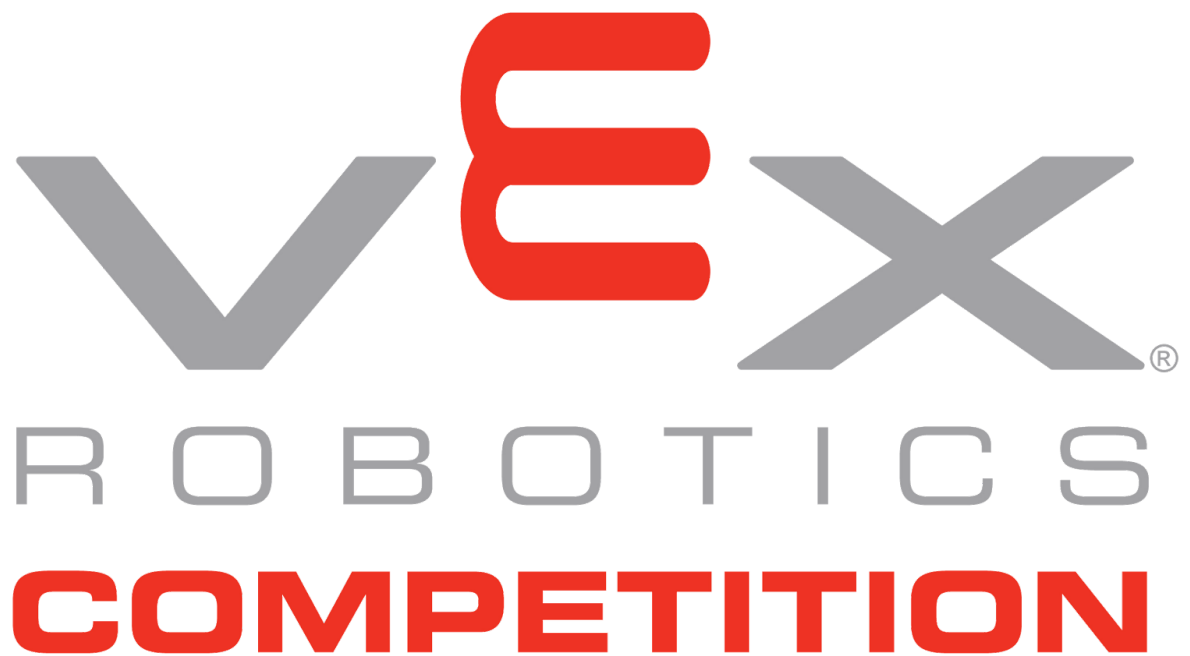




Texas Instrument Electronic Online Challenge 2018



By: Liam Taylor, Timothy Pfaff, Chi Pannell, and Parit Phornvutiyanont

Table of Contents

- 3 - Introduction/List of Components
- 4 - Components Roles / Battery and Phillip Screws
- 5 - Components Roles / Wifi-Board and IR Board
- 6 - Components Roles /

Introduction

For our Vex Texas Instruments Electronics Online Challenge of 2018, we have decided to take apart a Nintendo 3DS XL. The reason that we chose this device is because its screen broke and it was allowed by the owner of the device.



List of Internal Components

- 3.7V 1300mAh 5Wh Li-Ion battery
- Wi-Fi board
- IR board
- Motherboard
- Chips
 - Nintendo 1048 0H ARM CPU
 - Atheros AR6014G-AL1C Wi-Fi SoC
 - Samsung KLM4G1YEMD-B031 4 GB eMMC NAND Flash
 - Fujitsu MB82M8080-07L 128MB FC-RAM
 - Texas Instruments 93045A4 49AF3NW G2
 - Renesas Electronics UC KTR 442KM13 TK14
 - Texas Instruments AIC3010D 48C01JW
 - NXP S750 1603 TSD438C Infrared IC

- Texas Instruments PH416A I/O Expander
- UC CTR 041KM73 KG10
- Invensense ITG-3270 MEMS Gyroscope
- ST Micro 2048 33DH X1MAQ Accelerometer Model LIS331DH
- 2.42" x 1.81" LCD with 320 x 240 pixel resolution (Lower Screen)
- 15:9 (5:3) autostereoscopic LCD screen with a display resolution of 800×240 pixels (Top Screen)
- Microphone
- Stereo Speaker

