What's this FAQ about?

Inside this FAQ, you will find a variety of alternatives for controlling games on your computer. Using a keyboard or standard off-the-shelf joystick pales by comparison to the experience of playing your favorite game in an arcade or on a home game console with their respective controls. Imagine playing PacMan using a real ball-top arcade joystick, or Robotron with dual arcade sticks. Imagine Tempest with a real arcade spinner. Imagine playing the old Atari 2600 games using a real Atari 2600 joystick. Imagine using the controls on games that don't even *support* a joystick. Imagine . . .

It's all inside here. There are two different ways to go. You can set up arcade controls like you'd find in an arcade, either as a stand alone desktop joystick set, or by putting your computer inside a genuine arcade cabinet for that full arcade experience -- joysticks, trackballs, spinners, etc. The other way to go is to interface console controllers to your PC like the Atari 2600 joysticks, Nintendo NES/SNES and even N64 controllers, Sony Playstation controllers complete with force feedback, and others.

You'll find instructions and links to sites with instructions for building all of the above, the software to make it work, and - for those who want the fun but don't want to build - places to buy much of the above already made. There are over 90 examples of arcade control projects for you to peruse and see what other folks have accomplished.

The FAQ is maintained by saint. It began sometime in late 1997. I believe it was in mid 1997 that I was frequenting Dave's Video Game Classics message boards following a thread between a few guys about how great it would be to make arcade controls for computers. Three guys, Eric, Shadow & DeCosa did more than talk about it - they made it happen. All of them were kind enough to pass on instructions on how to duplicate their work.

There was a lot of discussion about the hows and whys and such, and I asked if maybe someone could compile it all and post it on a web site. Then I asked again a few days later... Then I got the hint, and voila - Build Your Own Arcade Controls was born :)

There are over 130 megabytes of data, pictures and downloads here. I update the FAQ irregularly, sometimes daily, sometimes every two weeks or less. Usually I try at least once a week. My biggest source of updates now is folks like you who have something to contribute . . . please feel free to email me!

And now, click your back button, read the step-by-step guide, and plunge in! WARNING - if you're married or in a relationship, get your significant other something nice, because one day you'll look up and realize you've been in your basement for 6 weeks messing with buttons and wires, and have no idea if you're even still in a relationship. Good luck :)

--- saint

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🔵 Browse the examples 🔵

Before you contemplate even beginning to get started, you should plan a good evening seeing what everyone else has done. In the bottom frame you'll find a variety of options. First, you'll find some 75+ odd projects broken into two categories: <u>Arcade cabinet projects</u> - an arcade cabinet with arcade controls hooked up to your computer playing whatever games you have on it, and <u>Stand-alone arcade control projects</u>, meant to sit on a desktop or lap (these things are *big* so have a sturdy lap!).

Aside from these build-your-own controls, there are a few other possibilities. There are ways to hook up Atari, Nintendo, Sega, Sony, and other <u>game console controllers</u> to your computer. Finally, if you've got the urge but not the time or talent, you can <u>buy</u> much of the above items. Typically, these cost more than it would to build your own, until you factor in how much your time is worth and having someone to stand behind the product in case of trouble.

Recommended step: Spend some time now browsing the projects below. Each will open in a new window, so just close the window when done. Don't get too involved in the details just yet, this is just to whet your appetite and let you see what's possible! Jot down or bookmark those projects that have something you like so you can review them in more detail later.

*** WARNING *** - *these links are not updated. On the main FAQ outside of this step-by-step guide, you'll find the examples page that is actively updated. As of this moment, there are now 160+ projects!*

When you're done, hit button 🔵2 over there on the left to read about picking your goal :)

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OK guys, you asked to see it, now here it is !!
These pictures are all about 35k "Jpeg" files. so they take some time to load.
The MIDI file playing was downloaded from "SEGA Haven".
Listen closely, you will get a clue as to which game is at the top of my Mame wishlist !
(Clue: Its a SEGA System16 game)

My dedicated Mame machine
This is how she looks in her prominant place in my flat.

Believe it or not, this machine was built around 1992, before I had even heard of emulation !!
The original idea was to use an arcade cabinet to play a bunch of PC games !! When I built
this, the Awesome game to play on a "Good sounding" system was "The Seventh Guest".
Later, I was so pissed with Seventh Guest, I replaced it with Microsoft's flight simulator. I was
also using this to play with some Arcade like games like "Galactix" and "Raptor". The only
thing was, I then had to "rewire" a keyboard inside for each game, not as easy as now. The
original Popeye Stuff is still in my back bedroom, It had acquired a ROM problem back in '90.
I had bought Popeye from a guy here in San Diego. He was closing an Arcade, and was very
much in need of cash. I bought it for ONLY 250 US Dollars !! (cleaned an edgecard connector,
then it was working perfectly). Brutus musta got the best of Popeye one day. I booted up the
machine and got scrambled graphics. I cleaned all contacts and pushed on all the chips and
connectors but nothing helped, so Popeye sat after that. I later found a Phoenix Mini at a
yardsale, picked it up for 20 bucks !!(bad monitor), Later bought a Frogger standup at a
"Little Ceaser's" pizza place for a hundred bucks (Working great, but painted an AWFUL
shade of orange !!)
When I built my first computer in 1991, I had the Idea to do a cabinet for games.

The Technical Stuff
As she is now:
Pentium 200 w/MMX, TX chipset,32 megs DRAM
Soudblaster AWE 64 Basic,Targa Equalizer (Yes, a car one !!)
Kenwood 5.25 inch speakers in front of cabinet.
Trident PC2TV w/4megs (9685 with NTSC out as well as VGA)
OLD Mitsubishi 21" monitor (Looks great !, but 640x480 only)($120 !!,used)
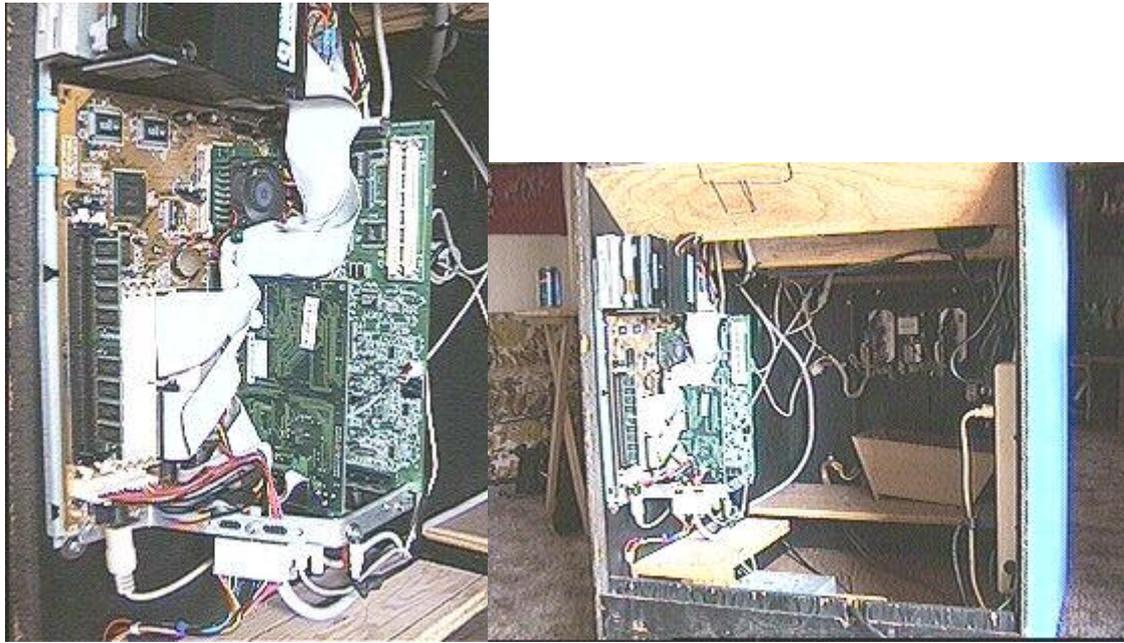
Couple good shots of the chassis mounted in cabinet. All connections are towards the bottom. The PC power supply is on the cabinet floor (with monitor plugged into it). Power strip is connected to a switch in front of cabinet. The power strip has the PC supply, Marquee flourescent, and twelve volt power supply (Car equalizer/Amp) plugged into it.
Creative Joystick port is connected to a switcher on the Art glass panel, it is used to switch between the Digital joystick on the left, and the Flightstick in the center.
Keyboard port goes to a switcher mounted on bottom of control panel console. It switches between a "Hacked" keyboard unit inside, and a wireless keyboard reciever on the right inside of cabinet (next to monitor). Keyboard is only used for maintenance and a few small controls that could not be remmapped to the panel buttons.

