ABSTRACT

Nanosatellites are a type of satellite made with various missions and objectives. To communicate with the earth segment, satellites need communication devices. One type of satellite communication is communication that is intended for TTC (Telemetry, Tracking, and Command). This TTC data is used to determine satellite conditions and also to collect informations about satellite from the earth segment. However, the satellite communication system is a long-distance communication. Many disturbance, interferences, and attenuation of communication channels greatly disrupts the process of sending and receiving information (data) because it can damage and even eliminate the information. Therefore, we need an Error Detection and Control (EDAC) or Forward Error Correction (FEC) to control and minimize data errors without the need for re-transmission of the data sent.

One type of FEC is BCH (Bose-Chaudri-Hocquenghem) which belongs to the block code. BCH is a coding technique which is simple to be implemented and has flexibility, but also has good performance and is suitable for communication with low data rate, including for nano satellites. In this thesis, a prototype of the TTC module is made and integrated with BCH (63.45) as its FEC. In addition, the AX.25 protocol is integrated as an amateur satellite communication requirement and is also used for error detection.

The results obtained from the implementation of this thesis are the creation of a TTC module on laboratory scale and can be used to transmit telemetry data and receive command data from ground stations properly, through BCH coding techniques (63.45) and is integrated with AX.25 protocols. Quantitatively, integration of BCH code can provide smaller Eb / No value for the same Bit Error Rate (BER) value, especially for BER equal to 10^{-6}.

Keywords : *Nanosatellite, TTC Module, BCH, BER, AX.25*