tape transport mechanism.

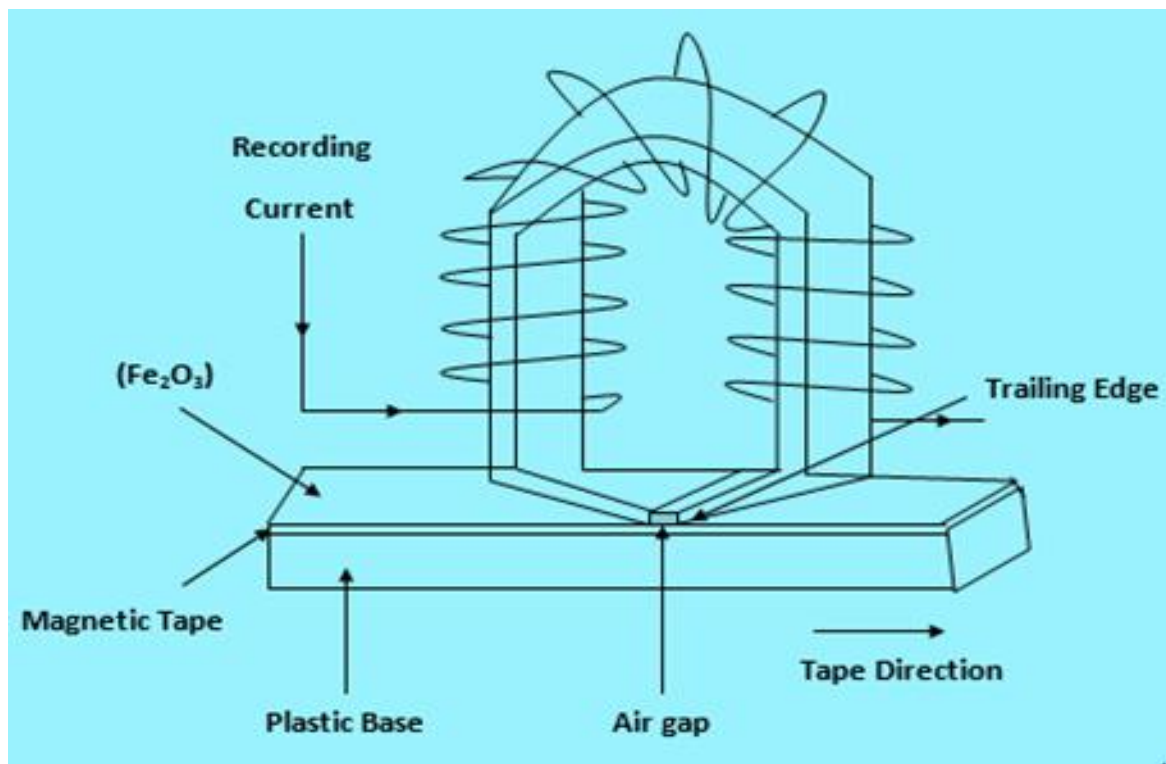


Figure 6: Recording head.

Complete Circuit Design via Interfacing

The complete circuit design for “Multiplexer as a Remote Controller” in Television and Tape Recorder” is obtained

through interfacing of three circuit as i) MUX. circuit, ii) Television circuit, and iii) Tape Recorder circuit.

