Bangladesh University of Business and Technology

Amplitude Modulation and Demodulation Module

Course Name-Telecommunication Engineering (Lab)

Course Code - EEE308

Team - “KINETIC VISION”

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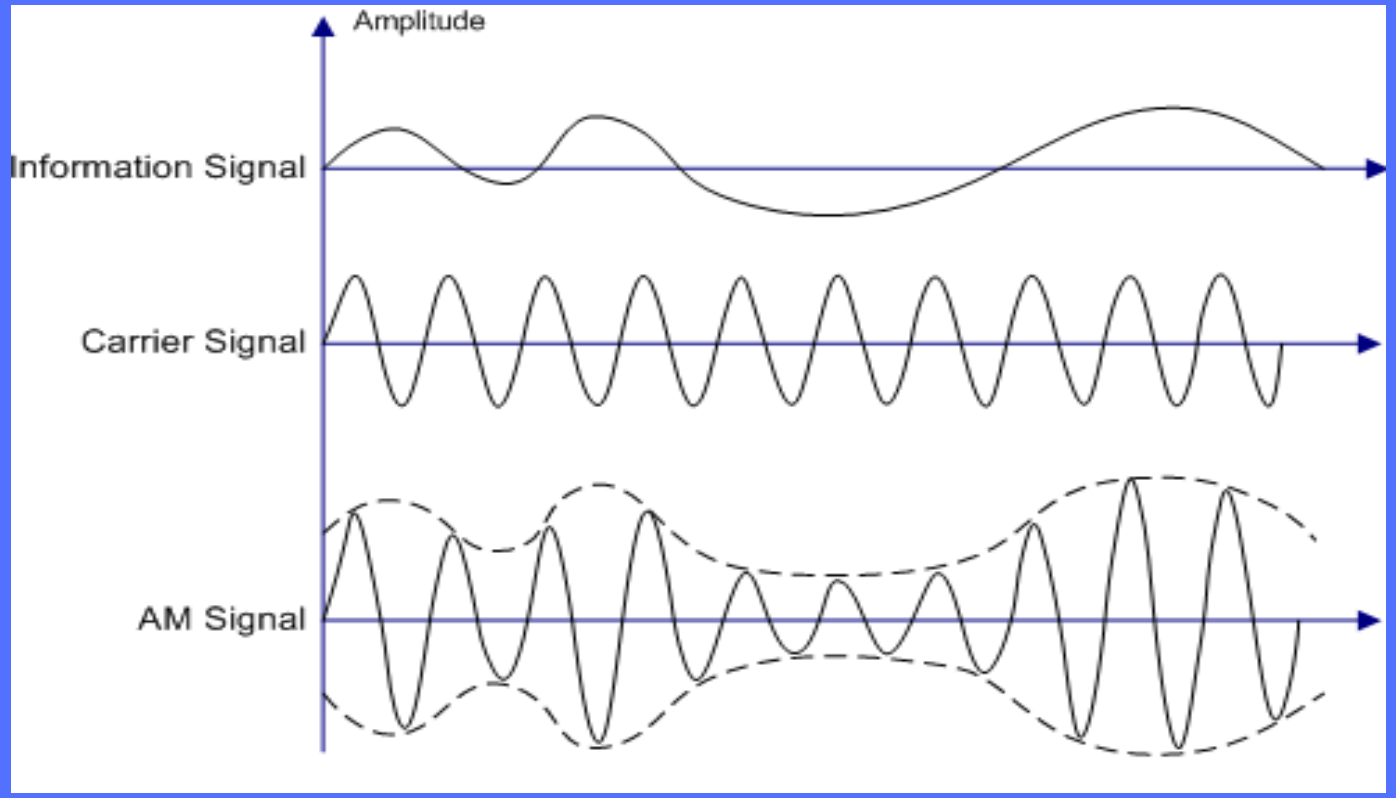
AGENDA

- Abstract
- Introduction
- Motivation
- Equipment
- Literature Review
- Methodology
- Circuit Diagram and Result
- Socio Economy Impact
- Future Plan
- Conclusion

ABSTRACT



- This modulation process involves varying the amplitude of the carrier wave in accordance with the instantaneous amplitude of the message signal.
- AM modulation and demodulation is crucial for many communication systems, including broadcast radio.

INTRODUCTION

- **Amplitude Modulation (AM) is a key modulation technique that has played a pivotal role in the development of telecommunications. It provides a means of encoding information onto a carrier wave by varying its amplitude, enabling the transmission of signals over long distances.**

OBJECTIVES

- To know about the AM modulation and demodulation
- To know about the hardware connection of this modulation and demodulation.
- To know about how the AM signal characteristics and how it works.
- To know about the envelope detector.
- To know about how the signal transmitting and receiving

MOTIVATION

- Amplitude Modulation (AM) holds a significant place, offering a straightforward yet effective means of impressing information onto a carrier wave.

