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Multiple Arcade Control Protocol Emulator

Introduction:

A common problem with technology is using new technology with old technology. The technology I am speaking of is old arcade games. They are very fun to play but are very primitive devices compared to the technology that we have today. Once the main control board for an arcade game bites the dust the game might seem unusable. But thanks to MAME these classic games can be emulated on newer hardware. The problem rises when you would like to use the old controls with a new control unit. This is where the Multiple Arcade Control Protocol Emulator or MACPE comes into play. This allows the old control protocol to interface with the common USB protocol. It can also interface with most coin acceptor slots and will interface with MAME directly. There is also a script being developed that will allow it to interface with console type games using RetroPie emulator.

Target Population:

This device is targeted towards people who are restoring or rebuilding old arcade games and those who would like to use simple or experimental controls with their existing MAME setup. The code that runs on MACPE is completely open-source and licensed with the Apache 2.0 License allowing the user to make full modifications to the existing code or write their own.

This device will allow beginner or advanced users to have complete control over the control layout for their MAME machine or a restored classic. Arcade games remind many of their childhood and the ability to take an old and broken game and easily restore it to it's original look and gameplay.

Purpose:

This device and program is unique because it can take multiple arcade layouts from Millipede with it's trackball and Ms. Pacman with her four way joystick and transform the capabilities of the layout. By using built in scripts or self developed ones buttons can be mapped to different operations and a basic four way joystick from games like Pacman and Ms. Pacman can be transformed into an eight way joystick to allow one to play games with different layouts such as Q*Bert.

Such devices already exist but are more expensive and don't allow full modification of source code. This device aims to be as simple as a novice would like or as complicated as an expert would like. By using open-source technology and hardware there is a large amount of documentation and help online for any troubles related to the hardware and software.

This device and software is extremely helpful to the user as they will have complete control over their arcade game and MAME emulator. There is nothing like the feel of an original Pacman joystick in your hand. It makes the entire experience very enjoyable especially for one with fond memories of dropping quarter after quarter into a childhood favorite.

Constraints:

- Control lag time
- Only arcade games
- Many different standards

The main problem with using a single controller to interface with multiple setups is that there is a chance of control lag within the microcontroller itself. The second problem is that the coin acceptor will only work with the MAME framework. The third problem is that arcade games use many different setups and standards.

To avoid possible bugs and problems the code will be structured in a way to allow for maximum efficiency and will use a smart algorithm to calculate when it should check for different inputs. Even though the coin acceptor module will only work the MAME emulator the control layout will still work with any modern or classic console game. A add-on script is being developed that will allow the use of coin-op mechanisms with console games. Lastly there is a problem with games using different standards, this device will mainly use the JAMMA standard as it is the most common but support the different and custom setups will be available.

Conclusion:

This device will greatly help the arcade restoration community in providing an easy, fast, and customized setup for providing authentic controls to new and restored arcade machines. Personally I am restoring a 1982 original Upright Ms. Pacman game and needed to interface the original controls and coin mech with a new control board

which in this case is a Raspberry Pi 3 but MACPE can be used with any device that uses the USB protocol.

First I will be building the circuitry to provide input from arcade controls to the microprocessor and the interface to a USB protocol. Second I will be writing the main framework for MACPE that will run the controls and coin mech. As a later addition to the project I am building a add-on that will allow use of coin mech operation with games like Super Mario Bros. and Legend of Zelda.