ARpiCADE v3.7 Instructions

FIRST READ THIS BIT

It is a good idea to back up your software in case of emergency. I recommend imaging your whole SD card for easy restore should something go bad.

By default this software operates at low resolutions and is intended for use on monitors that can handle 240p/480i.

This software is intended for use with RaspberryJAMMA hardware using GPIO controls. The MK_ARCADE_JOYSTICK kernel module loads early during boot, to disable it edit /etc/modules with root privileges 'sudo nano /etc/modules'.

I DO NOT recommend hotplugging usb devices when powering the pi through JAMMA. Plug and unplug your USB keyboard or whatever else when the power is off.

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INCLUDED SOFTWARE

This Raspberry Pi distro is built around the following software (and would not be possible without a lot of peoples hard work, huge thanks to everyone involved in open source development):

EMULATORS

-MAME 0.172 (2nd newest version of MAME included, has the most accurate emulation and can do a few things the others can't like mirrored cocktail mode & fine adjustments to video output size)
-AdvanceMAME (designed for use with arcade monitors, very configurable - HIGHLY RECOMMENDED for its mix of good speed, options and emulation quality)
-MAME4all (the fastest version of mame for arm architecture but very old with the most dated emulation, the version on this software is modified to work with the correct scanline output in low res) *Not recommended for Pi3, the other versions of MAME have much better emulation due to age*
-RetroArch and it's cores
    -MAME2003 (retroarch core, good speed but a little buggy, improving though - good for mk2 and later Midway titles & SEGA System32 games) *also very good at mapping analog controls to a digital joystick*
    -FBA_Next (retroarch core, fast but not as accurate/configurable as mame - good for CPS3 & PGM & a few SHMUPS that are buggy in advmame)
-Daphne (plays laser disc games like Dragons Lair & Space Ace)
-MAME 0.181 (newest version of MAME included, has the most accurate emulation and can do a few things the others can't like mirrored cocktail mode & fine adjustments to video output size)*181 scales differently to all other emulators included, I recommend 0.172*
- Assorted console emulators

FRONTENDS

-Attract-Mode (fancy frontend hugely themeable, access to menus through 'tab' on keyboard)
-AdvanceMENU (now the optional frontend, formally the default. Exiting Attract-Mode with 'esc' loads advmenu as it is useful for rom management using the 'F8' menu)

OTHER SOFTWARE

-Linux and other free tools (Raspbian base)
-GPIO controls are currently using mk_arcade_joystick modified to suit the wiring of the RaspberryJAMMA board
-The hotkey system is using currently leanstick.pl and pikeyd (ideally it would be part of mk_arcade_joystick but for now this works ok)

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BASIC USE

Copy roms to SD card plug into JAMMA cab power up and play.

ADDING ROMS

Arcade roms should be placed in
   /boot/roms/*/%.zip
where "*" is the emulator and "%" is the game. Roms must be in the correct directories and named and zipped according to the conventions of the relevant emulator.

The exception to the arcade rom storage system is Daphne, its roms are stored in /boot/roms/daphne/rom and framefiles in /boot/roms/daphne/framefile/(directory with same name as the rom) due to the way the emulator works.

Console roms in:
        /boot/roms/consoles/*/%.ext
where "*" is the emulator, "%" is the game and "ext" is the relevant extension. Roms must be in the correct directories and generally must be unzipped (except advmess). Names of console roms are not critical as they are for arcade roms, name them so you can identify them in the menu.

Rom scanning is automatic at startup by default but can also be done manually through the service menu.

Make sure to safely remove/eject your SD card before pulling it out of your PC.

JOYSTICK SHORTCUTS (IN GAME)

Hold 1P Start for a couple of seconds + 2P Start exits a game back to the menu.

