

Design of a Cascadable Dish Satellite Control Module for Settop Boxes

The Cascadable Dish Satellite Control Module (CDSCM) is an intelligent RF peripheral which allows a user to automatically control the satellite pointing of certain KVH antenna systems by monitoring the Dish Network signal that is generated when a channel change is initiated on a Dish Network receiver. Because many vessels have multiple Settop control boxes, each settop box requires its own control module. Furthermore, the control modules must be able to communicate with each other and send only one command to the antenna.

This project is a continuation of a Capstone Design Project from the 2008 – 2009 academic year.

In that project, hardware was designed that intercepts the Dish Network signal and transforms it into a digital signal that a microprocessor could read. Software was developed to decode the transformed signals, and determine which satellite the signal corresponds to. Additional software was developed to send out a “change satellite” signal to the antenna controller telling it to move to the selected satellite. Continuation of this project will include adding support for the DiSEqC protocol (both hardware and software) and incorporating the microprocessor onto a PCB with the designed circuit.

A communication methodology needs to be developed that will allow multiple control modules to communicate with each other and ensure that they coordinate their commands to the antenna. A hardware protocol must be evaluated and selected. Currently Ethernet is favored, but USB and standard RS-232 serial are also possible choices.

Functional Specifications:

1. Extend the design of the satellite control module previously developed to accept, decode, and generate DiSEqC commands.
2. Design a communication methodology, both hardware and software that allows multiple control modules to communicate with each other and one or more antennas.
3. The control module should have a parts cost of less than \$70, and preferable less than \$50 (excluding cables and any software royalties)

Required Skills:

This project will require a team of 3 students:

1. a computer engineering student to implement the software;
2. two electrical engineers, one who has experience in communications protocols and hardware and one with experience in electronics microcontrollers.

Knowledge of electronics, interfacing embedded systems, and selection/programming of embedded development boards will be extremely useful.

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