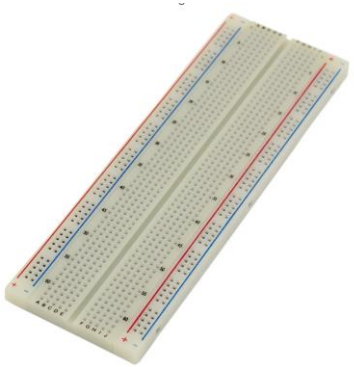
- AM enables the propagation of signals over long distances, making it a cornerstone in radio broadcasting and various other communication systems.

Efficient Use of Spectrum

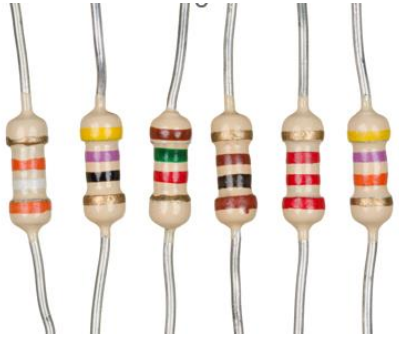
Resilience to Interference

Compatibility with Analog Signals

EQUIPMENTS



Breadboard



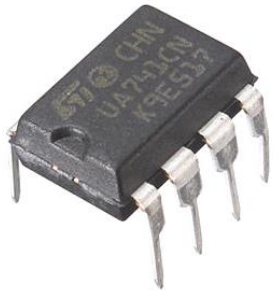
Resistors

Capacitors

Inductors

Transistor

Jumper Wire

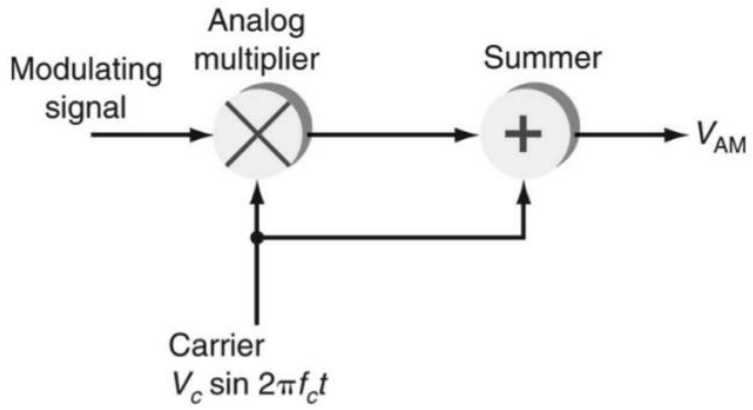


Transistor

Diode

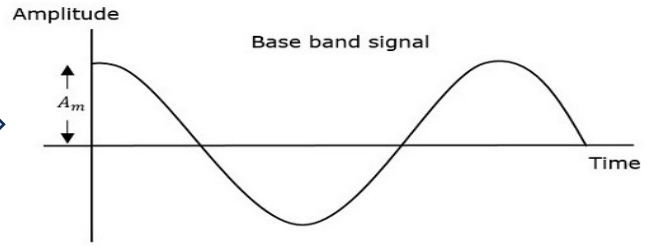
LITERATURE REVIEW

Am Modulation



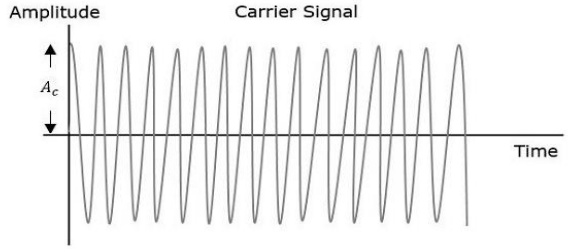
❖ **In AM, the amplitude of the carrier signal is made to vary in accordance with the instantaneous amplitude of a modulating signal (often referred to as the message signal or information signal).**

