

Dish Positioning Controller Using TV Remote

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ABSTRACT

Accurate positioning of a satellite dish is essential for obtaining satisfactory signal reception from broadcasting sources. Conventional manual adjustment of the dish is time-consuming and may not provide the optimum orientation required for maximum signal strength. This paper presents a **Dish Positioning Controller Using TV Remote**, which enables remote adjustment of the dish in horizontal and vertical directions. A conventional TV remote acts as the transmitter, while an infrared receiver detects the coded commands and forwards them to the microcontroller. Based on the received command, the microcontroller generates appropriate control signals for the motor-driver circuit, which operates two motors responsible for positioning the dish. The proposed system reduces manual intervention and provides a simple, economical, and convenient method of controlling dish orientation. Experimental operation demonstrates the ability of the developed system to change the dish position in different directions using commands from the TV remote.

Keywords— Dish Positioning, TV Remote, IR Receiver, Microcontroller, L293D, DC Motor, Satellite Dish, Remote Control.

INTRODUCTION

Satellite dishes are widely employed for receiving television and other broadcasting signals. The quality of the received signal depends significantly on the orientation and angular position of the antenna with respect to the satellite. In conventional installations, the dish is manually adjusted until an appropriate signal level is obtained. Such manual positioning can be difficult and time-consuming, particularly when repeated adjustment is required. Therefore, an automated or remotely operated mechanism can provide a convenient alternative for controlling the orientation of the dish.

The proposed system provides remote control of dish orientation using a conventional TV remote. Two motors are employed to provide horizontal and vertical movement of the dish. The TV remote transmits coded infrared signals that are detected by an IR receiver connected to the microcontroller.

The microcontroller identifies the received command and generates the corresponding signals for the motor-driver circuit. The driver operates the appropriate motor in the required direction, thereby changing the orientation of the dish. The approach provides a low-cost and comparatively simple solution for reducing the difficulty associated with manual dish positioning.

LITERATURE SURVEY

Several studies have contributed to the development of motor-control and remote-operated positioning systems. Richard [1] discussed motor-control electronics and emphasized the use of servo motors for accurate control and heavy-load applications, although their relatively high cost can limit their suitability for economical positioning systems. Chatterjee [2] presented various industrial electronic and motor-control techniques and explained how remote-control technology combined with microcontroller-based control can improve motor positioning and maintain

the desired position. These techniques provide a foundation for applications involving automation, robotics, and industrial control.

Me Me Kway Oo *et al.* [3] proposed a satellite dish positioning system using a DC motor and IR remote control, demonstrating the possibility of controlling the orientation of a geosynchronous satellite dish through remote commands. Similarly, S. A. Maskel *et al.* [4] presented a dish-positioning system using an IR remote, an 8051-family microcontroller, and two motors to obtain horizontal and vertical movement. The IR receiver decodes the remote-control signals and supplies them to the microcontroller, which generates appropriate commands for the motor-driver circuit. These studies indicate that microcontroller-based remote dish positioning provides a compact, economical, and convenient alternative to manual adjustment while reducing positioning time and human intervention.

PROBLEM STATEMENT

Manual positioning of a satellite dish is time-consuming and may result in inaccurate alignment, preventing the antenna from being directed toward the optimum position for receiving the strongest available signal. Therefore, a simple remote-controlled mechanism is required to adjust the dish in the desired horizontal and vertical directions.

OBJECTIVES

1. To design and implement a remotely controlled satellite-dish positioning system using a conventional TV remote and a microcontroller.
2. To control the horizontal and vertical movement of the dish using two motors so that its position can be conveniently adjusted to obtain improved signal reception.

PROPOSED SYSTEM

The proposed Dish Positioning Controller Using TV Remote is designed to provide convenient and remote adjustment of a satellite dish in both horizontal and vertical directions. The system consists of a conventional TV remote as the transmitter, a TSOP1738 infrared receiver, a microcontroller, an L293D motor-driver IC, and two motors. When a key on the TV remote is pressed, the corresponding coded infrared signal is received by the IR receiver and supplied to the microcontroller. The microcontroller decodes the received command and generates the required control signals for the motor driver, which operates the appropriate motor in the desired direction.