The Control Panel

Joysticks:
Left--A regular arcade joystick (red buttons just to the right are "A" and "B")
Center--Flightstick, (switch on front Art glass switches between Left and center joysticks)
Right--The "Hacked" keyboard joystick (red buttons are the "Cntrl" and "Alt" keys)
Button on left corner is "Pause" Button on Right corner used to be "F9" (volume), volume is now handled by knob on equalizer at the right side above control panel. Now I am thinking of making that button the "Enter" key (for some other emulators like KGEN)

Blue buttons across front edge (from left to right) are:
"Escape"--(with an extra hard spring to prevent accidental exits)
"1"--Start Player one
"2"--Start Player two
On the right side, there is a little trackball, this is the only item on here that I wish I could do a little better. It is used for navigating GUIs and can be used for games, but it's placement makes this a little tricky for gameplay.
Coin slots are connected to "3" and "4" (great for saving laundry money !), but above the coin slots are pushbuttons for testing purposes. Lower right corner of security plate has a toggle switch to turn the whole thing on/off (Easier than reaching behind cabinet)

"what it does"

Sometime in March '99, I received an email from a guy named
Craig. He wanted to tell me about his arcade cabinet project.
Now, I'm always happy to receive these emails as I love to
showcase people's work. This project, however, has a couple of
unique touches I haven't seen before (that I know of). After
he sent me some pictures and the details, all I could say was
"awesome . . ." Craig said that when he has friends over, the
machine nevers gets a rest -- I believe it. Craig has agreed
to share his project with everyone here. Thanks Craig :)

UPDATE! Added information and a screen shot of the Roswell
frontend. Looks good :)

Roswell 88201's features:

- Pentium 233mhz, 32 megs RAM
- 19" SVGA PC monitor
- **THREE** interchangable control panels (components by Happ
  Controls) featuring trackball, spinner, and joysticks
- Control panels protected by plexiglass
- Interfaced via PowerRamp PC Joystick
- Customized marquee and wrap around cabinet artwork
- Protective kickplating around the bottom
- Customized menu system

The Cabinet

A large graphic of the moon's surface completely wraps every
inch of the cabinet, down to tiny stars on the monitor bezel
(see closeup of bezel bottom further below). Craig
painstakingly reproduced the moonscape from Hubbel Telescope
pictures, painting every square inch by hand. Well, actually
he admits somewhat sheepishly that it's wallpaper ($99). :)
The base of the cabinet is fitted with custom-made aluminum
diamond kick plates for protection. I personally really
appreciate the simplified color scheme for his control panel -
I think it gives it a look of class.

The Marquee

Craig made the marquee on his computer using Paint Shop Pro 5.
It was printed on photo quality paper at a local print shop.
The cost of printing was approximately $50.00 because he had to
have two copies made. One is left as is, the second one he cut
out the Roswell lettering and the earthrise, leaving nothing
but the black behind. Then he applied it to the back of the
picture. In other words, the black is doubly thick, the
letters and earth rise singly thick. This ensures that when
the marquee is illuminated, the black is dead black and the
neon green lettering and the earthrise glow brightly. The
marquee was then sandwiched between two pieces of plexiglass.
Click on the marquee to get the original graphic he took to the
printer.

The Control Panels

The machine has not one but **three** interchangeable control
panels. Craig chose to utilize this design because he did not
feel there was a singular control panel layout that "correctly"
encompasses all of the 330 games on his machine. As you look
at the pictures, notice how well laid out and playable the
controls appear.

Original Control Panel

Click for larger views

The first (Main) control panel is based on two joysticks. Craig
based the design of this panel around the game "Defender"
because it had the most buttons. The ergonomic design of this
panel very comfortably works with approximately 90% of the
games on the machine. Compare this to Dale's graphic of the
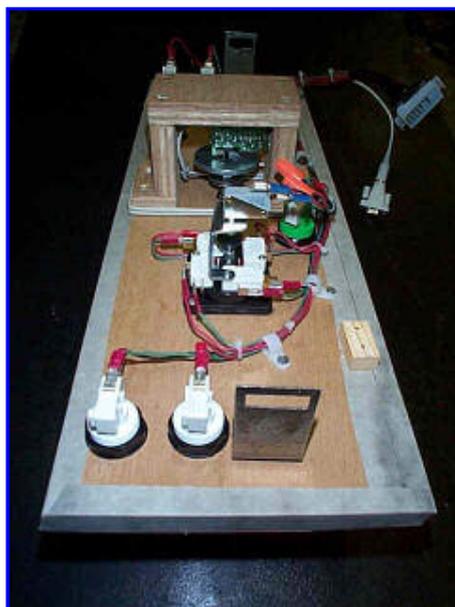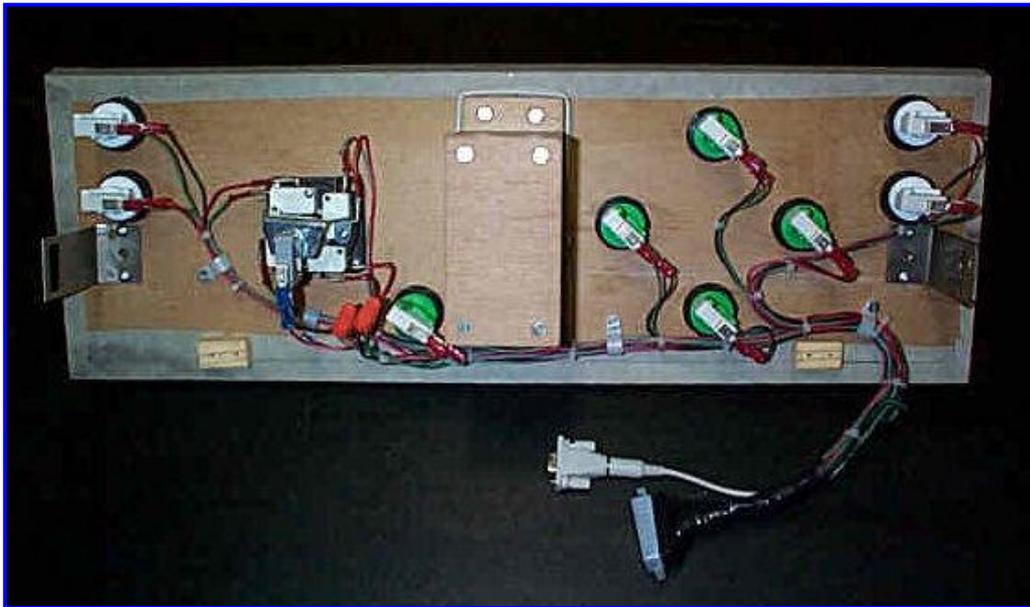original Defender control panel. Notice the connector.

Trackball Control Panel

Click for larger views

The Second panel is designed around a track ball and was based on "Missile Command".

Spinner Control Panel

The third panel is designed around a spinner control and was based on "Tron". Spinner by TwistyGrip.

Inside the Control Panel

Each panel has a wiring harness that ends with a 36 pin Molex connector (A molex connector is a molded plastic multiple-pin connector used for quick connection/release in arcade games). Swapping of the control panels takes **less than a minute** and is very easy to accomplish. The panels can be swapped on the fly with no re-booting needed. All arcade buttons, joysticks and trackball are from Happ Controls. The control panels are finished with Plexiglas to protect the control panel overlay.