Message Signal



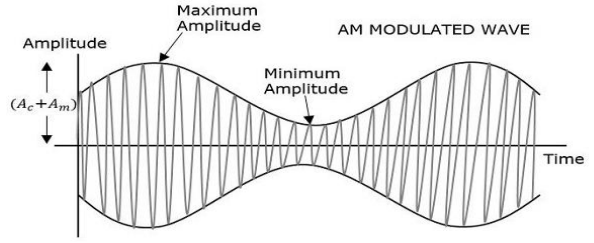
$$m(t)= A_m \cos(2\pi f_m t)$$

Carrier Signal



$$c(t)= A_c \cos(2\pi f_c t)$$

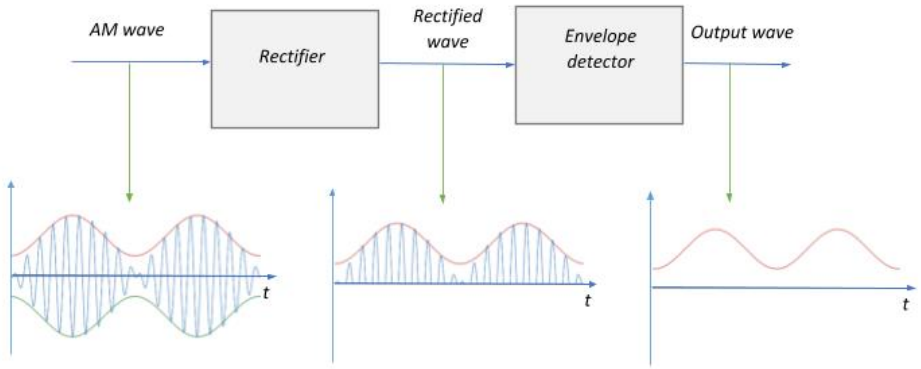
AM Modulated Signal



$$s(t) = [\, A_c + A_m \cos(2\pi f_m t)] \cos(2\pi f_c t)]$$

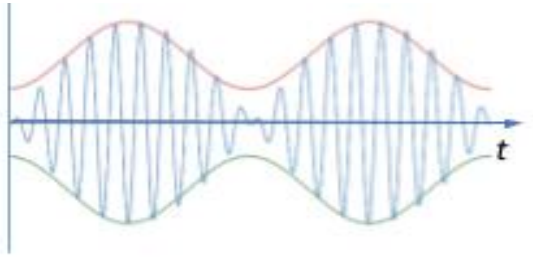
LITERATURE REVIEW

Am Demodulation

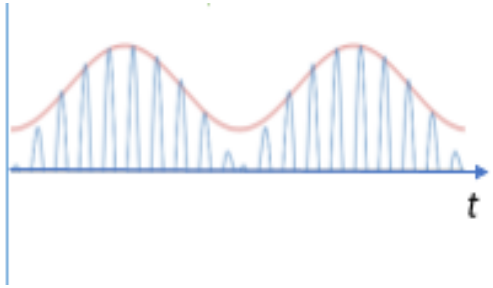


- **Amplitude Modulation (AM) demodulation is the process of extracting the original modulating signal from an amplitude-modulated carrier signal.**

