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Motorcycle Safety System with "Auto Connect"

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Abstract
The vehicles thefts, especially motorcycles, occured without knowing the time and the owner. Motorcycle thefts occured in public places such as housing, markets, places of worship, tourist attractions, offices, even in the house. It caused anxiety that made us anxious in doing daily activities. Therefore, it was necessary to look for innovation technology to secure motorcycles from thieves. Motorcycles made by the manufacturer, were actually quite safe with the ignition key. However, thieves were not witless either to break into the ignition key by using "T" keys. Thus, the security system of a vehicle (motorcycle) was not enough by relying on the ignition key. Thus, there was necessary to make a new breakthrough as additional safety on motorcycles, namely motorcycle safety system with "auto connect". This motorcycle safety system with "auto connect" worked based on the distance between the motorcycle and the "auto connect" controller. If the controller was within the radius of the motorcycle then the motorcycle will be active, but if the controller is out of the range, then the motorcycle will not turn on and the horn alarm will sound. Motorcycle safety system with "auto connect" was not only installed on the motorcycle but also can be installed on helmets, bags, clothes pockets and other goods.

Keywords: motorcycle, safety system, auto connect, innovation, technology

INTRODUCTION

The theft of motorcycles in Pringsewu district is very troubling for residents. This causes considerable material losses among the residents. As quoted from Tribun Lampung edition of May 6, 2020, it was reported that the criminals of motorcycle theft were expected to be arrested immediately, because they had harmed the residents [1]. In addition, in other areas such as Pontianak, the crime rate, especially motorcycle theft had been an anxiety of the residents for a long time [2]. The news above was a small part of many motorcycle thefts which occured in Indonesia, especially in Lampung.

Reflecting from some of the events above, it is impossible for us to rely solely on the built-in safety of motorcycle which is only an ignition key [3]. Thieves have been very easy to break into the ignition keys using "T" key [4]. In addition, thieves usually use a mixture of chemicals derived from the elements HCl (hydrochloric acid) and HNO3 (nitric acid) to break into the ignition key [5]. Even the time required by the thief was not long, only less than 1 minute. There are more than ten cases of theft every day in Lampung [1].

The thieves take advantage of the situation and conditions to carry out their actions, even in crowded places they can operate without hesitation, such as in minimarkets, markets, tourist attractions, places of worship and other public places. The design of the motorcycle safety system made by the manufacturer still has weaknesses that make it easier for motorcycle theft to occur if the owner is careless in guarding his/her vehicle [6]. Therefore, additional safety in vehicles, especially motorcycles, is a must, so we have an innovation idea to make tools that serve as additional safeguards on vehicles, especially motorcycles.

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This innovation product uses the basic principles of electronic switches. An electronic switch is an electrical circuit breaker and connector consisting of several basic components, namely resistors, transistors, capacitors and relays[7]. Electronic switch circuits are much needed in electronic equipment, because with electronic switches, the process of disconnection and current connection takes place quickly.

This innovation product was created to provide a sense of security to the general public and reduce crime rates. These innovation products are very helpful to the economy of the community and can create business opportunities and provide understanding to the community to love local products more [8]. Thus the presence of the innovation products provide motivation for the public to innovate and compete with foreign products.

METHODOLOGY

Design and manufacture of products using 3 stages as followed:

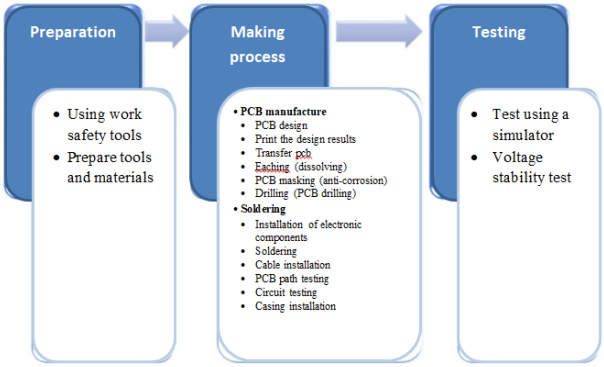


Figure 1. The stages of product manufacture

Preparation process

This stage prepared the tools and materials that will be used for the innovation product design and manufacture of motorcycle safety system with "auto connect". Materials provided include plain PCB boards to make designed PCBs, Ferrite Clorida (Fe-Cl3) solutions, electronic components, module boxes and transmitters, and sufficient cables. These materials were easily found in the store of electronic spare parts or online shopping.

Equipment used in the manufacture of this product include: PCB drills, trays for dissolving PCBs, screwdrivers, hammers, hacksaws, cutters, solders, measuring instruments and other work support tools. In addition, work safety needed to be considered in the work process. Work safety equipment used were: glasses, plastic gloves, and medicines.

