ENR -272: Research Paper

Video Game Controller.

Member: Hao Hoang Nguyen, Jonathan Haile

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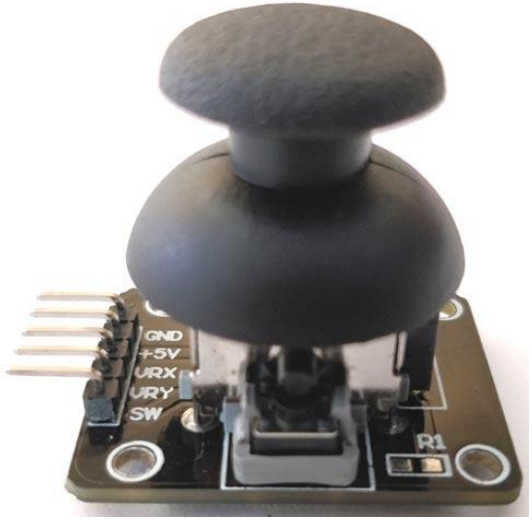
Introduction

1. **Throughout the history of video games, one of the most important aspects of console video games is the controller. This piece of hardware is the one with which the players interact the most and is by far the most memorable component.**
2. **The design of a video game controller should not be taken lightly. Aside from removing the barrier between the player and the virtual environment, the controller also specifies the type of experience the player will have by defining what types of games are best played on it due to its design.**
3. **In this project, we came up with the simplest video game controller " Joystick Game Controller".**

