

AUTOMATIC MICROWAVE ANTENNA ALIGNING SYSTEM

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ABSTRACT

A microwave connection is very important to a telecommunication network because a fault of the link may drive the sites out of control. Microwave link alignment is a somewhat difficult task in the microwave installation process, because it is done manually. In the installation process a lot of problems occur. Sometimes manual alignment cannot find the most accurate aligned position and there is not any proper way to align those antennas. There are two receive signal (RSL) level measuring methods when an antenna is aligned in a microwave antenna system. These methods are DC voltage at the RSL test point and RSL indication in software/firmware. When align an antenna the first method is suitable. Ringers use that method and they connect voltmeter to RSL test point at Out Door Unit (ODU). This work focuses on doing that operation most accurately and automatically.

Keywords: *Microwave link, Microwave antenna alignment*

1.0 INTRODUCTION

In as much as microwave link is a circuit between terminals separated by a sizable distance, it can be considered as a type of transmission line. Terrestrial microwave signals propagate through the lower atmosphere¹. Most of the telecommunication service providers in Sri Lanka use microwave network to enhance their network coverage.

Telecommunication industry currently experiences an exponential growth in technological advancements. New Technologies demand new regulations and the regulator is forced to keep abreast with its regulations, especially with the burden of installation at a level field. A microwave connection is very important to a telecommunication network because a fault of the link may drive the sites out of control. Microwave link alignment is a somewhat difficult task in the microwave installation process, because it is done manually². In the installation process a lot of problems can occur. Sometimes manual alignment cannot find the most accurate aligned position and there is not any proper way to align those antennas.

This research is to propose and design a prototype system to minimize the time delay and to simplify the operator’s job in the installation and aligning the Microwave link in the telecommunication field.

2.0 EXPERIMENTAL

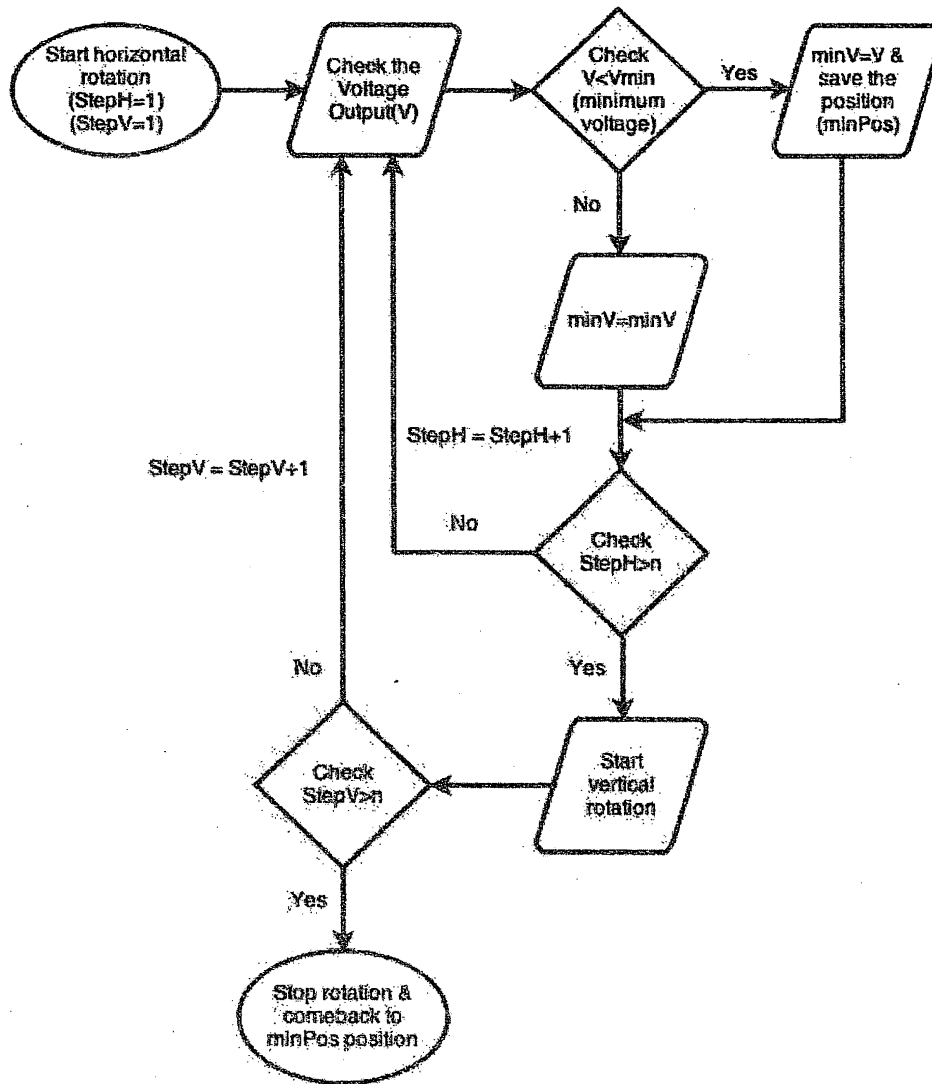


Figure 1: Flow chart of designed system

In this proposed system two stepper motors were used for vertical and horizontal rotation. After each step the voltage output was checked and it was compared with current minimum voltage. If current voltage output is smaller than minimum voltage it was saved as minimum voltage and its position. After a complete full rotation it comes back to the position which has the minimum voltage. PIC16F877A microcontroller was used for

controlling the logic of the system³.L293D stepper motor driver IC was used to drive the stepper motor⁴.Available minimum voltage was displayed in the LCD display.

