

## **ABSTRACT**

*The development of technology makes many ways to do measurements, one of examples is a remote measurement. Telemetry is a process of measurement for an object in a separate location through either wired or wireless means. Wireless is a communication system that used frequency/radio spectrum in transmit and receiving the data. In other way, the wireless telemetry system could made a remote measurement possible by using radio frequency as its medium.*

*This final project is done by constructing a wireless telemetry system that will be used as a heavy instruments (excavator) monitoring. This system is consisted of three main parts, the transmitter, the repeater, and the receiver. In general, these parts are consisted of zigbee modules as a medium of wireless communication, Arduino microcontroller board as main controller, and battery as a power supply for each parts, and I/O expansion shield that designed alone and functioned as a connector bridge of every used components. In the transmitter part, the accelerometer sensor and gyroscope are used to read predetermined parameters while for user interface, the Visual Basic software is used to show the measurement results.*

*This final project is succeeded in making a wireless telemetry system that could measure the performance of heavy instruments with excavator type. The sensors are used to represent heavy instruments in three conditions, those are when the engine is off, idle and working. The received data is also could be attained successfully through there is still one empty data which is received. The maximum distance covered in indoor space is 100 m and for outdoor is 200m. The measured inter-device delay is 4 ms – 5ms.*

*Keywords : Telemetry, Wireless, Zigbee, Arduino, Accelerometer, Gyroscope, Complementary filter, Visual Basic.*