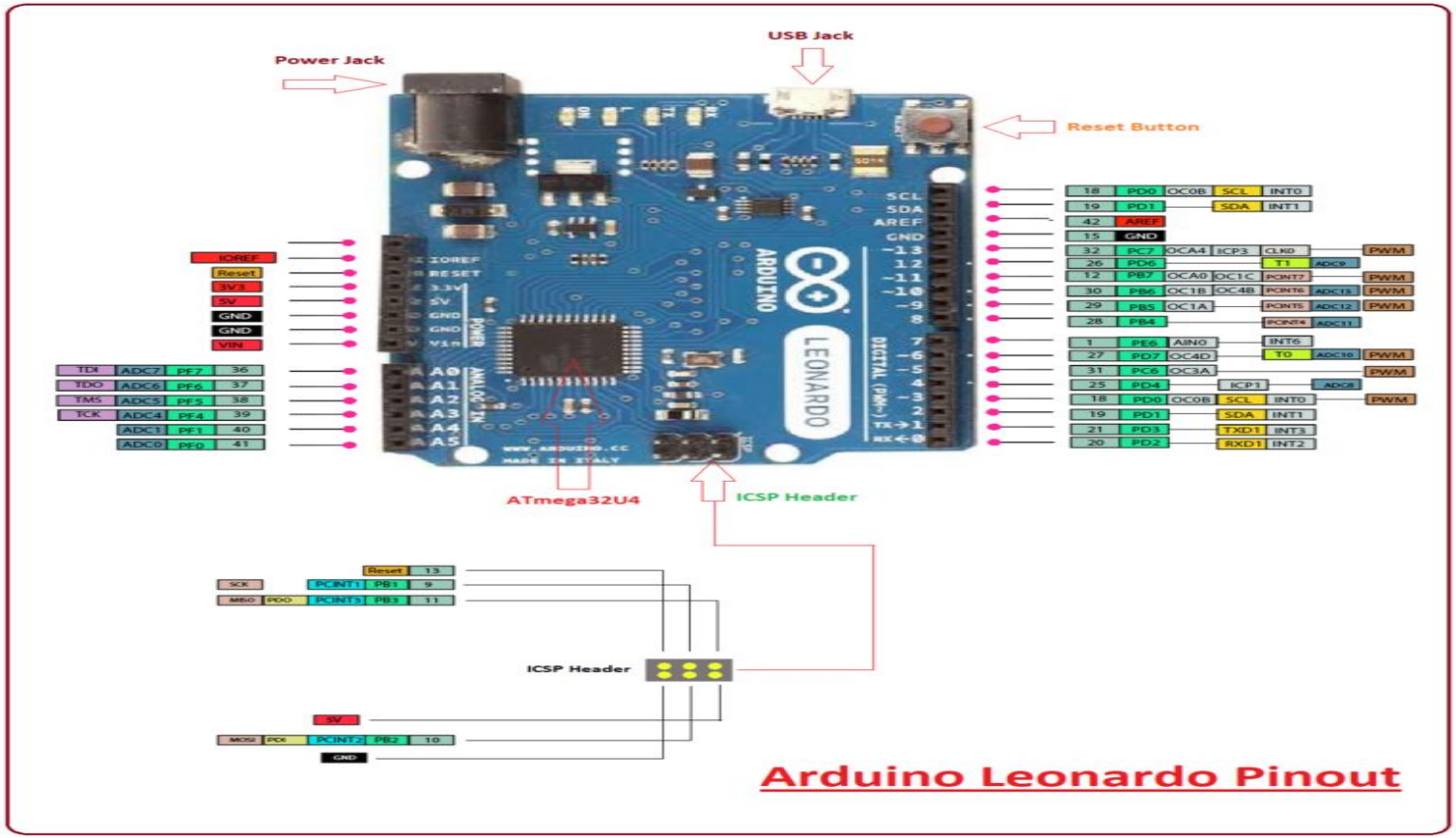
Joystick Game Controller

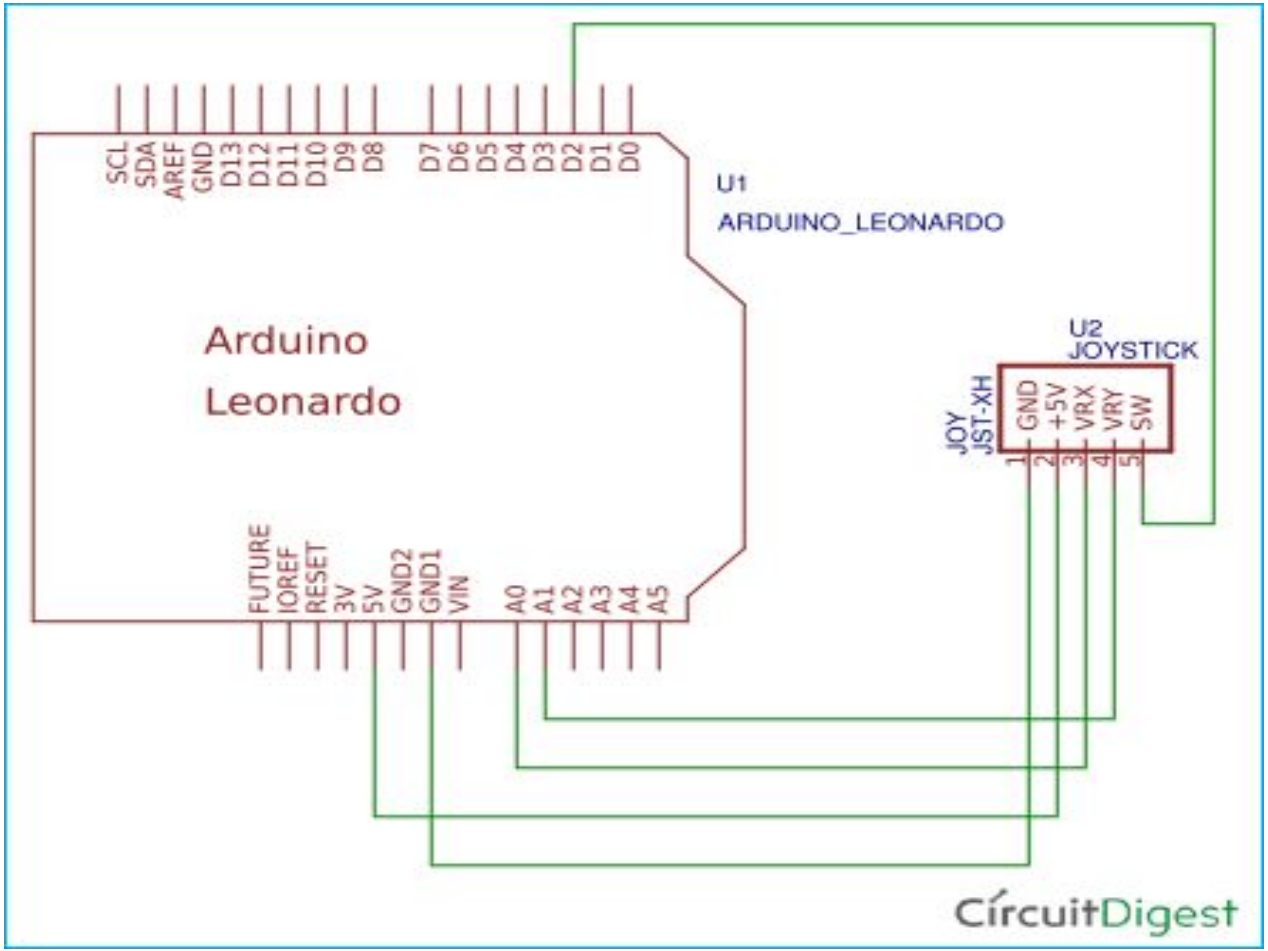
1. **In this project, we will research about joystick as a game controller to play any computer game which requires Left, Right, Up and Down Movement.**
2. **Using Arduino Leonardo to interface Joystick as Game controller. It can be detected as Mouse, or keyboard when connected.**