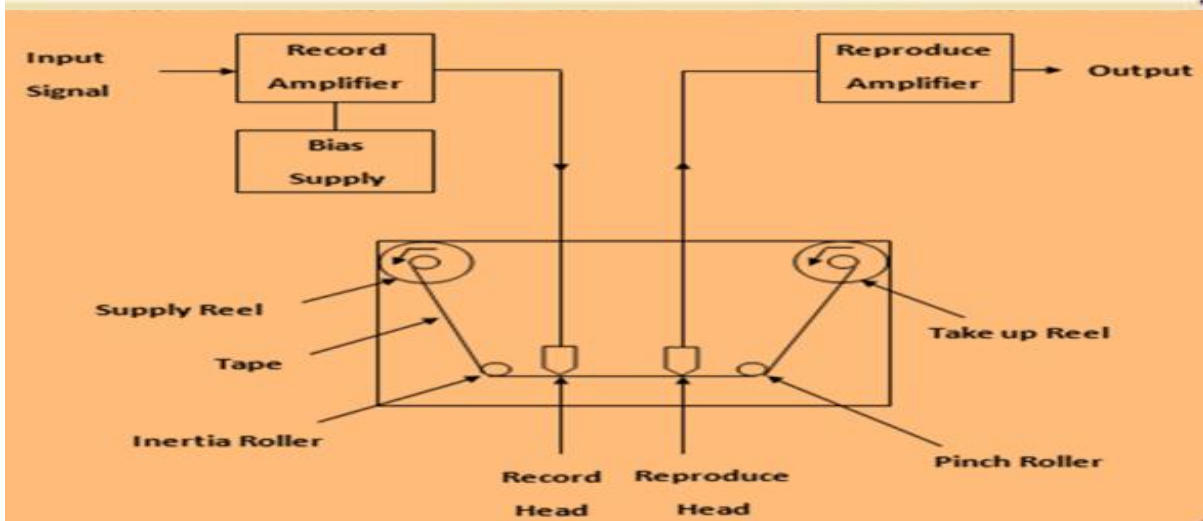
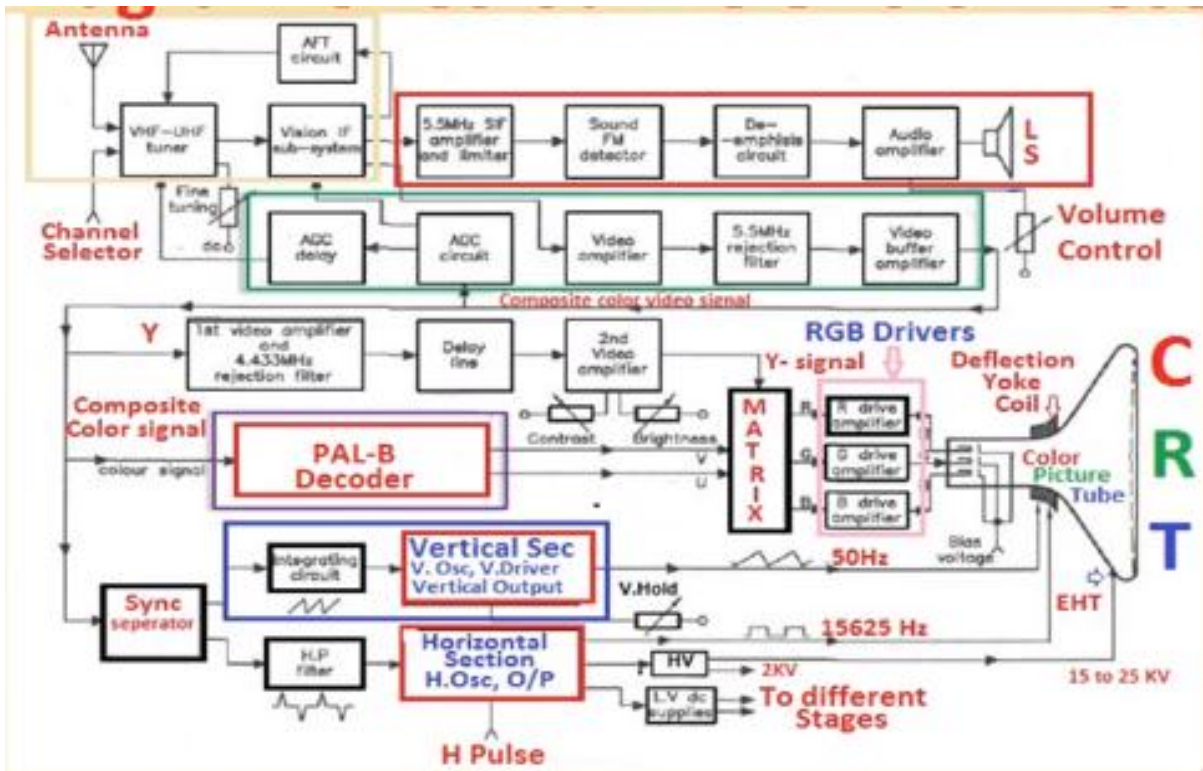
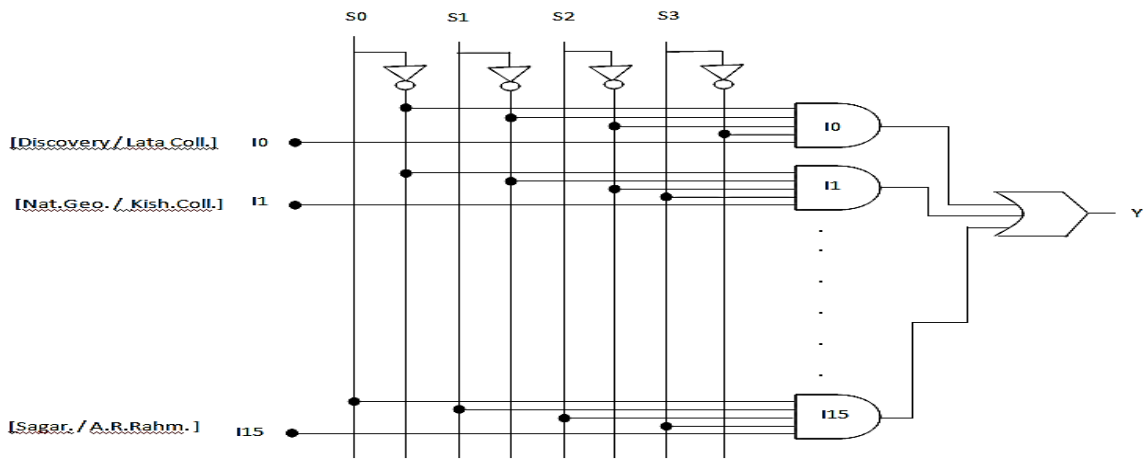


Figure 7: Multiplexer as a remote controller in television and tape recorder.

CONCLUSION

The complete circuit design results into successfully converting “Multiplexer as a Remote controller in Television and Tape Recorder ” capable of selecting particular input out of multiple inputs with provision of selection lines and further directs the selected input to single output line. The Multiplexer uses “logic based selection criteria” to select particular input out of multiple inputs and further becomes able to display selected input via T.V. (Audio/Video) and via Tape Recorder (Audio) based on requirement within the system. The concept to develop and design “Multiplexer as Remote controller” is one of most relevant applications, to meet Circuit designer’s challenge of developing system with improving performance, smooth and reliable functioning speed to select particular input and act as a Remote controller.

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