Hold 1P Start for a couple of seconds + P1B1   == Credit

Hold 1P Start for a couple of seconds + P1 Joy Down == Pause/Unpause

Hold 1P Start for a couple of seconds + P1 Joy Right == MAME menus (MAME only)

ADVANCED USE

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SD CARD STRUCTURE

The "boot" partition

There are two partitions on a typical Raspberry Pi installation. Only one of these partitions (the first) is usable by Windows. For Windows users this software compilation features an expanded first partition containing the rom directories for the emulators. This allows you to update your roms through a Windows computer. More extensive customisation can be done on the pi or on a Linux (or possibly other UNIX like OS) box which will be able to see the second partition as well as the first. There is a directory on the boot partition to assist in updating settings usually unreachable by Windows using scripts run from the menu (/boot/config-updater).

Basic instructions to the Raspberry Pi for booting are contained in
   /boot/config.txt
which can be seen in the boot partition of the SD card as config.txt (even in Windows). Options contained within this file include video mode and overclocking. For use with the RaspberryJAMMA hardware the hdmi_mode option directly changes the resulting RGB output from the JAMMA edge connector. This software boots in 480i and switches resolution before launching games so be careful editing resolution settings here.

Video output width can be changed in config.txt using the overscan options without image quality being ruined. Best not to play with the height though as it will affect the scanline perfect output.

Video output can also be flipped (180 degrees) in this file without a performance hit using
   display_rotate=2
Although rotating (90 degrees) output here is possible it is easier to achieve consistent results across multiple emulators using emulator specific options (explained there).

Arcade roms are stored on this partition in
   /boot/roms/*/%.zip
where "*" is the emulator and "%" is the game. Roms must be in the correct directories and named and zipped according to the conventions of the relevant emulator. The exception to the rom storage system is Daphne, its roms are stored in /boot/roms/daphne/rom and framefiles in /boot/roms/daphne/framefile/(directory with same name as the rom) due to the way the emulator works.

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The instructions for what happens after boot are in
   /boot/run.sh
which is a shell script controlling what happens after automatic login. It contains a very hacky "now loading" message that is seen during boot and game loading (until broken by the resolution switching) and launches the hot key system as well as Attract-Mode, the game select menu.

The emulator launcher scripts are in

/boot/launchers/
and are used to change the resolution prior to loading games (when applicable) and back again after. This folder also contains the parts of the new system config menu for Attract-Mode (it's very basic at the moment).

Hotkey config is done through
    /boot/hotKeys.conf
you can hash out lines to disable certain functions, or add new ones if you need them.

If you are curious about what is actually happening during boot the regular Linux boot text can be seen by replacing
    /boot/cmdline.txt
with
    /boot/cmdline.txt.bak
if you want to go back to the silent boot use
    /boot/cmdline.txt.silent

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The other partition
Basically invisible to Windows is the second partition. It contains the Linux system and emulator software and config files. To edit these files you will need either a computer running an OS that can write to this partition or to edit the files on the Raspberry Pi using a USB keyboard. Editing on the Raspberry Pi is easiest outside of an arcade cabinet on a more modern monitor however in cab edits are possible in a pinch and the F8 menu in advmenu can help too.

To edit MAME options:
    for MAME 0.172 (some behaviour is controlled by the launcher instead of the config file)
    /home/pi/mame172/mame.ini

    for AdvanceMAME (MAME-106) (some behaviour is controlled by the launcher instead of the config file)
    /home/pi/.advance/advmame.sdl.rc (& for games that render badly in SDL /home/pi/.advance/advmame.rc)

    for MAME4all (some behaviour is controlled by the launcher instead of the config file)
    /home/pi/mame4all/mame.cfg

    For Retroarch based emulators use the Retroarch menus to edit settings.

Some options common to different versions of MAME may have slightly different names in each version. For example screen rotation:
eg. advmame:
    display_rol no
    display_ror yes

eg. mame4all:
    ror=yes
    rol=no

Both of these commands achieve the same thing and should match between all emulators for the gaming experience to be smooth.

Editing attract modes config is best done through the built in menus but if needed all the files are in
  /home/pi/.attract/

To edit AdvanceMenu options (not required to rotate or switch layout)
  /home/pi/.advance/advmenu.rc

Another file you may want to change is the boot splash which can be found at
  /etc/splash.png
you will need to have root access (admin rights) to write to this location due to the structure of the Linux system. This can be done through the new service menu in Attract-Mode or the F8 menu in AdvanceMENU (explained below in the FAQ).