What is the Device ? “ Arduino Leonardo”

1. It is a microcontroller board based on the ATmega32u4.
2. It has 20 digital input/output pins (out of which 7 can be used as PWM outputs and 12 as Analog inputs),
3. A 16 MHz crystal oscillator, a micro USB connection, a power jack, an ICSP header and a reset button.
4. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.
5. Eliminating the need for a secondary processor. This allows the Leonardo to appear to a connected computer as a mouse and keyboard


Power Jack
USB Jack
Reset Button
ATmega32U4
ICSP Header
ICSP Header
Arduino Leonardo Pinout


SCL
SDA
AREF
GND
D13
D12
D11
D10
D9
D8
D7
D6
D5
D4
D3
D2
D1
D0
U1
ARDUINO_LEONARDO
Arduino
Leonardo
U2
JOYSTICK
JOY
JST-XH
GND
+5V
VRX
VRY
SW
1
2
3
4
5
FUTURE
IOREF
RESET
3V
5V
GND2
GND1
VIN
A0
A1
A2
A3
A4
A5
CircuitDigest

What problem does it solve ?

1. The Arduino Leonardo appears to be the host computer as a generic keyboard and mouse.
2. The Leonardo has a resettable polyfuse that protects your computer's USB ports from shorts and overcurrent
3. Microcontroller is an electronic device which is capable of doing various task efficiently in automatic control systems. It consists of memory, I/O ports and processor.
4. This device is a smaller version of computer
5. It is economical and easier programmable logic control that can be interfaced with external devices in order to control the devices from a distance.

What are its Application ?

- Industrial Automation
- Health and Security Systems
- Creating wireless keyboard
- Automatic Pill Dispenser
- Embedded System
- Student Projects
- USB Trackpad
- Water Level Meter

Device History

1. **Arduino** is an open-source hardware and software company, project and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices.
2. The Arduino project started in 2005 as a program for students at the Interaction Design Institute Ivrea in Ivrea, Italy.
3. The purpose was to provide a low-cost and easy way for beginners and professionals to create devices that interact with their environment using sensors.
4. Arduino project was invented by David Cuartielles, Gianluca Martino, Tom Igoe, David Mellis, and Massimo Banzi.