**Did you notice the sticker on the bottom right of each control panel? :)**

The Interface

The controls are converted into keystrokes by a circuit board
pulled out of a PowerRamp PC joystick ($39.99 retail). He chose
the PowerRamp because it has 4 macro settings which memorize 4
completely different sets of keyboard configurations. This enables
the machine to be used for MAME as well as standard computer games
(e.g. Duke Nukem, Quake etc.) all at the flick of a switch. Notice
the use of quick connector blocks (available at Radio Shack among
other places). In case Craig ever has to do any re-wiring, all
he'll need is a screwdriver, not a soldering iron.
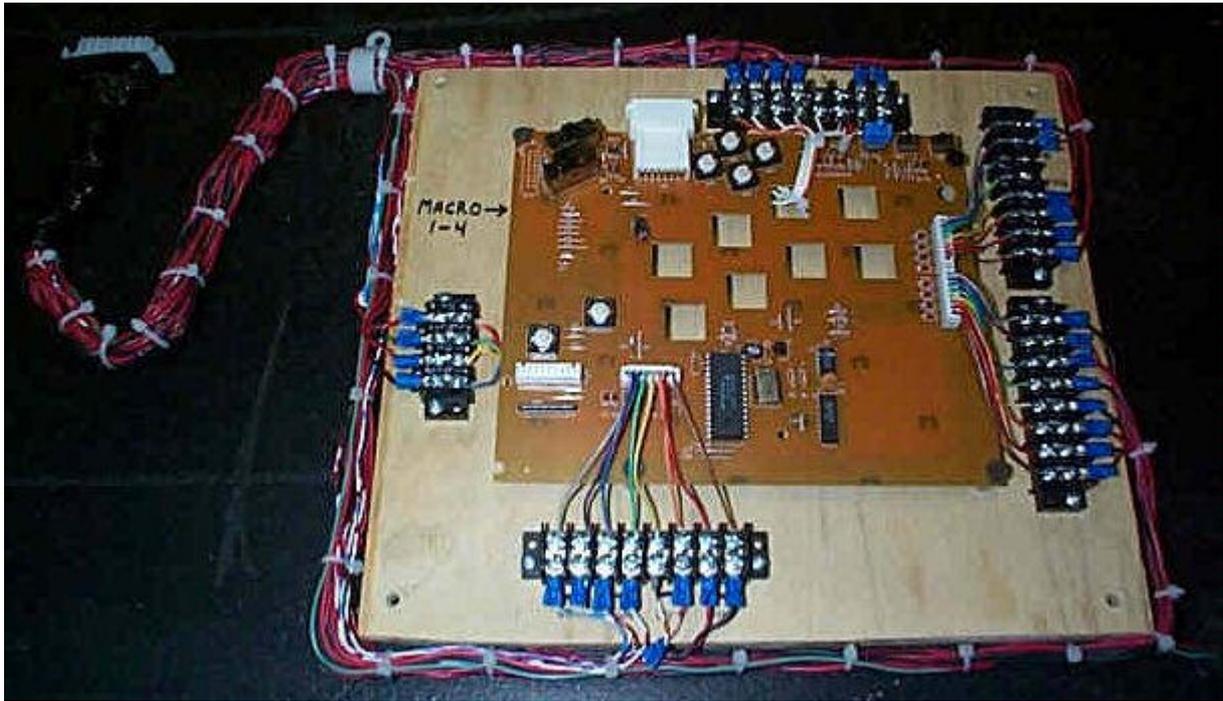
Coining Up
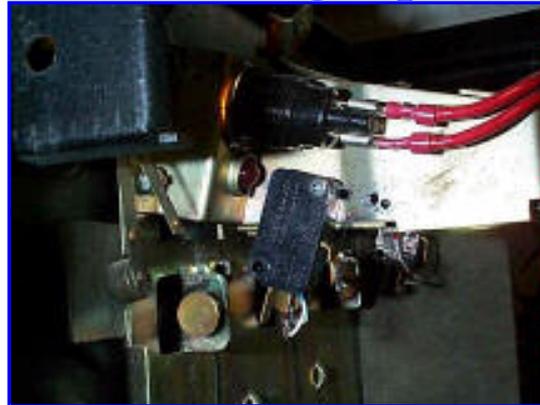
Click for a larger view

One of the nice touches Craig included were microswitches inside
the coin return slots. As he put it: "The first time people use
the machine they read the instructions and get up to the point
when the game requires credits and say "now what?" I tell them to
touch the quarter slots. It always get a great reaction." A lot
of people have been talking about doing exactly this in their own
projects.

Inside the Cabinet

        Here's the rest of the details...

- Craig's cabinet is controlled by a custom menu being programmed
  using Visual Basic with an HTML backdrop. It's not ready for
  prime time yet. The way it works, however, is slick. To play
  the machine the user simply toggles to their game of choice by
  tapping the center joystick up or down. Once the desired game
  is highlighted, they press the "Select" button to load the
  game. If the player decides at any time to change games all
  they need do is press the "Menu" button and the game menu
  returns. A friend of his is developing the custom front end
  specifically for this machine. When complete, sensors will be
  mounted to each of the control panels. When each panel is
  mounted to the machine, only the games that apply to that panel
  will appear in the menu. A photo of the control panel will
  appear on the screen. The controls in the photo will be labeled
  (left, right, fire etc.) As the player toggles through the list
  of games, the labels under the controls will change to match

the game selected. Definitely slick!

UPDATE! Craig has since sent me a [picture](#) of the front end in
action. Some of the features include being able to quickly
scroll through the list of games via joystick - push left/right
to skip by letter (6 clicks to the right and you're at the "F"
games), high-speed scroll after holding joystick up/down for 3
seconds, proper Windows 98 shutdown via the menu & player 1
button. Very cool :)

- There is a pair of amplified speakers in the header which
  includes volume control as well as a headphone jack for private
  play. Inside the cabinet is a subwoofer (which you can see
  "Inside The Control Panel" above) with an external switch. When
  activated it shakes the whole box.

- One thing about the cabinet is the lack of T-mouldings. Craig
  stripped off all of the mouldings, filled the grooves and
  laminated all the edges. The end result is a sophisticated
  furniture-like feel that is different from the other cabinets
  he owns.

- The bottom of the box has two twin nylon rollers in the back
  with nylon feet in the front. It can be moved quite easily by
  one person yet does not budge during gameplay.

- The computer is controlled by a wireless keyboard with a hidden
  infrared sensor. There is also a hidden control that is mapped
  to the "Tab" key for keyless configurations of the games.

  Craig says the project took him 4 months. I think it was worth
  the effort! :) Craig has let me post his [email address](#) in case
  anyone wants to talk to him about it. Thanks Craig!

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Cocktail Table Project

Quick Click to Latest Entry 6-25-99

Links!

More pictures of the Cabinet

Measurements and Diagram

  I'm a relative newcomer to the world of emulation, having just found out about **M.A.M.E.** in February of 1999. Since then, I've become intrigued with the idea of running the old arcade games as well as the older console games from Genesis and Nintendo.

  I have been disappointed playing my old favorites on the computer's hardware, however. A keyboard, mouse and Sidewinder joystick don't substitute well for the Genesis's or SNES's own gamepad. And playing the old arcade favorites with these controls REALLY wasn't the right experience.

  So I decided to do what others have done before and convert an old arcade cabinet into a playable **M.A.M.E.** machine, with the **Super Nintendo** and **Genesis** thrown in for good measure.

  As of this writing, March 26, 1999, I've been working on it for about two weeks. This page will be a diary as well as progress report for this project.

  While knowing that things would be a lot easier for me if I used a standard upright cabinet (considering the greater interior space), I thought it would easier to convince my wife to let me finish this project if I used the more home-furnishing friendly cocktail table style cabinet. (But honey, we can just throw a tablecloth over it when we're not using it…).

This made things harder for me in more ways than one.

First, more people (it seems) make **M.A.M.E.** machines out of standard upright cabinets, so there's a lot more helpful information available to people starting out on that platform. Second, it's harder to get your hands on a cocktail table cabinet in decent shape, and I definitely didn't want to try to build one, but after a little searching, found a one in good physical shape with a blown monitor and a fried board for $75. It was a little more than I wanted to pay, but measured against what it would cost me to build from Home Depot; it was a bargain.

This is how it looked when I got it home.

Since I was planing to replace my home computer system anyway, I relegated the old parts to "**The Project**". This parts used are:

- my old motherboard with 64MB of RAM
- a 233 AMD processor
- a 2 MB video card
- a $20 PCI sound card that was acting a little wonky with some CD-ROM based games, but worked well otherwise;
- a hacked keyboard with microswitch keys
- a 4 GIG hard drive
- and a 14" SVGA monitor (which, while too small for an upright machine, is a good fit for the cocktail table)

I'm bouncing around a lot with the construction of this so don't be surprised if your reading about one phase and I suddenly am talking about another.

The first thing that had to be done was to remove all the left over parts from the cabinet's previous life, giving us a completely bare interior to work with. This included the old power supply and coin mechanic and coin box (which had a wood housing that was a pain to remove). The only parts of the coin system I kept were the coin-return buttons and return-cups. The insert-coin slots I back-filled with some putty epoxy (don't want any quarters bouncing off any exposed electronics, do we?) Next to each insert-coin slot is space for a coin amount sticker. I removed one of them and will put a button there for the coin-drop key (3) for **M.A.M.E.** games. I removed the glass top and rotated the cabinet's bezel/shroud from portrait to landscape orientation so that the whole monitor screen will be seen when it's in place.

Moving to the keyboard, which will provide most of the controls I need, I opened one of several spares I have until I found one that had microswitches instead of those little bubble contacts like most keyboard have. Each key has a switch soldered onto the PCB of the keyboard with two contacts each to solder a lead wire to. The keyboard should still work as well, so I won't have to switch keyboards when doing "system maintenance". I'm hoping this design will prevent "ghosting", as I'd rather not pay $80 for the Hangstrom setup. I'll post further when I know.

I tried to alter a trackball for use in the system, but I'm very limited in the space I have in the control panel. The one I bought was too long below the ball to fit in the space I had, so I tried to move the parts around onto a new board that could be placed under the panel with out trouble. Unfortunately, it didn't work out too well. While connecting the leads from the new board to the old one, I pulled out some of the printed circuit and wrecked it. I've found a trackball that will fit (a Microsoft BallPoint Trackball, made for older notebooks in the Windows 3.0 days), but I've started thinking that maybe a touchpad will work better. Considering that the BallPoint's ball is only about 1/2-3/4" in diameter, it's really unsuitable for playing trackball games like Centipede and Missile Command, and I'll mostly just need it as a mouse, the touchpad may be the way to go.