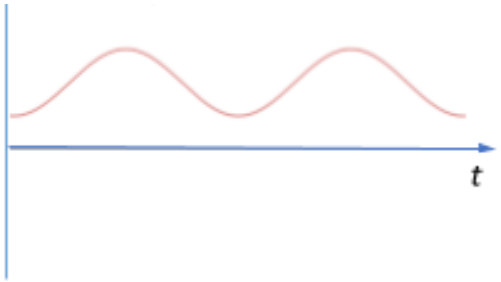
AM Modulated Signal



Rectified Signal

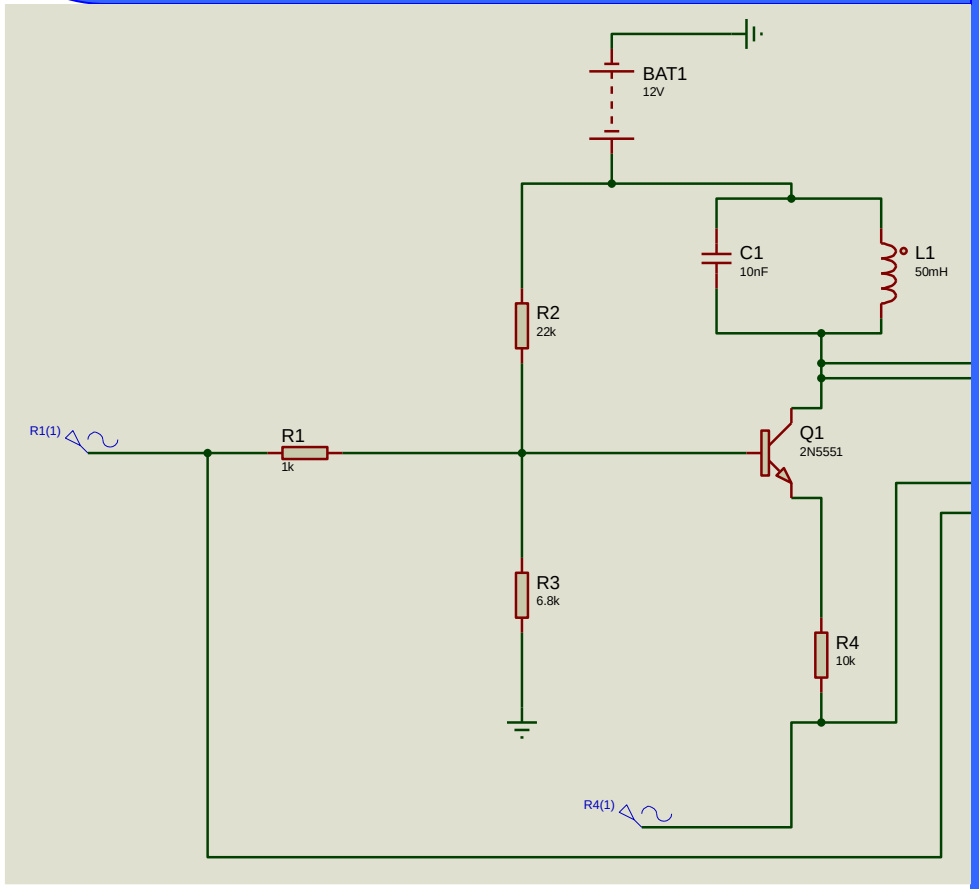


AM Demodulated Signal

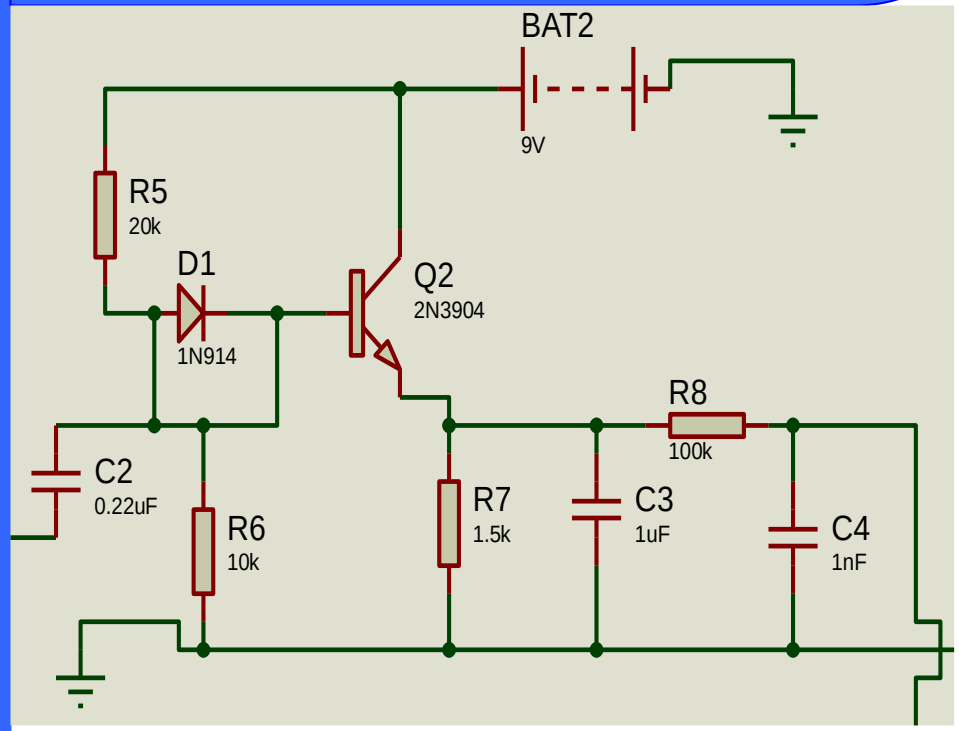


METHODOLOGY

AM Modulation Circuit

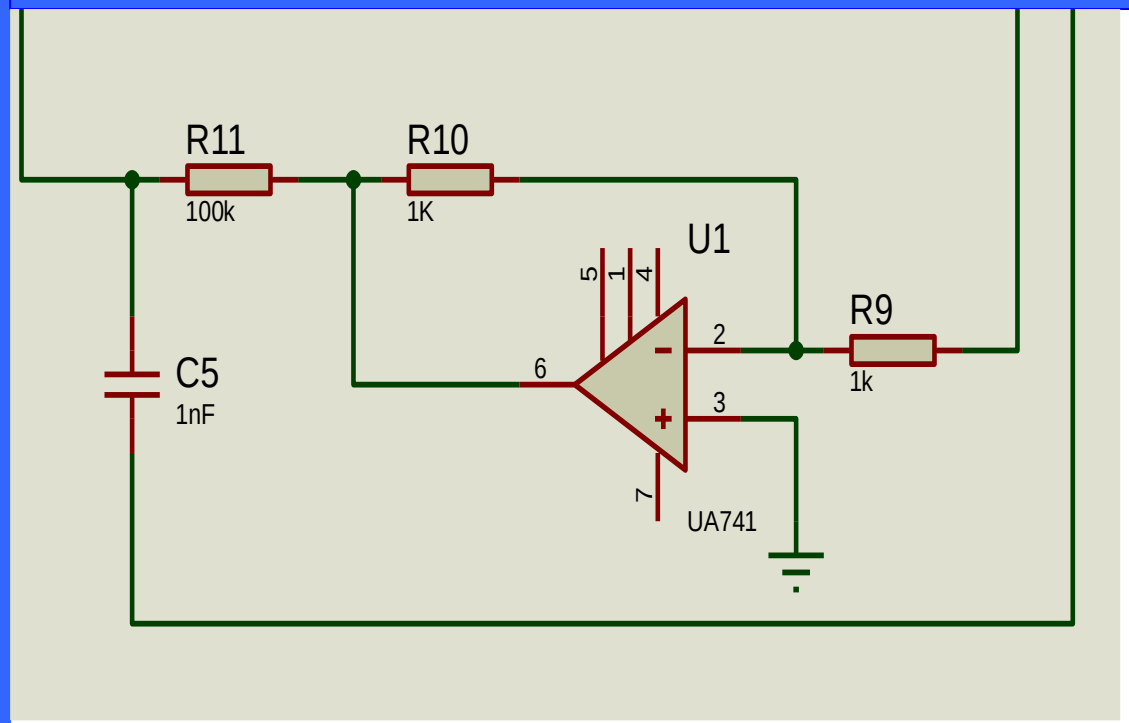