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FAQ

Why so many versions of MAME?

   Each version of MAME included has it's strengths and weaknesses, to get the most out of the system a bit of mixing and matching is required.
   MAME 0.172 is the latest recommended version and has the best emulation quality although it's performance is highly variable between titles.
   AdvanceMAME has many more options and more accurate emulation than MAME4All or MAME2003/MAME078 as well as better performance than MAME0172.
   Mame4all has faster emulation and is useful for any games which run slow in the other emulators, although it has the least accurate emulation of the MAMEs included (it is based on 15 year old MAME).
   MAME072 (MAME2003 Retroarch core) has hacks built in to speed up the emulation of some Midway DCS audio titles. This emulator is slowly improving and is still under active development. It is also very good at mapping analog controls to digital JAMMA controls.

Do I need to safely shutdown the board in any way?

   I recommend exiting a game so as you are at the game menu before shutting down your cabinet. It should not be necessary to run a shutdown script as while at the game menu there are no writes to the SD card to be interrupted to corrupt the card. If you make changes to your systems settings I recommend a shutdown or reboot to ensure those changes are written to the SD card. (but have a backup just in case things go bad some day)

How do I do X with Y piece of software on the Pi?

   Try Googling specific pieces of software you are working with because with the exception of some scripts and modifying the scaling code of mame4all & SDL1.2 I haven't been a programmer on any of this software. The versions of software on this software compilation are publicly available and have much information online. If your query is to do with one of the scripts I have written get in contact and I'll help if I can.

How do I change the software from low res to high res to use with my other cab?

You start by setting the Pi to the resolution you want in
/boot/config.txt
using the
hdmi_mode=
setting you desire. This will ensure the hardware boots at the resolution you want and is the first thing to do.

You will then need to edit the service menu launcher script (boot/launchers/servMenu.sh) to uncomment (remove the '#' hash) the highres options. After a reboot the option will be available in the service menu. When the relevant option is selected the system will reconfigure itself and reboot in the selected settings.

How do I edit the game menu?

Fine tuning of the game list can be achieved through editing the file corresponding to the list you're editing:
/home/pi/.attract/romlists/allGames.txt
/home/pi/.attract/romlists/Arcade.txt
/home/pi/.attract/romlists/Console.txt
to change resolution or edit emulators, etc. It is a good idea to switch off the rom scanning in /boot/run.sh to stop it overwriting any changes you've made.

Attract-Mode themes and features can be explored using a keyboard by pressing 'tab'

How do I rotate the system for my vertical monitor?

If your cab has no service button you will need to plug in a USB keyboard before powering up. Once the system has booted press either 'service'(cabside) or (on keyboard) 'left' or 'right' until you're at the service menu. Use the joystick to select low res vertical and the system will reconfigure itself and reboot setup vertical. You will probably also want to change the theme in Attract-Mode to a vertical one.

If you need to flip the picture to suit your monitor mounting:
In the file /boot/config.txt
display_rotate=2
will flip the image should your monitor mounting be upside down.

How do I edit files on the Raspberry Pi?

Plug a USB keyboard into the Pi (best to do while powered off). When game menu has booted press "esc" to leave the menu (if a second menu loads do it again). You are now on a Linux command line and can edit files using the editor Nano
nano /path/to/file.extension

"ctrl" + "x" will exit nano after giving you the option to save your changes. If you need root access to save changes to a file launching nano with super user rights can be done with

    sudo nano /path/to/file.extension

Be careful editing files with superuser privileges as you can render the system useless. It's probably a good idea to Google 'Linux command line basics' and familiarise yourself a bit if you want to learn more about using Linux on RPi.

When you are done on the command line you can type 'sudo reboot' to reboot, 'sudo poweroff' to shutdown the pi safely, or 'logout' to restart Attract-Mode (logging out will cause you to be automatically logged back in which causes /boot/run.sh to be run again so however you have run.sh setup is what will happen after a logout).