The two motors are independently controlled to obtain the required dish orientation, with one motor providing movement along one axis and the other providing movement along the second axis. By selecting appropriate keys on the TV remote, the motors can be rotated in clockwise or anticlockwise directions, enabling the dish to be positioned toward the required satellite signal. This arrangement reduces the difficulty and time involved in manual dish adjustment and provides a simple, low-cost, and user-friendly solution for remote satellite-dish positioning.

BLOCK DIAGRAM

Fig. 1 shows the block diagram of the dish positioning controller using a TV remote. The IR receiver detects commands from the TV remote and sends them to the Arduino Uno R3, which controls the motor-driver IC and two DC motors to adjust the dish in the required horizontal and vertical directions.

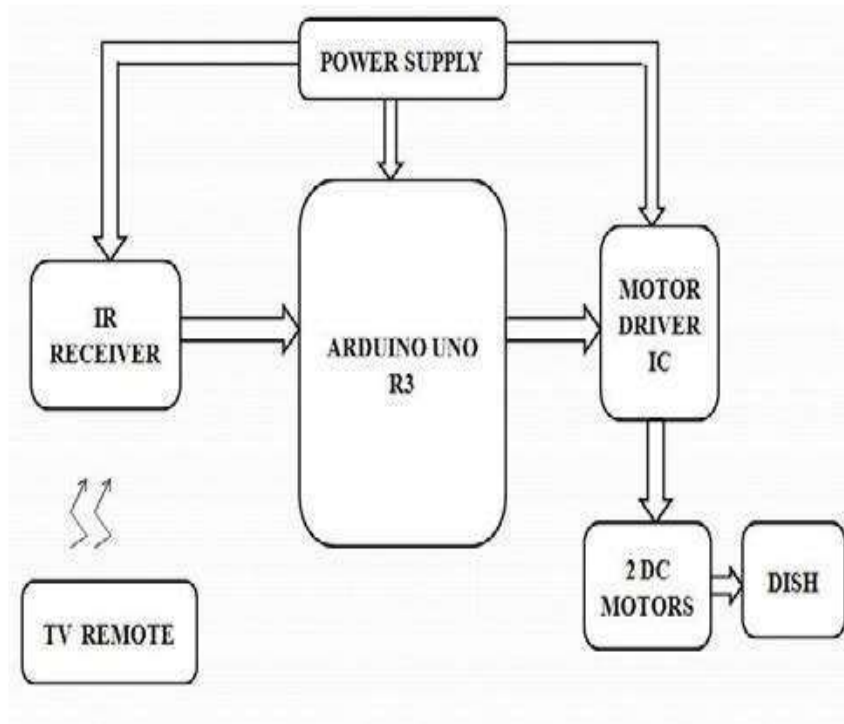


Fig 1 Block Diagram

CIRCUIT DIAGRAM

Fig. 2 shows the circuit diagram of the dish positioning controller, integrating the microcontroller, TSOP1738 IR receiver, L293D motor-driver IC, power supply, and two DC motors. The microcontroller processes the IR commands received from the TV remote and controls the motor driver to rotate the motors in the required direction for accurate dish positioning.