AM Demodulation Circuit

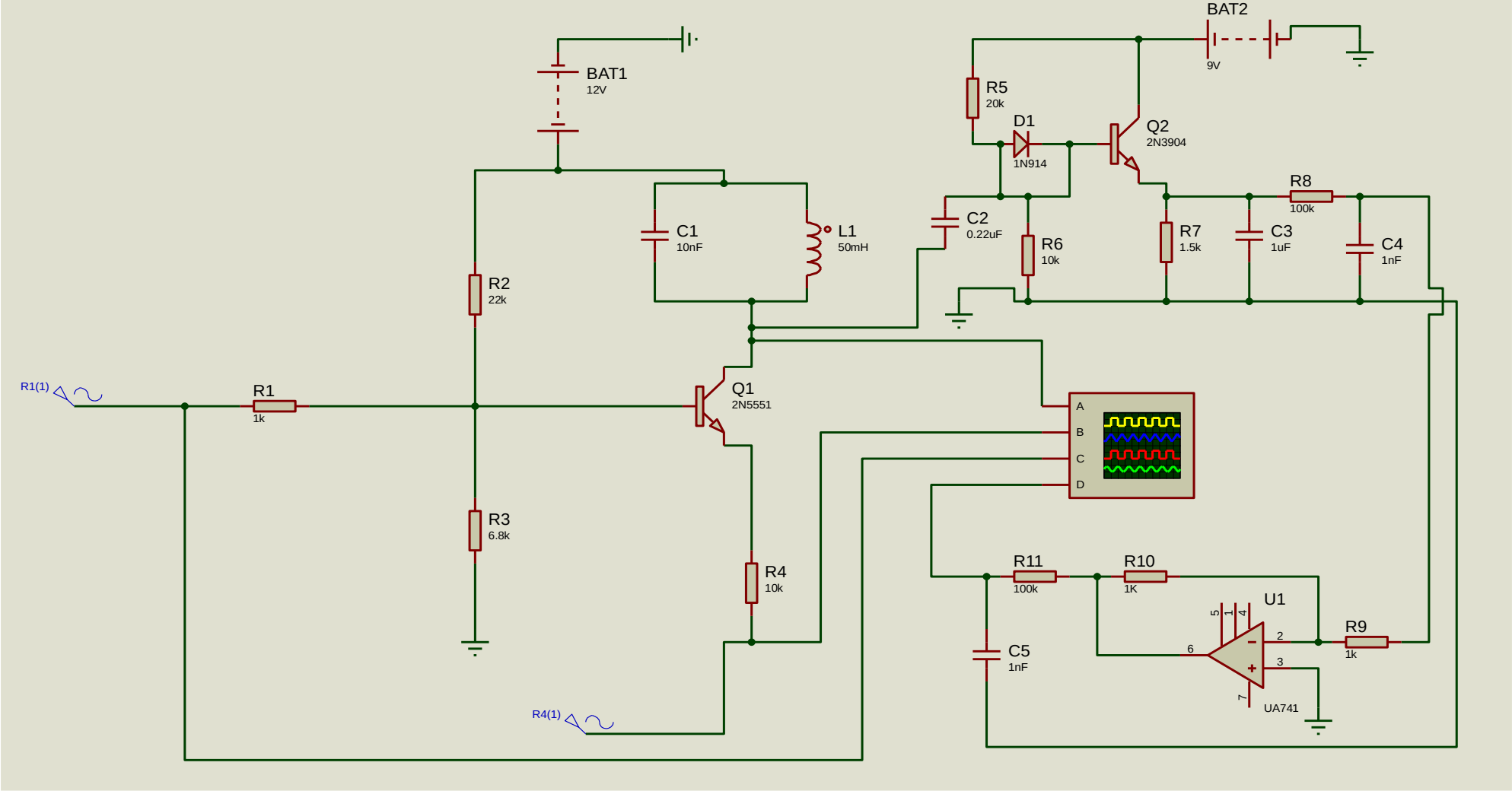


METHODOLOGY

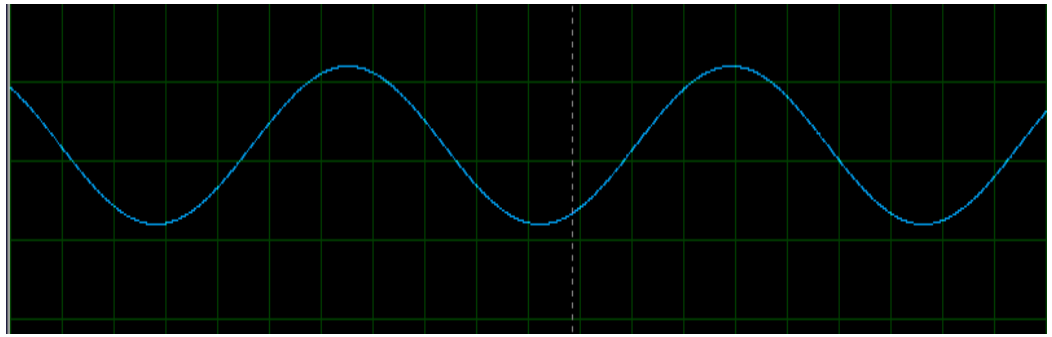
Inverting Amplifier Circuit



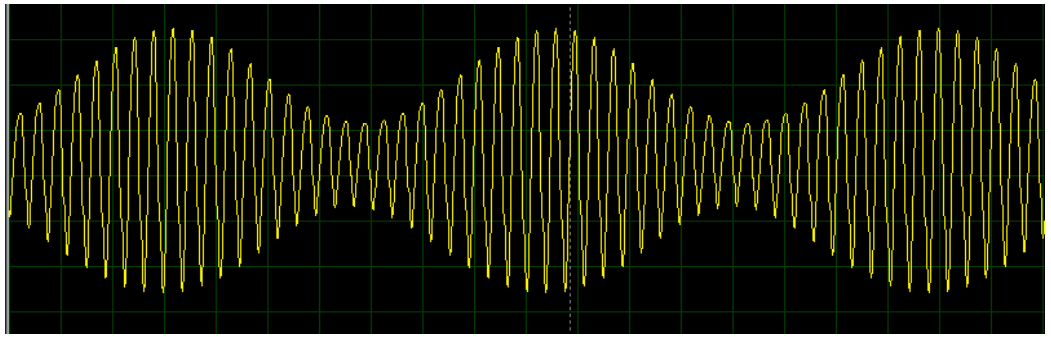
CIRCUIT DIAGRAM



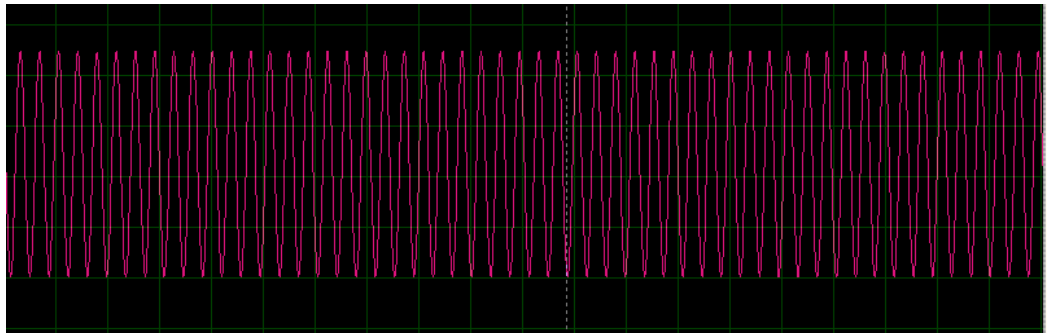
RESULT