There appear to be only two ways to place the monitor; either on a mini-platform, or suspended from straps. I think I'll need the space (about 3-4") under the monitor for keeping the keyboard, so I decided to try suspending it. I opened the monitor case (Monitors have capacitor inside that can store electricity. BE CAREFUL! I waited 5 days with the monitor unplugged and still didn't want to touch anything inside), and drilled two holes at the top and bottom corners of the case. I placed a 5mmX20mm bolt (with washer) through each hole. What I plan to do is buy some aluminum or steel strapping from Home Depot, attach the straps to the bolts and then screw the other ends to the cabinet while holding the monitor propped up in the correct position.
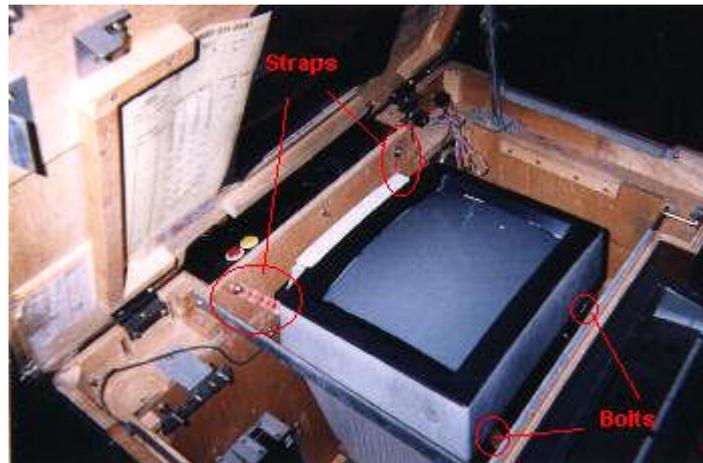
Got my 14" Packard Bell monitor installed in the cabinet. First I masked off the screen and spray painted the monitor case black to hide it's normal beige color. As noted above, I need the 2-3 inches under the monitor to store the keyboard, so I hung the monitor by the four bolts I placed in the monitor case with some pipe-hanging strapping I got from Home Depot (6' for about $2.50) The strapping is a copper-colored flexible metal strip about 3/4" in width with holes drilled along it's length. Each strip ended up being only a few inches long. I attached them to the cabinet with the monitor held up by blocks to the correct (or what I thought was correct) height.

When I was satisfied that the monitor wasn't going to drop, I tried to close the glass "hood" of the cabinet and found I had mounted the monitor a little too high. The screen bezel under the glass top was hitting the monitor and lifting on the glass. I had to remove the glass, lift out the tinted plastic sheet and screen bezel and carefully grind down the bezel until it fit snugly on top of the monitor with the glass on top. This was pretty tedious, as I was going back and forth to the grinder, but better that than take too much off...

I found that the monitor swung around a little from it's short hangers, and since I want to be able to move the cabinet around (to friend's houses, etc.), I wanted to stop that. I put some 1/2" pipe insulation ($0.79 at Home Depot) under and over the straps between the monitor and the cabinet, now it's nice and steady, even if you tilt the cabinet.

Having the monitor in place really shows me how little space I have to deal with in this type of cabinet. It's going to be an adventure in sculpture getting a computer inside here as well...
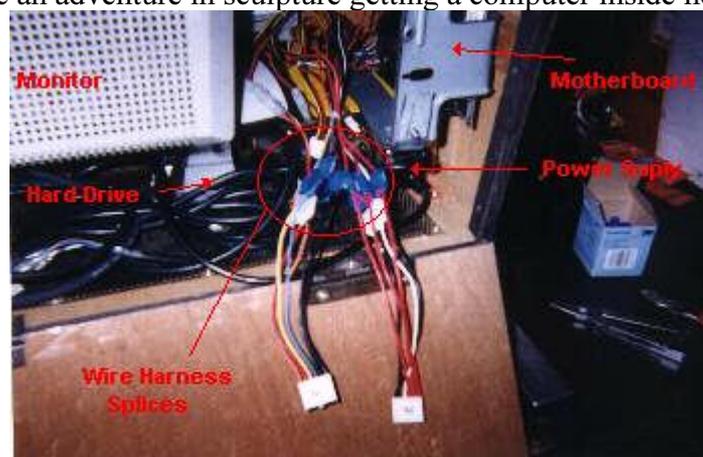
The computer started going in the box. Due to the cramped space inside, an entire computer case would never fit, so I took an old one and cut as much metal as I could off of it. The power supply was separated from the case and secured to the bottom of the cabinet with strapping and a bracket holding the hard drive was screwed to the floor next to the power supply. I couldn't secure the computer in the case since the power supply cables to the motherboard were a little short after being shuffled around. I'll have to graft some longer wires in the middle of the present ones. I was able to get the system started enough to discover that my hacked keyboard apparently doesn't work. I have

dig out a spare keyboard to test that it's that and not something that I damaged it the process of placing the motherboard.

I have the system installed and secured to the cabinet; Windows 95 OSR2 was installed after putting on a spare keyboard, but for some unknown reason, Windows failed to recognize the PCI sound card. Sigh. The BIOS screen shows it, but the OS fails to find it. It must be me, couldn't be Microsoft... It also failed to detect an old MediaVision ProAudio Spectrum 16 sound card I had laying around. I'm probably just going to pick up a 16-bit Creative Sound Blaster **(see below)** and give that a go. But, other than that, the system works.

My package of controls arrived from Happ, with only three blue buttons back ordered. Hopefully, they'll arrive this week.

May 1, 1999

It's been a while since the last update to this page, most due to some problem with Fortune City. For an unknown reason (at least, unknown to me), Fortune City removed this page for a while. In the meantime, I tried putting this page up on space that a friend of mine had, but that was a pain in the rear, as I had to put my html file on a floppy, bring it down to his place, and let him upload it, so now that Fortune City has appeared to gotten it's act together, I'm back to being here.

In the meantime, I've gotten a lot done with the project, and for all intents and purposes, it's done. Of course, I've found that to be a relative term. I should say it's done **for now**.

Happ finally did get my last three buttons to me, so now I have all I need to complete the job with at least one spare button of each color used.

Having killed two trackballs attempting to put one on the player 1 side, I decided to go with a touchpad mouse that was flat enough to attach to the panel with some good double-sided tape. It works as far as I need it to, but it's a little too sensitive with it's ability to register taps on the pad as mouse clicks. I recently found yet another trackball (a old Memorex, with a 2" ball and three buttons off to the right side, so after I take a little break to chill out on this a little, I'll re-create the player one side and try to make this trackball work in the panel. But that's for later.
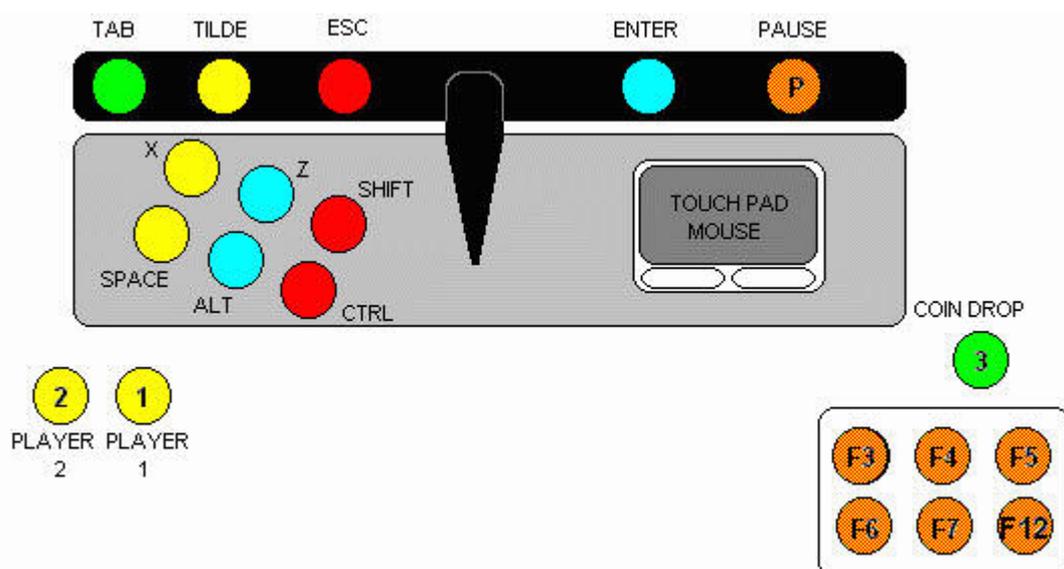
The panel space I have is pretty small (3 1/2" by 14 1/2") as I didn't want to rebuild the entire thing to get more. I wanted to keep the cabinet more original than that. I've laid out the panel as follows (pictures to come soon):

- Left side: Six buttons laid out in two rows of three on a 45 degree angle; wired as follows:
  - Bottom Row
    - SPACE
    - ALT
    - CONTROL
  - Top Row
    - X
    - Z
    - SHIFT
- Center: Joystick

    I chose the **Happ Universal Joystick**. I would have preferred the **Ultimate Joystick**, but with the limited space I have, both in the panel box and below the glass, the 3/4" shorter Universal was my only option. The joystick is wired into the arrow keys rather than the joystick port on the sound card.
- Right side: Touchpad mouse

The Player Two side is laid out similarly, only with no mouse, and only four buttons.

Both panels were made out of a piece of brushed aluminium that I cut out of a door "kick panel" bought at Home Depot. Under each piece of aluminium is a duplicate sheet cut out of 22 gauge sheet metal for added strength.