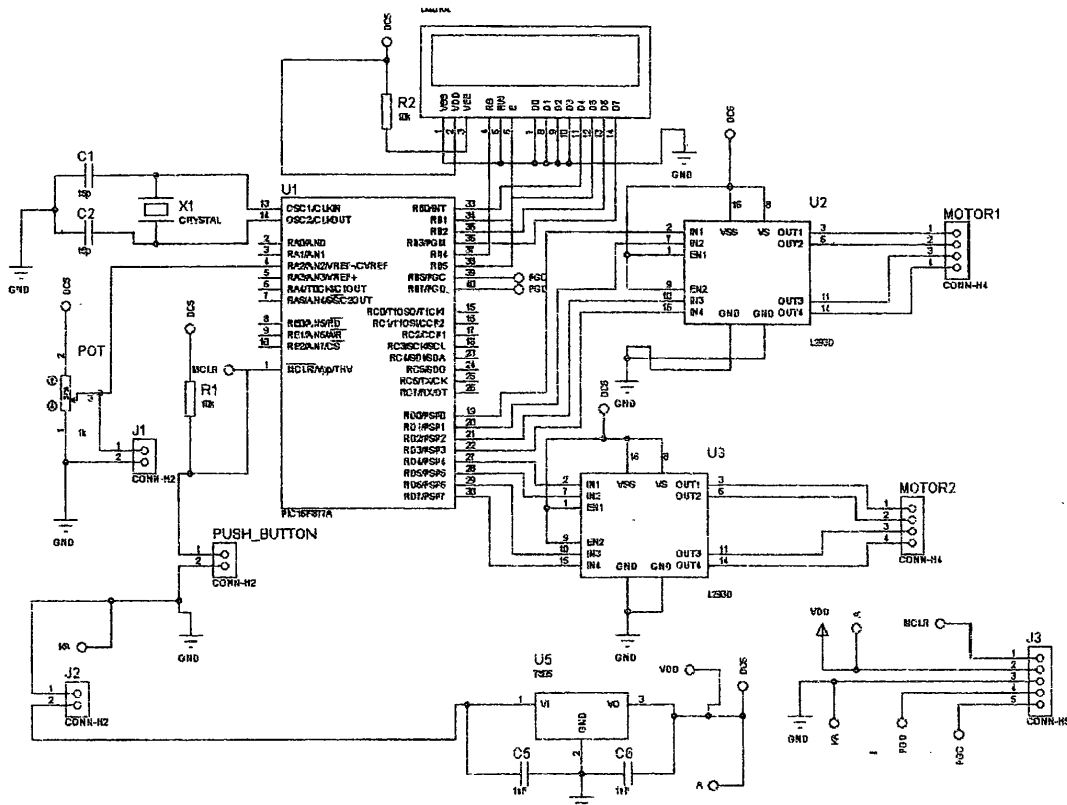


Figure 1: Circuit diagram of designed system

3.0 RESULTS AND DISCUSSION

This system is very useful to any service provider because it decreases their labor cost. Also this is the solution for automatically detecting RX level change due to environmental condition. Technicians can discuss and can get the correct alignment for the link without visiting the site. Thus they can do their work very efficiently and effectively. There are some limitations of the proposed system. They are, when antenna diameter is very large required very large stepper motors are required to tolerate weight of the antenna and additional power supply is also required for the proposed system.

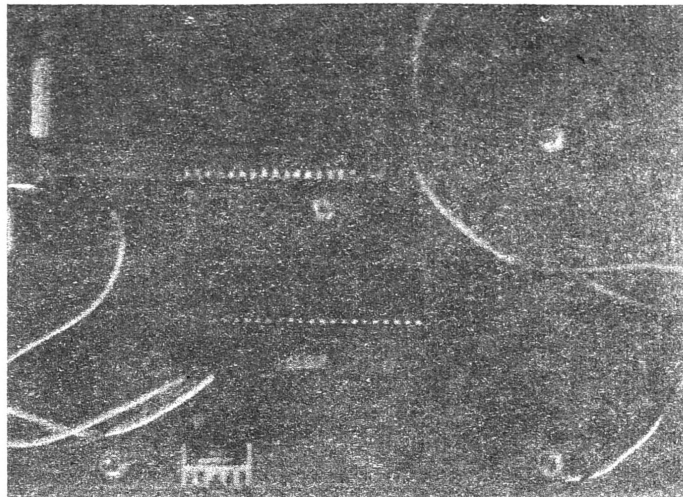


Figure 2: Circuit of the designed system

4.0 CONCLUSION

Even though this is a preliminary study, the results predict the possibility of using this system for automatic alignment of microwave antenna. The proposed system must be included in the antenna as an inbuilt system.

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