

Team: Genius Bots 9007A

Team Electronic Project

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INTRODUCTION

Our team, team 9007A, decided to open a TI-30XIIS calculator. We chose to open a calculator because it is simple to assemble and disassemble. It is also very cheap, unlike a phone, which is expensive. It has less parts which makes it easy to keep track of all the assembled and disassembled parts. It is also easy to know the external and internal components. Finally, the calculator is a very safe device to handle.

COMPONENTS

The components that we saw used in the calculator were the LCD(Liquid Crystal Display), Chipset, Solar Panel, Coin battery, TI Chip, PCB (Printed Circuit Board), and the keypad. The only item that we saw were made by Texas Instruments was the TI Chip. The remaining other parts were parts that TI ordered from other companies and attached into a calculator to make the final product.

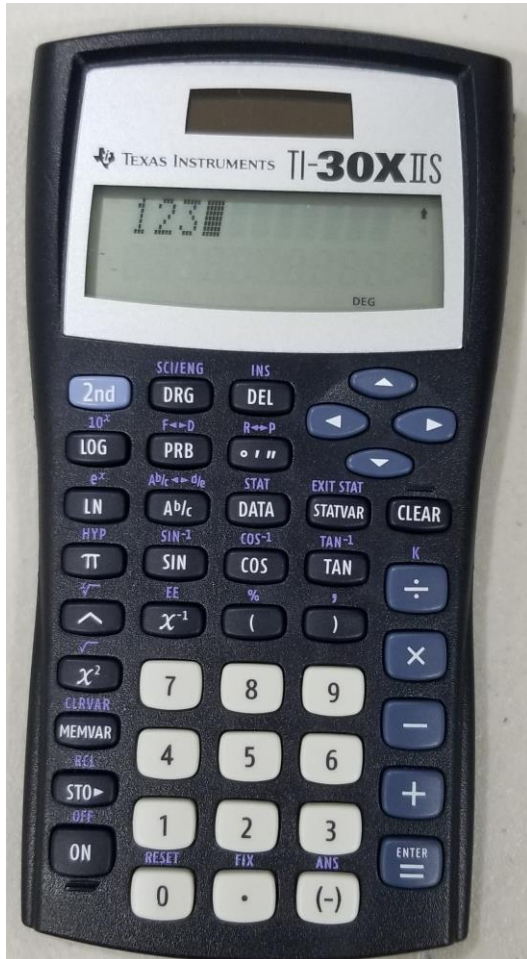
HOW IT WORKS

The LCD is the screen that shows whatever button is pressed is projected on the screen, this is known as the LCD. The solar panel is the external part of the calculator that converts light into energy. It takes that energy that it converted and sends it to the battery. The Coin battery is the internal part of the calculator that stores energy from another part called the capacitor. The TI chip is the main internal part of the calculator. It is the brain of the calculator and it solves all problems that are typed. If someone just wants to type a number, the chip sends a signal to the LCD to display that number. The PCB is also an internal part that sends electronic signals to the TI chip telling it if a button was pressed.

CONCLUSION

As a conclusion, we learned that Texas Instruments did not make everything. It takes parts from multiple different companies to create a final product. We also learned that companies do not make everything in one product. We also learned that when a button on a calculator is pressed, electronic signals go through the PCB and it gets set to the TI chip, which then displays your number on the LCD screen. Another one is that calculators with solar panels do not power the entire calculator. The solar panel sends energy to a battery inside the calculators. Finally, we learned that there is a capacitor that stores energy. Whatever energy the capacitor cannot hold, it gets sent to the battery, which then the battery saves.

PICTURES AND CAPTIONS



This is an image of the calculator before disassembly. As you can see, it works.



This is the calculator after we opened it up and took out all the buttons. We noticed that there is a soft rubber keypad under the buttons.



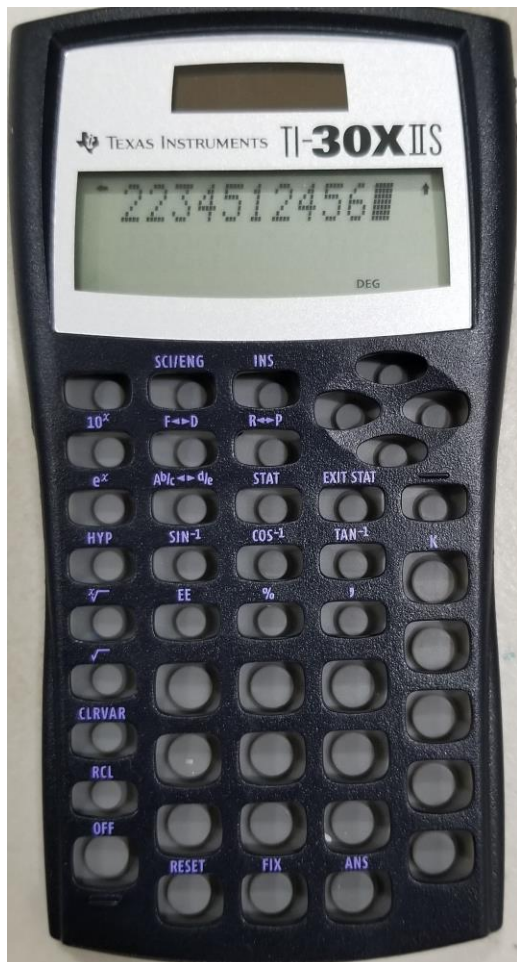
This is us observing the disassembled calculator. We noticed the buttons were loose so they will come out very easily.



This is the LCD and the solar panel wires which are red and black. We can see that there is no glass on the LCD.



This is the back of the PCB with TI chip in the center. It is a circular and black in color.



Here, we are testing the calculator without buttons. First, we tried pressing the PCB with our fingertip and it did not work. Then we tried the same experiment with the gray rubber keypad on top of the PCB. SUCCESS! We pushed the gray rubber circles and used our memory to tell which button is what. It was an interesting experiment. We realized how important it is to label buttons on any device to make user friendly.