Above the Player One panel, but below the glass there is a vertical area that I have placed buttons to control (from left to right) the TAB, TILDE, ESC, ENTER, and P (to pause MAME games) keys.

Player 1 Panel dropped down, showing drill holes for control buttons

Below the Player One panel, in what used to be the coin-box door, I've placed six buttons in two rows to control the F3 through F7 and the F12 keys.

On the bottom of the cabinet there is a ventilator grid that is somewhat recessed, I put the original rocker switch for the computer on the Player Two side near where the power cable comes out of the cabinet, and a button wired into the DELETE key on the Player One side. Neither button is near each other, so the delete key won't accidentally be pressed by feeling around for the ON/OFF switch, and due to the recessed grid, it would be very hard to hit them accidentally

Wiring the buttons to the keyboard
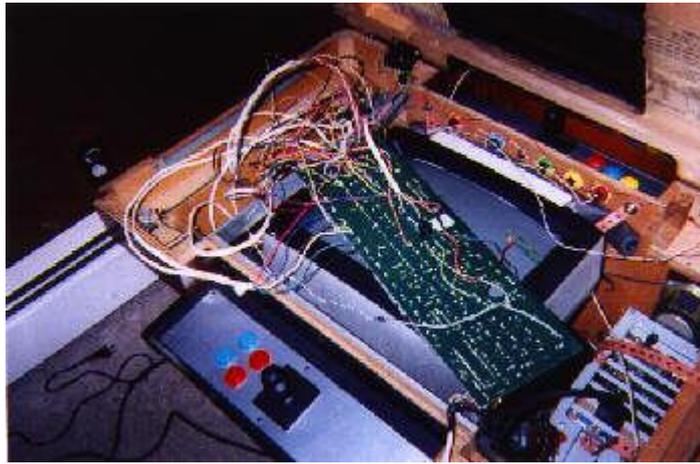
After the problems **noted above** with two sound cards tried in the system, I decided not to mess about and bought a 16-bit Creative Sound Blaster for $20 at a computer show to insure all-round compatibility. It works flawlessly in Windows95, M.A.M.E. and ZSNES (the Super Nintendo emulator), but for some reason, plays only very quietly in KGen (the Sega Genesis emulator). But after the problems with the other two, I'm not complaining. I wired the original cabinet speakers to a chopped up headphone jack. Their not exactly high fidelity, but easier than trying to mount a pair of stereo speakers in the case. At the suggestion of a friend, I may look out for an old car stereo amplifier (10 amps or so, don't want to blow out those old speakers...) and try to put that in to boost things up a bit. I don't know if it will work, but if I can find one for $5 at a yard sale, it's worth a try.

June 25, 1999

Just for fun, I took a bunch of the screen shots of the game contained in the cabinet and printed them out, in color on some glossy paper. I removed on of the original Donkey Kong Jr. signs that the cabinet had when I bought it and placed the screen shots under the glass in kind of a montage. I think it looks pretty good, and it gives a quick look at some of the games available on the cabinet.

Click the picture for a larger view

I'm using a program called **Keyboard Express** to assign shortcuts to the buttons to do various things. For example, pushing the lower blue button and the Player Two button (ALT+2), runs a macro which exits Windows95.

I played around a little working on various things to hide the Windows 95 interface from the user when I get this project done. Made a new Start-up Logo, Shutting Down Logo, and Safe Logo, as well as changing the cursor to a joystick and the substituting the hourglass animated icon with a chomping Pacman!

 New Pointer - "Hotspot" is the tip of the joystick.

New "Working" Icon - Pacman chomps while your machine is busy.

New Boot and Shut-Down Screens
I used ZD's LogoManager to change these screens. Download it **HERE**

New Wallpaper

Email To: **devas@osfn.org**

Created March 26, 1999

This page has been visited [Fortunecity.com pages only] times.

Arcade@Home, the #1 M.A.M.E. Front-End Site
Emulation Excitement Great site with other emulators.
Build Your Own Arcade Controls FAQ
Retrogames
Kinox - The Emu Scene Dump

Welcome to my MAME cabinet page

My goal in this project was to produce a cabinet that housed a PC running MAME and offered a com
controls. This includes a joystick, a spinner, and a trackball. With these basic controls most arcade ga
near original form. As time allows I will add further images and desriptions of the project.

I purchased this cabinet at an auction for $75(CAN) it originally hou
card game, it came with monitor and panel with several buttons. For
my 'Gate Of Doom' JAMMA cabinet. It seemed to be a good candid
conversion as it was never a desirable game in it's original form. I st
guts so as to have a clean start on the unit.

The monitor was replaced with an older mitsubishi 640x480 19" fix
Thje physical screen size was the same as the original electrohome C
from the cabinet (to be used in my cocktail cabinet for a commando
mounting the new unit pretty straight forwards. The display is drive
xpert@play card, by using a terminating resistor on the comp out po
restricted to a 60Hz refresh rate. The OS is windows 98 with the arc
This allows me to set all games for a 640x480 or 320x240 screen si
for most games. I actually originally had the monitor in the vertical
wirked great for games like GYRUSS but the vector games had som
this mode. Over all MAME really seems to run best with a horizont

The KB encoder is pulled from an older IBM KB (the clicky type).
PS/2 type cable and the board is seperate from the keys. It worked o
membranes seperate well and are easy to trace. That combined with
it an ideal candidate for hacking. I don't see any need for dual KB's
right so no provisions have been made for this.

The main control panel is of course one of the most important aspec
get a true arcade feel. The joystick was purchased from a local surpl
made by a chicago based coin-op company. It has a good feel, and t

to be holding up well. The buttons are also pulled from rreal arcade
common microswitch variety, the folliong keys are currently used. F
keys, 4 fire buttons, 4 buttons for "O K TAB RET". The original co
well as a hidden switch mapped to escape.

The spinner is an interesting piece so I'll go into abit of detail here. I
commercial units (expensive) as well as several home brew units. N
found seemed all that practical for cost or complexity. While browsi
surplus shop I had an inspiration. I needed something with a weight
bearings/bushings and mountable. In a big bin of old AC induction r
what I was looking for. At $5(CAN) the price was right for my appl
the coild and core and replaced them with hollow spacers. This left
shaft that was easily mountable and well built. I made an adapter fro
bottom shoft to mount the encoder wheel from my El Cheapo mous
knob for the top shaft ($1.60 CAN). A post was mounted to the bott
the mouse board epoxyed to the correct location. The unit works gr
$20(CAN) and took me less than an hour to build. I also have an ori
upright and I feel that my spinner is as good or maybe even better th
be posting some better pics of the contruction proccess for the REV
be building for a friend shortly. My main goal for the REV 2 is to p
shorter unit.

This shot shows the mounting location of the PII 266 board and the
nothing really fancy about this and I still have to build the brackets
CDROM unit.

Completed

- HD is now mounted
- speakers and AMP are installed
- Added f12 key for screen shots

Still To Do

I still have a few things to do on the cabinet.

- Trackball {serial mouse to work with the spinner (PS/2)}
- Bracket for CDROM
- Network card for system updates and hookup to my local net
- lots of finishing touches both on software and general appearance

I hope to get a decent set of decals done for the cabinet as I have access to a good color printer capab
also some interface work to be done so that the system is abit less human dependant (startup files etc

✌ Choose your goal ✌

Now that you have a good idea of the kinds of things that are possible, you have a few decisions to make . . . Do you want to:

- Build a <u>desktop arcade</u> joystick control center?
- Build an <u>arcade cabinet</u> with real arcade controls?
- Build an <u>interface</u> to a game console controller?
- <u>Buy</u> one of the above?

Ultimately, it is of course a personal choice. Click the above links for my thoughts on the pros and cons of each!

When you're done, hit button ③ over there on the left to read about control options :)

-- Home --

Decisions

?

?

Decisions

?

Decisions

?

Build a desktop arcade joystick control center

● PROS

Building a desktop control center is a good compromise between a full arcade cabinet and a chintzy joystick. You can get the full size of an arcade layout without actually dedicating the floor space. You'll probably spend between $80 and $200 depending on the level of sophistication you want, which is fairly reasonable.

● CONS

You lose your desktop :) Even the smaller desktop models take up a couple of feet or so. You also don't get 100% of the arcade feeling like you might hope to with an arcade cabinet. After all's said and done, you're still obviously sitting in front of a computer. You also aren't quite as flexible with what you can do - for instance, it's a lot harder to have a detachable steering wheel, due simply to the lack of real-estate to mount it to.

Build an arcade cabinet with real arcade controls

● PROS

Building an arcade cabinet is, to me, the only way to fly :) It's as close to the real thing as you can get. You get full sized arcade controls, a monitor wrapped in darkness that nullifies distractions and lets you really get into your game. There's plenty of real estate to do fancy things like removable steering wheels, sophisticated speaker systems, etc. Put it in a game room and you have a party favorite that's much easier to share than a

desktop joystick.