The Roles Each Component Holds



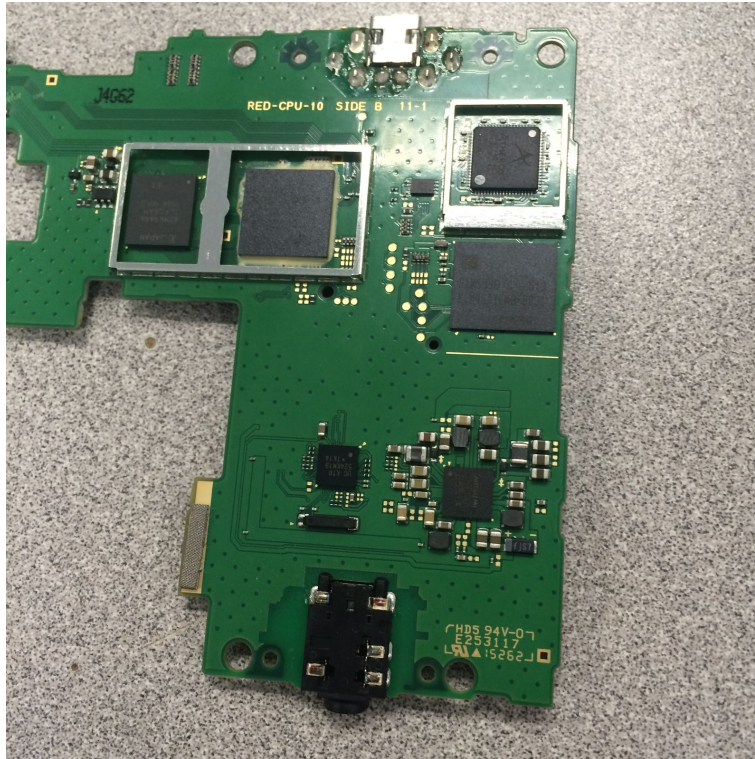
- The 3.7V 1300mAh 5Wh Li-Ion battery is what powers the 3DS XL on its battery life is 3 - 5 hours depending on the intensity of the game and how much power is needed from the CPU/Chip.



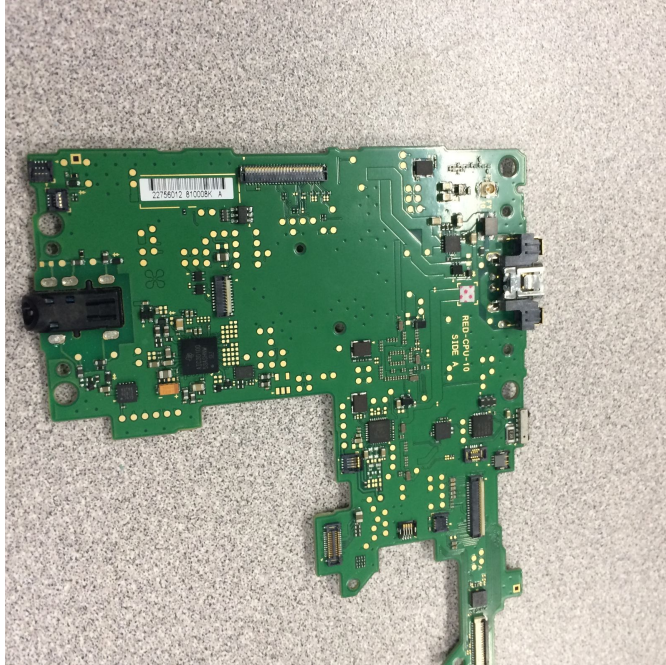
- The Wifi-Board of the 3DS System is responsible for connecting to Nintendo's Servers to allow System Updates, Game Downloads, and Online Play across regions. It also allows the players to connect to the E-Shop to purchase games.



- The IR Board is responsible for pairing other 3DS locally but some believe it was also for the Circle Pad Pro



- This is the Motherboard of the 3DS which includes 6 Chips. The Motherboard is responsible for holding the:
- Nintendo 1446 17 CPU LGR A,
- Atheros AR6014G-AL1C Wi-Fi SoC
- Samsung KLM4G1YEMD-B031 4 GB eMMC NAND Flash
- Fujitsu 82MK9A9A 7LFCRAM 1445 962 FCRAM
- Texas Instruments 93045A4 49AF3NW G2
- Renesas Electronics UC KTR 442KM13 TK14



- This is the back side of the 3DS Motherboard which includes 3 Chips. This side is responsible for holding the chips:
- Texas Instruments AIC3010D 48C01JW
- NXP S750 1603 TSD438C Infrared IC
- Texas Instruments PH416A I/O Expander

Description/Purpose of Chips:

- Nintendo 1446 17 CPU LGR A
 - This is the CPU of the 3DS it's responsible for carrying out instructions of the different programs of the 3DS XL
- Atheros AR6014G-AL1C Wi-Fi SoC
 - This allows the 3DS to connect to the wifi and enable online play and features.
- Samsung KLM4G1YEMD-B031 4 GB eMMC NAND Flash
 - Responsible for memory and video storage
- Fujitsu 82MK9A9A 7LFCRAM 1445 962 FCRAM
 - This chip offers a different form of RAM to the 3DS XL. It's a form called Fast Cycle RAM this form fixes the problem that as processors get faster memory gets slower. This chip increases the speed in which memory is accessed while using less power.
- Texas Instruments 93045A4 49AF3NW G2
 - This is possibly the power management of the system but we couldn't find if it was for sure.
- Renesas Electronics UC KTR 442KM13 TK14
 - This microcontroller possibly handles the input controls of the buttons during gameplay.
- Texas Instruments AIC3010D 48C01JW
 - This chip could be the codec IC but we could not pinpoint what this chip does.
- NXP S750 1603 TSD438C Infrared IC
 - Conserves and manages power/battery supply.
- Texas Instruments PH416A I/O Expander

What we Learned

The 3DS XL has a multitude of chips that help to power and run the many games on its system. Many of them help to cut down on computing process time and reduce input lag so that the games can run smoothly and efficiently. The power management ensures that the device will have enough power to run the game or current program without shorting out in the middle of entertainment. Overall, the 3DS XL is a powerful machine with a lot of engineering and computing power packed into its handheld and portable design.