How do I change the bootsplash?

Make the boot splash you want and copy it to the memory card in the boot partition as "splash.png". Boot Pi with USB keyboard attached, wait for menu to load, press "esc" to exit menu and copy your new boot splash to the system as a super user:

    sudo cp /boot/splash.png /etc/splash.png

Then reboot to see if it worked out how you wanted.

    sudo reboot

This can also now be achieved from Attract-Mode (cab service button OR left or right on a keyboard to find the service menu) or advmenu using the F8 menu and the /boot/config-updater folder by placing the new picture you want in the folder as splash.png the pressing F8 in advmenu and using the option to update the splash.

How can I set FREEPLAY?

The games that originally had freeplay options in dip switches can be set using the mame menus or in AdvanceMAME only through the config file line:

    misc_freeplay yes

however not all games had a freeplay mode and also a lot of games do not show an attract mode when set to freeplay so you will probably want a coin slot/button or button combo to add credits in mame.

Games which used test menus can have their test menus accessed by pressing the cabs Test button/switch or 'F2' on a keyboard during the game.

You can also use the shortcut P1 Start (long hold) + Button 1 for credits.

Why don't my roms work?

Different versions of MAME use different romsets, some roms will work across many versions of MAME others won't. You can convert romsets using programs like romcenter and datfiles for the emulators.

The 3.7 image is sized smaller than the memory card I want to use how can I resize it?

The image is sized for an 8 gig card as it's the minimum usable size. To use a bigger card you will need to use the partitioning program of your choice to move the 2nd partition to the end of the image and resize the first partition to fill the newly created space in the middle of the card. Before resizing the first partition copy it's contents to your computer as resizing will destroy the contents, then copy it back when resized and you should have a working image.

Will this SD card image run on a standard RPi3 w/o the RaspberryJAMMA hardware?

Yes but it may require some setup.

You may need to adjust the resolution in /boot/config.txt if your HDMI monitor doesn't like the signal (mine are fine with it), if you do need to change to high res also uncomment the change to highres options in /boot/launchers/servMenu.sh and adjust the system to highres in the Attract-Mode service menu (left/right on the keyboard or cab service button in the menu to find the service menu). Do not launch a game before changing the resolution like this or the launcher script could change the res to one unsuited to your monitor.

Keyboard use may be buggy as the system is intended for cabinet use.

What runs well in the 181 build? Cave?

Honestly I don't really use 181 except for 2 games by Universal that run very slightly better than in 172. The rendering has changed somewhere between 172 and 181 and the results don't match the rest of the system perfectly. Performance is similar to 172, maybe a little better in some titles but I didn't look too much further into it. I mainly included because it was still the current version of MAME (at the time) and I don't think anyone had released a current version in an image before.

Cave stuff is generally best in Advmame or FBA, depending on the title.

How do I stop the game list being generated every time I power up?

can be disabled in /boot/run.sh (this is the file that controls what happens after the pi boots).

How do I enable hi-res the easy way?

You need to adjust the resolution in /boot/config.txt to high res also uncomment the change to highres options in /boot/launchers/servMenu.sh and adjust the system to highres in the Attract-Mode service menu (left/right on the keyboard or cab service button in the menu to find the service menu). Do not launch a game before changing the resolution like this or the launcher script could change the res to one unsuited to your monitor.

How can I use WiFi?

JessieWonka on KLOV posted this for how he got his wifi setup (wifi is blacklisted for boot speed):

Modify /etc/modprobe.d/raspi-blacklist.conf and remove or comment out the "disable wifi" lines, then reboot.

There are several ways to add wifi to begin with, but these steps worked for me:

1) $ wpa_passphrase wifinetworkname password (then copy what it creates)
2) $ sudo nano /etc/wpa_supplicant/wpa_supplicant.conf (paste in this file, save)
3) create blank file called "ssh" in BOOT directory
4) reboot