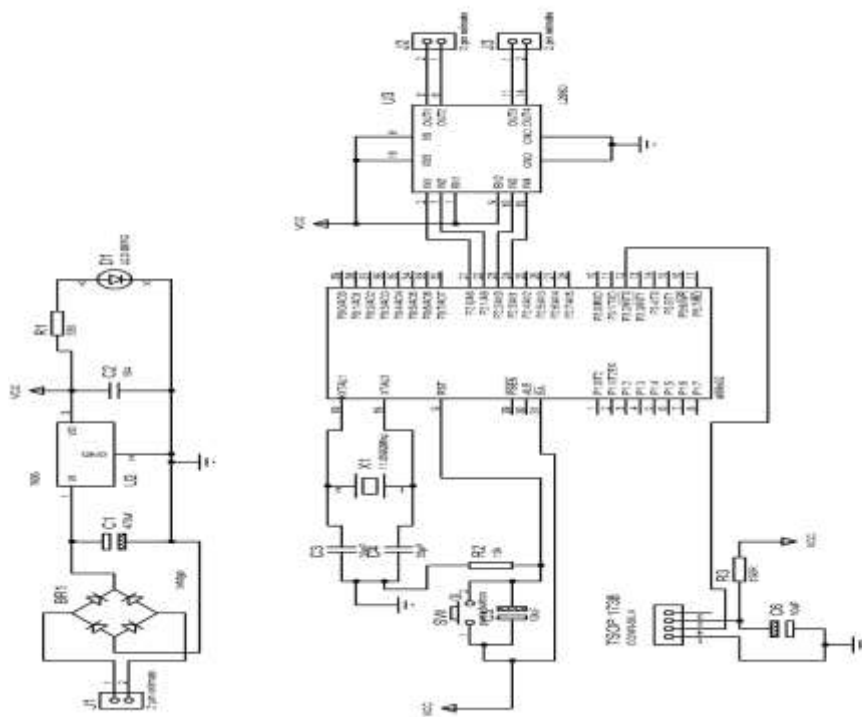


Fig 2 Circuit Diagram

METHODOLOGY

The proposed dish positioning system operates by receiving commands from a conventional TV remote through the TSOP1738 IR receiver. The received infrared command is supplied to the microcontroller, which identifies the selected key and generates the corresponding control signals. These signals are applied to the motor-driver circuit to operate the two motors responsible for adjusting the dish position. The motors can be rotated in clockwise or anticlockwise directions to provide the required horizontal and vertical movement of the satellite dish.

During operation, the microcontroller continuously monitors the IR receiver for remote commands. Depending on the key pressed, Motor 1 or Motor 2 is activated in the required direction, thereby changing the angular position of the dish. This process enables the user to adjust the dish remotely toward the desired position for improved satellite signal reception, reducing the need for manual alignment and simplifying the overall positioning process.

RESULTS AND DISCUSSION

Fig. 3 illustrates the developed dish positioning system, which demonstrates the remote adjustment of the satellite dish using commands transmitted through a conventional TV remote. The infrared signals generated by the remote are detected by the TSOP1738 IR receiver and forwarded to the controller for processing. Based on the received command, the controller generates appropriate control signals and sends them to the motor-driver circuit, which operates the corresponding geared motor. Two geared motors are independently employed to provide clockwise and anticlockwise movement, enabling the dish to be adjusted in both horizontal and vertical directions. This arrangement

provides a simple and effective method for controlling the angular position of the satellite dish remotely, thereby reducing the need for manual adjustment and assisting in obtaining the desired dish orientation for improved satellite signal reception.

During experimental operation, different remote keys were used to obtain different motor movements. The reported sequence demonstrates Motor 1 operating in clockwise and anticlockwise directions and Motor 2 operating in both directions, thereby allowing the dish orientation to be changed according to user requirements. This confirms the basic feasibility of using a conventional TV remote as a simple interface for controlling satellite-dish orientation.



Fig 3 hardware setup

CONCLUSION

The Dish Positioning Controller Using TV Remote provides a practical approach for remotely adjusting the orientation of a satellite dish. The developed system uses an infrared TV remote to transmit commands, an IR receiver and microcontroller to process the commands, and motor-control circuitry to provide horizontal and vertical dish movement. The implementation reduces the difficulty associated with manual positioning and provides a simple, low-cost method of controlling dish orientation. The project demonstrates that microcontroller-based remote control can effectively be applied to antenna-positioning applications while reducing human intervention and adjustment time.

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