

## **ABSTRACT**

In recent years, the development of cube-shaped Nano satellites or CubeSats has increased. CubeSat is one type of small satellite that currently has quite a lot of development because of the lower level of complexity than conventional satellites. Cube satellites can be a solution in emergency and early warning systems. In Indonesia, this system is needed because there are many natural disasters that harm the community and poor management due to the ineffectiveness of early warning systems and emergency communication.

In general, CubeSat is composed of several integrated subsystems, such as Telemetry Tracking Command (TTC) and On Board Computer (OBC). TTC is a subsystem that is responsible for cubesat to carry out the data communication process from internal housekeeping as a measurement of satellite conditions, as well as commands from ground stations. While OBC is the main subsystem on a nanosatellite where its function is to manage operations in nanosatellites and communicate with all subsystems on satellites. In this capstone design, an integration system is designed between communication modules, namely TTC and Main OBC modules which are included amplifiers and Redundant in OBC modules to create an efficient system in communication and data processing because integration between the two modules is very important in the development of cube satellites.

The results obtained from this capstone design are the realization of the design of a TTC module that can work at a frequency of 437 MHz equipped with an amplifier and integrated with OBC modules along with Redundant OBC, Main OBC can communicate with TTC via I2C communication, store housekeeping data, Redundant is able to receive main commands from OBC, and the AX25 protocol on the sender side of the TTC board has been successfully developed and implemented including frame address and error detection using CRC.

Keywords: CubeSat, TTC, Amplifier, OBC, Redundant