

Texas Instruments Electronics Online Challenge Essay

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We took apart the TI-30 XS calculator. We selected this device because it is a ubiquitous and widespread device that is sure to have TI components as the company itself manufactures it. The calculator is also used by millions in America, in classrooms, and other work areas. Certain parts make up the calculator, including the LCD, the battery, and the motherboard. All these pieces create a device that works harmoniously.

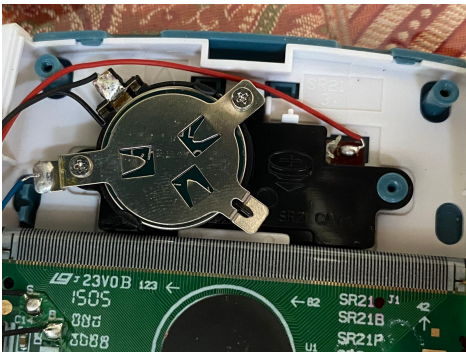
The first piece that we noticed was the motherboard. A motherboard is a vital piece to not only calculators but all devices. It connects the CPU or GPU and the hard drive to work together harmoniously. It contains the CPU, the memory, the chipset, and the circuits that connect them all. In order for a device to ultimately function, the motherboard must be fully functional. A motherboard from one manufacturer will not support parts from another, making it very limited and creating a variety of different types of motherboards. The motherboard in the TI 30 XS calculator cannot support another device like a laptop, as the requirements are entirely different and more advanced.

The LCD is a type of flat-panel display system that uses liquid crystals. It is a more efficient alternative than other display types, such as LED. It is much smaller and uses less power in order to produce an equal or better effect. LCDs use a backlight to light their screen. Then the pixels will be switched on and off, while the liquid crystals will rotate polarized light. There is a pixel layer in front of it to achieve this, there is a polarizing glass filter, which is separated by the liquid crystal poured in between.

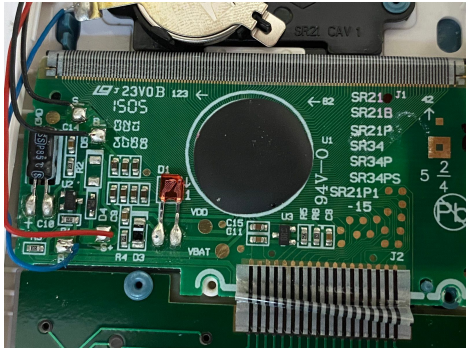
We also found the battery, which charges through a solar panel on the front of the calculator. The CR2032 battery is a Lithium-manganese dioxide battery that works from -20°C to 70°C . The battery has a specification of 225 milliamp hours. It is 20mm in diameter and 3.1mm in height, and due to its shape, it gained the nickname of the coin battery.

The buttons, used to add inputs and values, are connected by a circuit board that led back to the motherboard. The signal would go back and forth in a matter of milliseconds when a button is clicked. The circuit board not only connects the buttons to the motherboard, but it connects many other parts of the calculator, and, in many devices, a circuit board will connect the motherboard itself to all of its other parts.

The TI-30 XS has many TI components. One that we found was the semiconductor, which makes the whole electrical system faster and more efficient. From this experiment, we learned that the whole device depends on the motherboard to function in harmony, but the motherboard also depends on the parts to function correctly.



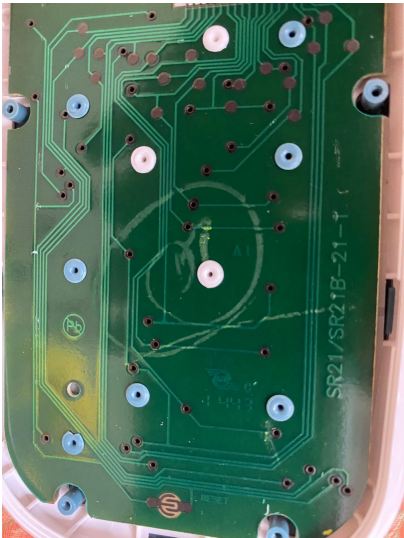
This is the CR2032 battery that lies on top of the solar panel that charges it.



This is the main motherboard which connects all the pieces together and helps them work together.



This is the display, which is an LCD, and physically displays the result of the typed buttons



This is the circuit board, which connects all the buttons to the motherboard.