● CONS

It's expensive. You'll probably spend at least $600 and more likely $1000+. Not only do you pay for the cabinet, but also the monitor, and the computer that is essentially dedicated to game play and cannot easily be used elsewhere. There's also the floor space consideration - they're big :)

Build an interface to a game console controller

● PROS

This can be a very good way to go. Relatively low cost in electronics will run you in the $20 range, possibly less, and of course the cost of the controller. Depending on how you do it, you don't have to sacrifice the ability to use the controller in the game console it is designed for. Some interfaces will allow you to hook up multiple controllers which is obviously great for playing with other people. The alternatives section of the main FAQ is where you want to be for this route.

● CONS

It's not an arcade controller :) If console emulators and PC games are your thing, it's great -- but arcade PacMan won't quite feel right! There really aren't any cons to this approach, but you do need to be aware of what you get. Some interfaces offer limited functionality, while others take full advantage of the controller (force feedback, for instance).

Buy one of the above

● PROS

If you've got the money, but not the time or ability, buying a pre-made product is a great solution. You can buy desktop controllers from at least 2 and soon 3 sources so far, and full sized arcade cabinets from 2 sources. Buying pre-made console adapters is a bit harder with limited sources -- one source with an adapter that supports full functionality

of the N64 adapter, and a couple of sources for adapters with limited button support and no force-feedback for N64/PSX.

Also, someone who is selling quantities of whatever you're interested in presumably has more experience than you might, and should stand behind their product with a warranty and support. If something you built doesn't work, we'll try to help you, but you get no guarantees :)

● CONS

Buying something instead of building it yourself is normally more expensive, but that may not be true depending on your access to tools, raw materials, and ability :) Also, you might not get the flexibility of customizing your system to suit your tastes, although several vendors offer customization at a premium. Finally, buyer beware! Just because someone is listed here doesn't mean I know that they're a reputable vendor. There have been vendors who have closed up shop or had horribly slow response times on getting you your paid for product. At least one vendor appears to have taken people's money and run. HOWEVER - they really are the exceptions and not the rule. Several have been honest vendors who couldn't keep up with demand, and so closed up shop after satisfying all their present sales requirements.

Generally though, the vendors currently mentioned in this FAQ are great people to work with. Many of them regularly offer their expertise for free on the message board, giving away advice and techniques that could conceivably be costing them in lost sales opportunities. Whenever possible, I post feedback both good and bad in the reviews section of the main FAQ.

The best place to get opinions on a vendor you're thinking of doing business with is on the message board. Also, I'd strongly urge you to do two things: 1. Pay by credit card - this gives you various protections. 2. Insist that the vendor not charge your card until the product actually ships.

-- Home --

🔴 The Controls! 🔴

This is what it's all about! To get the feel of a genuine arcade joystick in your hand, to spin a trackball madly across the screen dodging laser beams, to slam your hand down a hundred times a minute on the fire button trying to do unto them before they do unto you. It's what makes the difference between playing a game on a computer, and diving head first into a virtual arcade.

Ultimately what makes a perfect arcade setup is a personal experience. Some people are happy with an arcade joystick and a couple of buttons. Some go all out with dual joysticks, trackball, spinner, steering wheel, and a few dozen buttons. We'll talk about planning your layout in a bit, but for now, take a look at the various options and decide just what kind of arcade experience you want.

- 🔵 Joysticks
- 🔵 Trackballs
- 🔵 Spinners
- 🔵 Steering Wheels
- 🔵 Flight Yokes
- 🔵 Buttons buttons everywhere

When you're done visiting the options, hit button 🔴 over there on the left to read about interface methods :)

-- Home --

Joysticks

● USE

Joysticks are used in about 95% of all arcade games. No arcade control system would be complete without at least one, and preferably two or more.

● Options

There are so many different models of joysticks that discussing a preference with someone is almost like a religious debate. We'll let you decide which one's the best, but there are several factors to consider.

- Directions

  ○ There are two-way joysticks that only move left/right or up/down. Space Invaders is an example of a game that uses two-way joysticks.
  ○ There are four-way joysticks that move left/right and up/down, but not diagonal. Pac Man is an example of a game that uses four-way joysticks.
  ○ There are eight-way joysticks that move in all four cardinal directions and the diagonals as well. Most space shoot-em-ups use eight-way joysticks.
  ○ There are also a variety of varients, such as the 49-way joystick. However, the bulk of joysticks are 4 or 8 way.

You might think that you get the most versatility out of the 8-way joysticks, and for the most part you'd be right. However, there are some times that a 4-way is a better choice. For instance, in Donkey Kong, when you're trying to climb the ladder, you want to be able to go from moving right to moving up without

hesitation as a flaming barrel tries to make your acquaintance. With a 4-way, if your timing is good this isn't hard. With an 8-way however, it's easy to accidentally hit the up/right diagonal when you're trying to move from right to up, leaving poor Mario standing still while the flaming barrel barbecues him. The same kind of reasoning applies with a 4-way in an 8-way game.

- Style

There are two primary styles of joysticks - the bat shaped handle, and the ball shaped handle. There's no technical differences between the two shapes, it's just a matter of preference.

- Switches(?)

There are three types of switches that sit on the bottom of the joystick under the panel that send the actual signals to the game. The microswitch(definition opens in a separate window, close it to return here) is a tiny pushbutton that's pressed when you move the stick, with an audible click. Leaf switches have two flat metal blades that contact each other when the bottom of the joystick pushes in that direction, with no audible sound. Finally there are optical joysticks that use optical encoders to determine which direction the joystick is pushing. Microswitches are the most common, but many people complain they do not feel as good as leaf switched joysticks, and they find the clicking distracting. Leaf switches are not made anymore, and are thus hard to find. Optical joysticks have the benefit of one less mechanical part to need maintenance/repair, a consideration with micro or leaf switches.

The Controls section of the main FAQ is a good place to start reading about joystick options, but the best place to find out which joystick is "the" one to get is on the message board, where it's a frequent topic of conversation. Hint - presently the favorite seems to be the Happ Super 8 joystick, a bat handled microswitch joystick that can be switched from 4-way to 8-way.

Trackballs

● USE

Trackballs were used in many games, such as Centipede, Crystal Castles, and Marble

Madness. You can substitute a joystick, but it absolutely does not feel the same.
Imagine madly going from one side of the screen to another by push a stick instead of
slapping across a trackball - no comparison.

Options

Other than choosing the size of the trackball, there's really only two main options: The
first is to purchase a trackball meant for PCs, and hook that into your arcade controls.
The second is to find a real arcade trackball, and find a way to interface it to your
computer. The first method is easier, but the feel of a PC trackball is not as authentic as
an arcade trackball. Trackballs essentially function as a mouse, moving in the X and
usually also Y directions. There's more about how to hook up arcade trackballs in the
main controls section of the FAQ.

Spinners

USE

Spinners were also used in many games - either to aim your weapon, or to move your
character. In games where it was used to move your character, such as Tempest, a
joystick can be substituted for a playable but horrible feeling game. In games where you
have a joystick to move and the spinner to aim, such as Tron, it's nearly impossible to
play without a spinner. Spinners work much like a trackball in that they function as a
mouse, however they move only along either the X or Y axis (only horizontal, or only
vertical).

Options

Spinners are one of the more complicated components to add. The only two ways I
know of to obtain a spinner for your project are to either purchase one from a place such
as TwistyGrip, or to build your own. Fortunately, judging from the number of people
who have sucessfully built one, it is very possible to do so albeit somewhat difficult.
The controls section has more information on building spinners.

Steering Wheels

● USE

Steering wheels, of course, are the control of choice for driving games and such. The only acceptable alternative I might use would be a flight-yoke.

● Options

There is not much on the FAQ presently about steering wheels. Almost no one has incorporated one into their project to speak of, and those that talk about them usually just purchase one such as the Thrustmaster series. There are a couple of excellent sites devoted to building racing simulators, that include building steering wheels. Look for these on the links page of the FAQ.

Flight Yokes

● USE

Flight yokes (or StarWars yokes) are used obviously for flying/space games. Games that work well with these are Flight Simulator and StarWars for example. There really is no adequate substitute for a flight yoke if you are going to play these kinds of games.

● Options

There are a couple of options here. You can purchase flight yokes for PCs from most any gaming store. For the StarWars style yoke, you can purchase one from TwistyGrip when they are available (rare, sell out quick), or attempt to make your own based on the TwistyGrip plans. There's also one project on the examples page that built their own yoke that is just incredible looking. Learn more about flight yokes on the controls page of the FAQ.

Buttons buttons everywhere

● USE

A control system's not good if you can't shoot or jump, right? :) You push, something happens, life is good.

● Options

Buttons are probably the most painless part of putting together a control system. They have the same two options that joysticks do, that being microswitch or leaf style. Leaf are no longer being made, but can often be found in aftermarkets. There are really no reports of a preference in buttons, they all seem to give the same feel and gameplay.