Citation

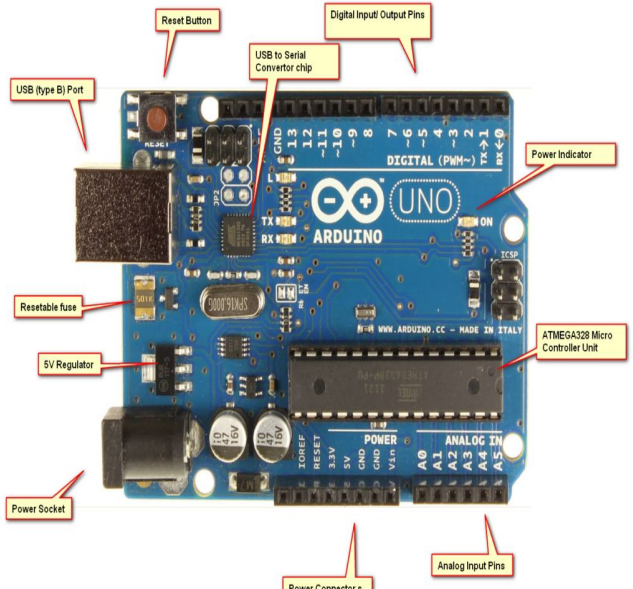
http://www.circuitstoday.com/story-and-history-of-development-of-arduino

https://mheironimus.blogspot.com/2015/03/add-usb-game-controller-to-arduino.html

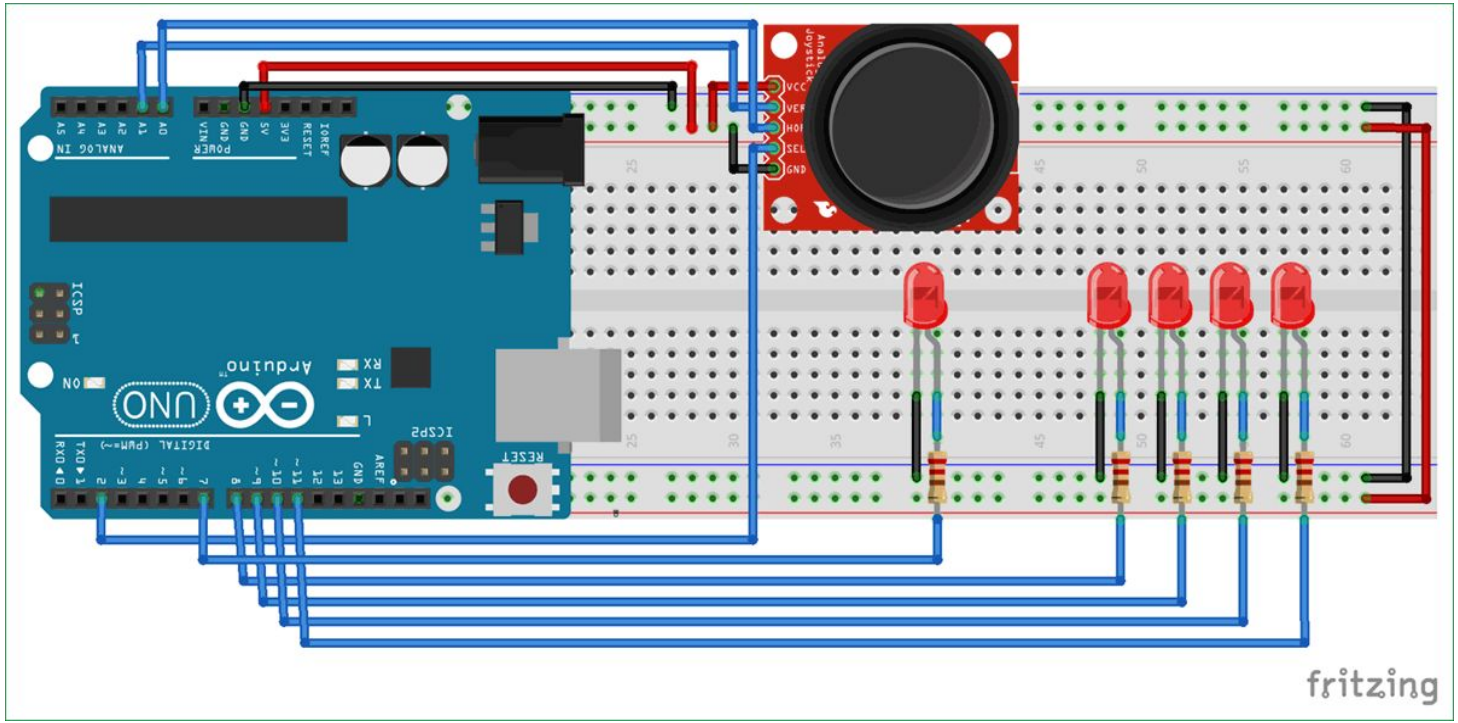
https://circuitdigest.com/microcontroller-projects/joystick-game-controller-using-arduino-leonardo