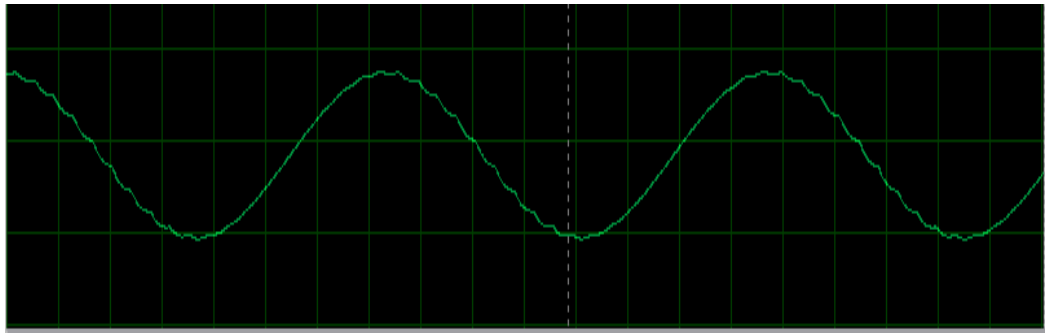
Message signal



AM Modulated Signal



Carrier Signal



AM Demodulated Signal

SOCIO ECONOMY IMPACT

- Efficient Use of Spectrum
- Resilience to Interference
- Compatibility with Analog Signals

Advantages

- Low Power Efficiency