🔥 Interface Methods 🔥

● Introduction   ● Keyboard hack   ● Keyboard encoder
● Joystick/Game port   ● Mouse port   ● Parallel/Serial ports
● USB port   ● Other

When you're done looking at interface methods, hit button 🔥 over there on the left to read about planning your contraption :)

-- Home --

Interfaces

If you've been at it for a while now, you might want to take a brief break. This section is probably the longest and most technical of all in the step-by-step guide. Remember I warned you that you'd find yourself buried neck deep in this stuff without warning? Here's your warning :) However, once you peruse this section, the hardest is behind you. You'll have a good idea if you think you can do this (you **can** do this!) and if you want to do this (can't help you with that one :)). Do read the rest of the step-by-step guide, there's more to consider, but it's all easy sailing after this!

Now that you have an idea as to what parts you want your dream system to have, it's time to consider how exactly you get them to talk to the computer. Conceptually, it's not difficult. There are numerous devices that talk to the computer now, such as the keyboard or mouse. The trick is to borrow these connections to send your arcade control signals instead of (or preferably in addition to) your computer's device. We won't go too much into the details of how in *this* section - the main interface section of the FAQ will give you all the details you need and more. Use this section to get an overview of the possibilities. This is an area that is still growing, and there are many options that will probably require the most thought -- there are many factors to consider. One thing to consider as you read is that you're not limited to any singular one of these - most of the projects on the examples page combine two or more of these methods. Some of the methods include:

- Keyboard hack
- Keyboard encoder
- Joystick/Game port
- Mouse port
- Parallel / Serial ports
- USB port
- Other

When you're done looking at interface methods, hit button 🔴 over there on the left to read about planning your contraption :)

Keyboard Hack

🔵 **USE**

Keyboard hacks are one of the most popular methods of hooking up an arcade control to

a computer. A keyboard hack involves taking apart a keyboard, and using the guts to hook your controls to. Almost all games support keyboard control, and keyboards can send hundreds of keystrokes to the computer, giving in theory hundreds of possible arcade controls. However . . .

Considerations

One important consideration is that if you take over the keyboard input for your arcade controls, you lose your ability to use a keyboard with the computer. If you're confident that once you get it set up you won't be needing a keyboard anymore, then you can get away with just swapping them back and forth. If you want the ability to use both arcade controls and the keyboard at the same time however, you can either build or buy a keyboard splitter.

One other important consideration is keyboard "ghosting" and "blocking." If you've ever been typing fast or just pressed many keys at the same time, you may have seen a weird keystroke appear that you didn't type - this is ghosting, a phantom keystroke that appears. Alternatively, you might see the situation where you hit several keys at the same time, then try yet another, and the final keystroke doesn't appear - this is blocking, a keystroke that refuses to register. Both situations can play havok with game controls. Imagine trying to fire and instead just sitting still while a bad guy gets you, or accidentally jumping off a platform when you didn't hit jump. There are whole pages devoted to discussing ghosting and blocking, and it's hard to get two people to agree on the causes and cures. However, everyone agrees the problems exist and need to be considered carefully in your design.

Read about all of the above and more in the interfaces section of the main FAQ.

Keyboard Encoder

USE

A keyboard encoder is a lot like a keyboard hack. In fact, a keyboard hack simply involves getting into your keyboard and using the keyboard encoder (a small circuit board) inside. A stand-alone keyboard encoder is one you can buy from a variety of sources that has the same functionality as the one inside a keyboard, without all the extra plastic around it.

Considerations

A stand-alone keyboard encoder has the advantage that you don't have to break a keyboard to use it, and offers *much* more flexibility in setting up your keystrokes and controls. Where a keyboard hack requires you to adjust your controls to whatever configuration the keyboard's encoder uses, a stand-alone keyboard encoder can be configured to your needs. It can also help you avoid ghosting and blocking problems. One disadvantage is the cost - an encoder goes for around $99, whereas a cheap keyboard can be found for $25. However, the supreme flexibility and programmability of an encoder makes it the method of choice if you are going to use the keyboard port as your input method for your controls, and your budget can afford it. Another nice benefit is that most stand-alone encoders come with a keyboard splitter (pass-thru) built in. You can learn more about the above on the main interfaces page of the FAQ.

Joystick/Gameport

● USE

The joystick port is a logical place to try to hook up your arcade controls to - after all, that's its primary function, right? Like a keyboard hack, you take apart a cheap joystick or gamepad, and connect your joystick and buttons to the original circuit board. Most games support joysticks already, what could be simpler?

● Considerations

This method has the advantage of being one of the quickest and easiest ways to interface arcade controls to your computer. Also, as you're using this particular computer port for its intended purpose, you don't have to worry about losing your keyboard/mouse, or having to hook up a splitter.

There are, however, some drawbacks to consider. The first and biggest is that the joystick/game port has a very limited number of inputs it will accept. Where a keyboard numbers in the hundreds, a joystick port accepts a limited number of inputs. X and Y axis on player 1, up to 4 buttons. Then, if you add a second joystick, you lose two buttons on the first joystick, allowing X and Y axis on player 2, with 2 buttons. No 6 button per player joysticks here, nevermind extra buttons for coin inserts, player 1, etc... The other drawback is that not every system has a gameport (laptops mostly), and believe it or not, not every game supports one!

Exception: The Microsoft Sidewinders allow daisy-chaining them together for up to 56 inputs -- the drawback is this only works in Windows games supporting Directx's DirectInput. This limits the applications you can use somewhat, but makes an excellent option if you're only interested in Windows DirectX games. Check out StaticX's Sidewinder hack for one example.

One thing several people have done is use the joyport for one set of player controls, and a keyboard hack for the other player. This is probably the cheapest way to get a full set of two player controls.

Mouse Port

● USE

The mouse port is ideal for games that use either trackballs or spinners. Trackballs and spinners move in the X/Y plane, just like a mouse. Most emulators use the mouse in place of a trackball/spinner, and most PC games support the mouse if the control makes sense. Using the mouse port, much like a keyboard hack, usually involves hacking open the mouse and using the guts with your own controls interfaced to it.

● Considerations

This can be more difficult. Unlike all of the above interfaces, this one involves mechanical technique as well as electrical connection. Mice work with optical encoders - as you move the mouse, the ball inside spins a shaft. The shaft is connected to a round

disc with evenly spaced spokes/cutouts as shown:

(Click for a larger view)
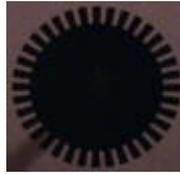
(Click for a larger view)

Looking down on the disc.   Profile view of the shaft and disc.

An LED (Light Emitting Diode) shines a light through the spokes to a receiver on the other side of the spokes. The receiver interprets the pattern of on/off light flashes, and based on your speed and direction, sends the appropriate signal to the computer.

Trackballs and spinners work much the same way. The essential guts may be different, but they also turn shafts that spin discs that cause a pattern of light that sends a signal to the game.

The trick here then is to not only use the electrical parts of a mouse to send the signal from your arcade control, like a keyboard hack does, but also to find a way to get the bigger trackball/spinner to spin a shaft that ultimately spins the shaft/disc from the mouse, sending the proper signal. The added difficulty of working the mechanical portion of this adaptation makes this probably the most difficult hack of all. However, every single person whose done it has said they're happy they did. It really makes a world of difference with the right game.

One final consideration is that tying up your mouse port means it's not available for mouse control. If you have a trackball hack, it will substitute adequately for the mouse. However, if you need a mouse as well as your hack, you can build or buy a splitter for the mouse port.

Parallel/Serial port

Parallel

● USE

There have been few attempts to use parallel ports for arcade controls. There are a couple you will find documented on the interface page of the FAQ. Where the parallel port really shines however is to hook up game console controllers, such as the Atari 2600 joystick, Nintendo/Super Nintendo gamepad, PSX controllers, etc... While arcade controls are great for arcade games, nothing beats playing a Nintendo emulator with a real Nintendo gamepad. You will find a few options if this is your cup of tea.

● Considerations

The only real drawback with this method is getting your game to talk to the parallel port. Unlike the keyboard, joystick or mouse, which are designed to send input from a

device to the computer, the parallel port is mostly an output device. Even though it supports two way communication, few programs are coded to accept it there. There are a couple of software/hardware interfaces you can download and build that will let you plug a controller into the parallel port, and send signals that then act like keyboard or joystick input. The software is free, and the interfaces require about $20 or less in parts to build with only a small amount of skill.

Note - many programs have begun to have built-in-support for one or the other interfaces above. This means that while you have to build the adapter still, you don't have to load the software interface, with all the problems this can sometimes cause.

As far as arcade controls via the parallel port - so far, there have been few projects attempting this. It *is* possible, and one of the software/hardware interfaces mentioned above supports this. However, keyboard/joystick/mouse interfaces tend to be more popular and don't require special software interfaces.

Serial

● USE

To my knowledge, there are no projects using the serial port as an interface except where the serial port is used for a mouse. The trackball/spinner hacks via mouse port listed above work equally as well for mice connected to the serial port.

● Considerations

The considerations for the serial port are essentially the same as for the mouse port above. Splitters for the serial port can be bought or built. Many people will use a combination of the serial and mouse ports to have both a game control and active mouse at the same time. My personal project will have a trackball, spinner, and mouse all connected at the same time via a mouse port/serial port combination with a splitter!