Making Process

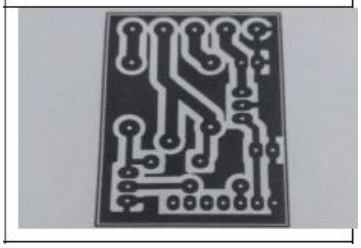
The making process of the innovation products through 2 stages, that were:

1. Making a Printed Circuit Board (PCB)

The process of making a PCB through several stages as followed:

PCB Design

Print the design result



Transfer to PCB

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Figure 2. The stages of PCB making process

2. Soldering

The stages of soldering through several activities as fol'

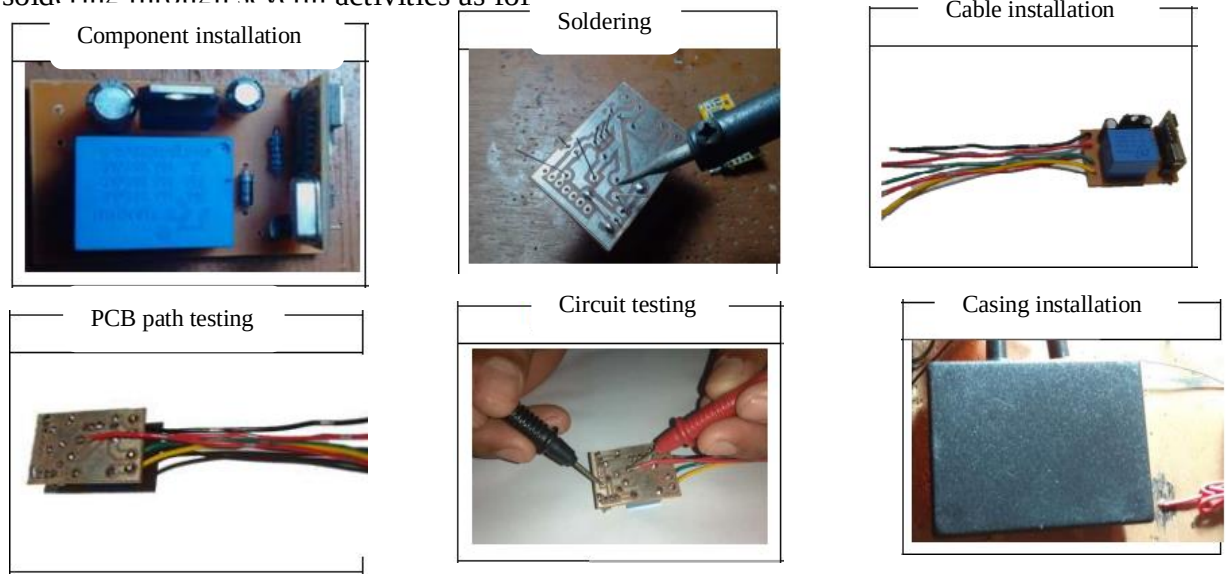

Figure 3. The stages of soldering process

Testing Process

The testing process in this innovation product using simulator software, namely Electronic Work Bench (EWB). In addition, a voltage stability test was conducted using IC regulator (IC 7805).

Spesifications

The innovation products made had the following technical specifications:

Module Dimension : P x L x T = 80 mm x 50 mm x 30 mm
Remote Dimension : P x L x T = 50 mm x 30 mm x 10 mm
Module Power : 0,0036 Watt
Module Voltage : 12 VDC
Module Current : 0,0003 Ampere
Tx Frequency : 433 MHz

RESULT AND DISCUSSION

Product

The innovation products created [9], it can be presented in the following figure:

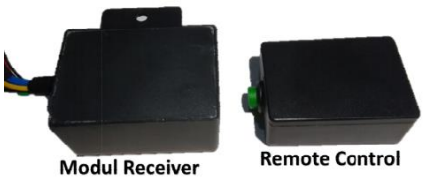

Figure 4. Form of *"auto connect"* module

The "auto connect" motorcycle alarm module product consists of two modules, namely the receiver and remote control modules. The receiver module is active when it gets a trigger from the remote control. The way this "auto connect"

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motorcycle alarm works is based on the distance between the motorcycle and the remote control. If the remote control is within a radius of ± 10 meters from the motorcycle, then the motorcycle will be active. If the remote control is outside the radius of ±10 meters from the motorcycle, then the motorcycle will not turn on and the alarm and horn of the motorcycle will sound.

This "auto connect" motorcycle alarm remote can be placed anywhere, for example on helmets, bags, shirt pockets or something else. It can provide safety to drivers when driving anywhere. As an illustration, if we experience unwanted things such as robbery on the way, then all we can do is give up the motorcycle and save ourselves. Then at a radius of ±10 meters, the motorcycle will turn off automatically and the alarm will sound, so it will attract the attention of people around the location of the robbery.

Wiring

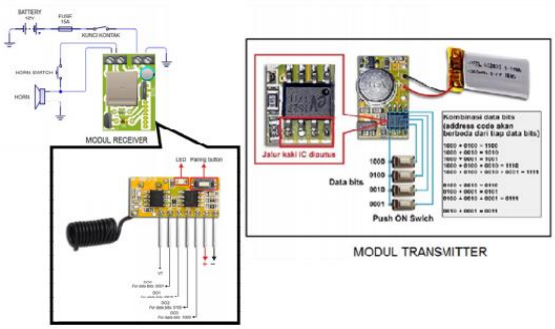

Figure 5. Schematic of the "auto connect" module circuit

Installation on motorcycles

The installation location of the "auto connect" module in the motorcycle is placed in front of the motorcycle on the inside. Strive to ensure that the module is located close to the motorcycle contact socket, in order to facilitate installation access. The placement of the "auto connect" module, it is necessary to consider the level of security, so that the "auto connect" module is safe from the destruction of criminals.

CONCLUSION

The innovation product of the "auto connect" module can provided a sense of security for motorcycle owners and can minimized crimes which occured. In addition, the "auto connect" module can motivated producers to open jobs in the community. The innovation products of the "auto connect" module was able to compete with foreign products, so it was necessary to develop further innovations, especially in more reliable 4-wheeled vehicles (cars). Thus, these innovation products can increase the selling price of vehicles as an implication of the vehicle safety system.

Acknowledgements

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