- Not Suitable for High-Frequency Signals
- Difficulty in Recovering the Original Carrier

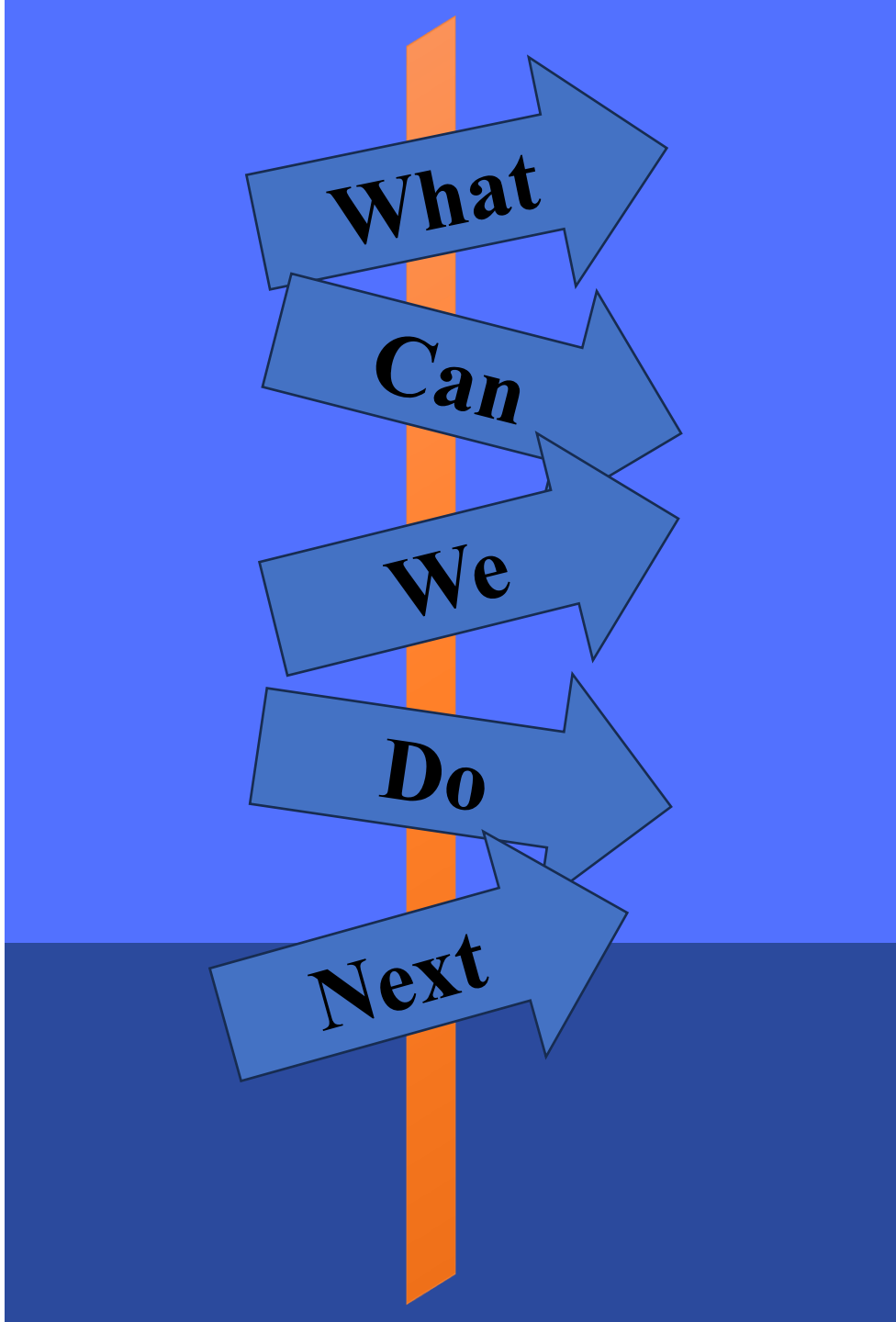
Disadvantages

Limitations of This Device

- Low Efficiency
- Susceptibility to Noise
- Lack of Security
- Complexity of Demodulation
- Susceptibility to Noise