If you plan to use both a mouse port and serial port, there are a couple of steps you have to go through to get the computer to recognize them both simultaneously. This is discussed in the interfaces section.

USB port

● USE

The USB port is a relative newcomer on the block. So far, as far as game controls go, it seems to be going the way of the parallel port. There are a couple of projects for hooking up Nintendo 64 and Sony Playstation controls via the USB port.

Theoretically, since there are now keyboard and mice that work via the USB port, the uses listed above will apply here as well.

One nice thing for you Mac users is that the newer Macs with USB ports support IBM-PC compatible keyboards and mice. This means the hacks above will work for you as well without modification. Most of the above can be applied for Macs as well, but where Macs require a change from how it's done for the PC, you're on your own.

● Considerations

One advantage of using the USB port for your game control hack is that the USB port is hot-swappable. You can unplug and replug devices without having to shut down, and you can plug multiple devices into the USB port simultaneously.

One big disadvantage is USB support. Games that use the built-in mechanisms of Windows to talk to the keyboard/mouse/etc will work fine with USB hacks. Games that don't, for instance if you're running in DOS, don't support the USB port.

Other methods

● USE

Uncharted territory! There's always something new on the horizon. :)

● Considerations

The only thing I can tell you is that if a way exists to send a signal to the computer, it can be modified to send your control's signal instead. One recent example is the PowerRamp from ActLabs. It's essentially a keyboard hack joystick pre-made by ActLabs. A lot of people have purchased them to gut and use the electronics inside for their own project. Thus, while it's technically a keyboard hack, it probably deserves its own page (and by the time you read this probably will). The only limit is your imagination :)

🔴 Plan, plan, plan 🔴

If you're like me, the temptation to rush out and buy parts is pretty high right now. I wouldn't if I were you. Before you spend any money, and start down a particular path, you should break out a pencil and pad of paper. Ask yourself some questions and record your answers. Time spent now will pay off in the end. As a friend of mine is fond of saying, "proper planning prevents poor peformance."

When you're done thinking about your plan (and hopefully with something on paper!), hit button 🔘 over there on the left to read about putting it all together :)

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Questions   Questions   **Questions**

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Questions

🔹 What's my goal?

A desktop controller? A stand-up arcade cabinet? A console controller adapter?
Should I build something small first to practice, then work up to a bigger project? Do I
have a PC to spare for this project, or will it have to do double duty as the family
computer?

🔹 Do I want to build or buy?

Build something to my specifications? Do I have the time, skill, and energy? Spending
the money to get half-way and then abandoning it would be a waste.

Buy? Will I be satisfied with someone else's design? Are they reputable? Will they
support me after the sale? Do they answer my questions before the sale? What kind of
reviews do they have on the reviews page?

🔹 What controls do I want to have?

What kind of joysticks and how many? Do I want a trackball or spinner? Do I have the
skill to build or the money to buy them? Am I building a one player project, or do I
need enough controls for two? Four?

🔹 What game software will I be using?

Emulators? PC Games? What controls do they support, that will help me determine
what I need.

🔹 What interface(s) do I want to use?

Keyboard? Mouse? Joystick? Other? The controls I want to use will help determine
what interface works best. The software I want to use will also. If I want DOS games
then USB isn't the way to go.

🔹 What's my goal?

Can I write down a description of what I'm intending to do now? I should be able to:
   ○ Draw a sketch of what my project might look like.
   ○ Identify the controls I want to use on the drawing.
   ○ Note how each control is going to be connected to the computer.

      o Know what type of software I'm intending to run.

There are probably many other questions to ask yourself. Before you begin to purchase a thing, you should be able to answer these questions and draw yourself a gameplan to follow.

A goal without a plan is but a dream . . . :)

🔟 Put it all together! 🔟

Almost there! One of the last things to think about is putting it all together. Now that you know the various parts of your whole, what's the final project going to look like? Let's figure that out . . .

- Layout
- Woodworking

- Artwork
- Monitors

When you're done reading about the finishing touches of your project, hit button 🔟 over there on the left to read about getting help :)

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Put
It
All
Together
!

Layout

In planning, we discussed laying out your controls on your project. One thing that helps is taking a look at how other control panels are layed out. In the Finishing section of the main FAQ, you'll find links to a bunch of real arcade control panels to look at for inspiration. Also, this is a good time to re-visit some of the examples you looked at earlier for inspiration.

There's one more thing we haven't talked about with your controls. It's hard to plan the "perfect" control panel with all the controls you want, and keep it a reasonable size. What to do? Many people now are using swappable control panels so they can have the best of both worlds. One control panel with trackballs, another with a joystick and a spinner, another with two joysticks and a bunch of buttons . . . Look for examples of this on the examples page.

Woodworking

There are a couple of options for your arcade project. The first is to make it a nice piece of woodwork to match your furniture or such. On the Finishing page, you'll find a site that gives a very nice step-by-step method to produce a nice, shiny, protected piece of fine woodwork.

Artwork

The other alternative is to produce a project with arcade artwork. The limit here is pretty much only your imagination, but there are a lot of resources to get you started. There are two marquees on the Finishing page that you can download and print out, with instructions on how to mount it as a marquee. There's also a page full of marquee examples if you want inspiration to make your own.

For the rest of the cabinet, this is another great time to revisit the examples page and see how everyone else has decorated theirs.

Monitors

Finally, this is one section that sooner or later is going to have it's own page. For now, on the Finishing page you'll find information on mounting monitors, orienting them horizontal or vertical, rotating them, masking them with a bezel, and finally a lot of information on using a real arcade monitor with your cabinet instead of a PC monitor. *phew!*

7⃝ Ask for help 7⃝

Stuck? Frustrated? Ready to use your project to test the laws of gravity? We've been there. Don't despair yet, there are several places you can go for help!

When you're done reading about getting help, hit button 8⃝ over there on the left to read about what you can do to help others :)

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HELP!

There are a few sources you can go to for help, but before you do, bear in mind that you're crusing in barely charted waters. Please make sure of two things when asking for help.

1. Do your homework. A lot of information can be found on the web. Make sure you've read what's available to read on this FAQ and whatever project example you might be using as a model.

2. Bear in mind that there aren't any guarantees. When you ask for help, there's no guarantee that anyone will know the answer. Even if someone does know the answer, they might not be around to answer it for a few days. Patience is the key :)

OK - I've done my best, now help!

There are a several places to go to for help. The first, and probably best, is to post your question on the message board. Some of the most talented, and thankfully friendly, people I know in this hobby frequent the message board. They've all been there, and are willing to help, assuming you've paid attention to #1 and #2 above.

If you've been following someone's project as your model, chances are they probably faced the same question you're facing. Try an email to the author - most of them likewise are willing to help.

If all else fails, you can try emailing me. I'm probably your last resort, for two reasons:

1. I usually have a backlog of 50 to 100 messages in my "Arcade FAQ" folder waiting for my attention. It's not that I get all that much mail - it's just that the FAQ gets done between work and family obligations, and there's not much time left after that :)

2. While I author and host this FAQ, I haven't in fact done most of what this FAQ is about. The content is mostly taken from the very talented people you'll find on the message board and examples page.

🐢 Document and share! 🐢

You've done the thinking and gotten started. You've made the mistakes, skinned your knuckles, or thought of something brilliant. Hopefully this FAQ or one of the many projects out there has inspired and helped you. Now it's payback time. There's only one price I ask for the efforts I put into this behemoth. Take what you've done, what you've learned, what you'd recommend and avoid, and document it! Someone else is just beginning, and they could use all the help you're able to give. Don't forget what it was like when you were just getting started :)

When you're done reading about the ways you can document and share your project, hit the home button 🔵 over there on the left to dive on in to the FAQ... Good luck and enjoy!

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So how can you help? Document what you've done and learned! If you've got the web space, put up a web page with your project on it. If you do that, please be sure to send me a message so I can add you to the list of examples! If you don't have the web space, or don't have the skill/desire to do a web page, I can create and host one for you. You'll still need to write up what you've done, but I'll take care of HTML'izing it and putting it online.

With this in mind, here are some things that will help make a better write-up:

- Detail

  What may seem obvious to you may be stumping someone else. If there are three steps between start and finish, please describe all three, even if step two is small.

- Document as you go

  The diary approach is one of the better ways of making sure you get all the details down. Trying to reconstruct what you did after the fact is much harder than keeping an ongoing log.

- Pictures, pictures, pictures!

  Take plenty of pictures. A picture really is worth a thousand words, and the more the merrier. Take several angles. Avoid polaroids if you can, they don't show up very well. A regular or digital camera is best. If you have print pictures, and no way to get them online, I'll scan them for you for free. Also, just like keeping an ongoing log, take pictures as you go.

- Got something unique?

  If you have something unique, please document that part heavily :)

- Remember your audience

  Bear in mind that your audience is probably someone in the same shoes you were in waaaay back at the beginning of your project. Try to think of what you wish you had known before you started, and document it.

Finally - put down the camera, put down the keyboard, pick up your dream machine, and . . .

PLAY!

Now that you've finished the step-by-step guide, hit the home button 🔘 over there on the left to dive on in to the FAQ... Good luck and enjoy!