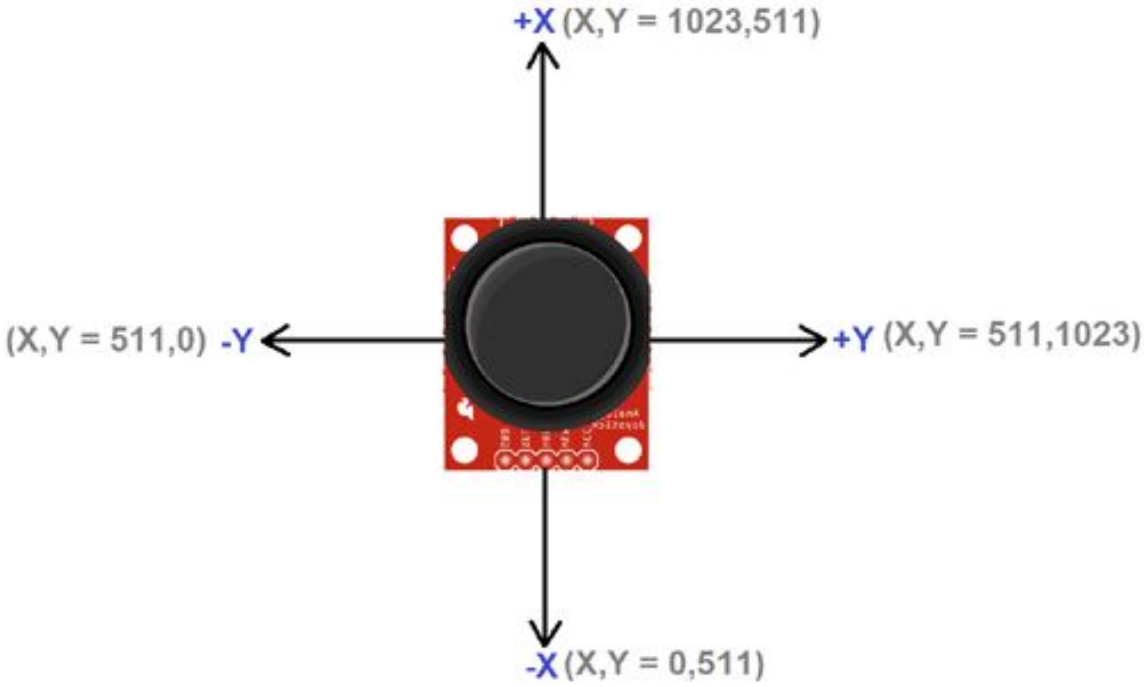
Arduino Uno

1. microcontroller Atmega328 - timers, counters, interrupts, PWM, CPU, I/O pins and based on a 16MHz clock that helps in producing more frequency and number of instructions per cycle
2. can be directly connected to the computer through USB cable that is used to transfer the code to the controller using IDE software, mainly developed to program Arduino



Circuit Diagram




+X (X,Y = 1023,511)
(X,Y = 511,0) -Y
+Y (X,Y = 511,1023)
-X (X,Y = 0,511)