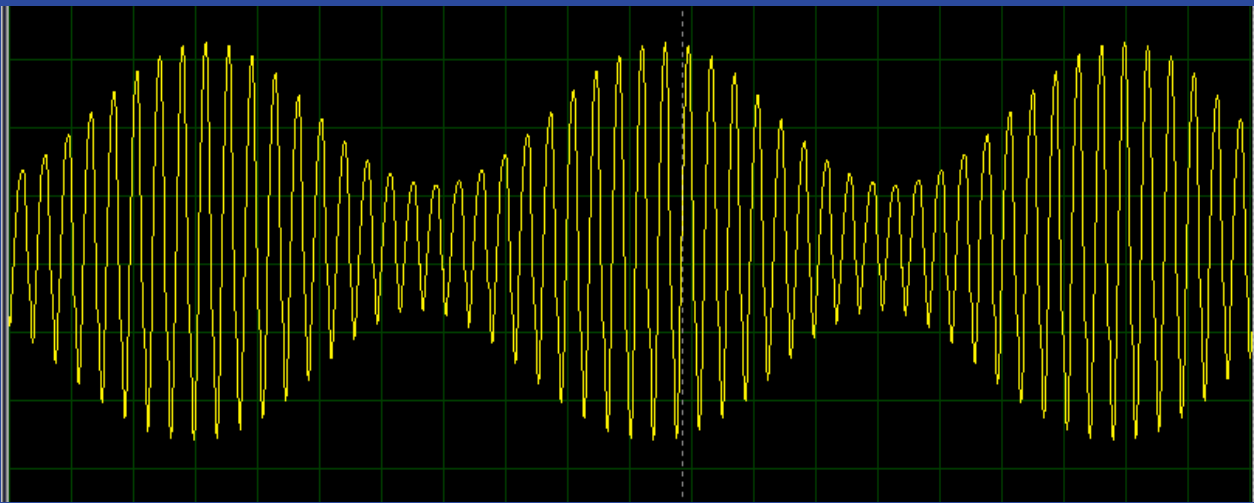
FUTURE PLAN

1. **Improved Spectral Efficiency**
2. **Hybrid Modulation Techniques**
4. **Integration with Digital Technologies**
5. **Exploration in IoT and Low-Power Devices**
6. **Revival in Specialized Broadcasting**

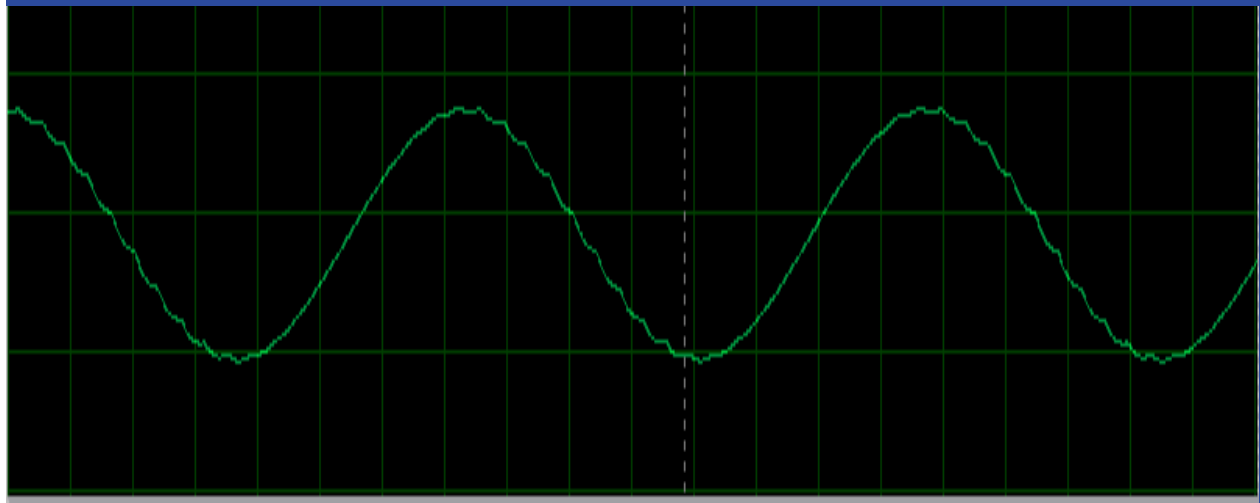


CONCLUSION

- **Amplitude Modulation (AM) has played a crucial role in the history of wireless communication, particularly in the realm of broadcasting.**



- **However, AM modulation and demodulation still find applications in specific scenarios, such as AM radio broadcasting.**




THANK YOU