XBOX AVIP-MOD V1 MANUAL (PRE RELEASE BETA)

Background.

This project stemmed from the need to find an easy way of connecting external Video\audio devices to the Xbox console, as the Xbox is out of production it is becoming ever hard to find good quality component cables and with TV's now starting to do away with these legacy inputs something needed to be done.

I have seen many home hacks to implement internal and external video mods to the console some have looked like they did not instill reliability or great signal integrity or have ended up in damage to the Xbox console either from incorrect installation or iron damage.

This adapter/ quick solder board will make it easy implement internal video adapters or to attach a custom connector to the Xbox with minimal of fuss and will provide great signal integrity with an almost Idiot proof installation.

Note: the AVIP-MOD has not yet been tested and may not function it is still in the development stages and I'm waiting to receive sample PCB's to test their suitability but from initial testing this product should work as intended.

Features.

Below is a list of general features:

1. Pluggable RF connectors for AV signals.
1. Impedance matched shielded analogue signals.
1. Automatic selection of backup AV mode.
1. VGA compliant 5V buffered V and H sync signals (non inverted)
1. Video mode toggling
1. Fits all motherboard revisions
1. Additional optional audio and video breakout boards
1. Open source design.
1. In circuit user reprogrammable.
2. Audible/ light mode indication options.
3. Expansion capabilities
4. AV pack boot fix (boot console without av pack fitted)

Once the board is in place and connected to the Xbox console the video signals are connected to the adapter board using miniature plug-gable RF connectors, semi making the solution plug and play by the installer.

In addition to these features I decided to include buffered Hsync and Vsync signals so that if someone wished they could implement proper VGA compliant signals (using a suitable bios, that is.)

The device is somewhat intelligent, it has the ability to detect if an AV pack is connected to the Xbox console and enable that output, if no pack is detected on startup or reset the Xbox will automatically select an appropriate mode base on the mode select jumpers M1,M2 and M3.

If an external push button is connected and operated upon power up of the console and no av pack is detected the AVIP-MOD will change into toggle mode, in toggle mode additional presses of the mode button will cycle through all the available AV pack types to manually.

The Hardware.

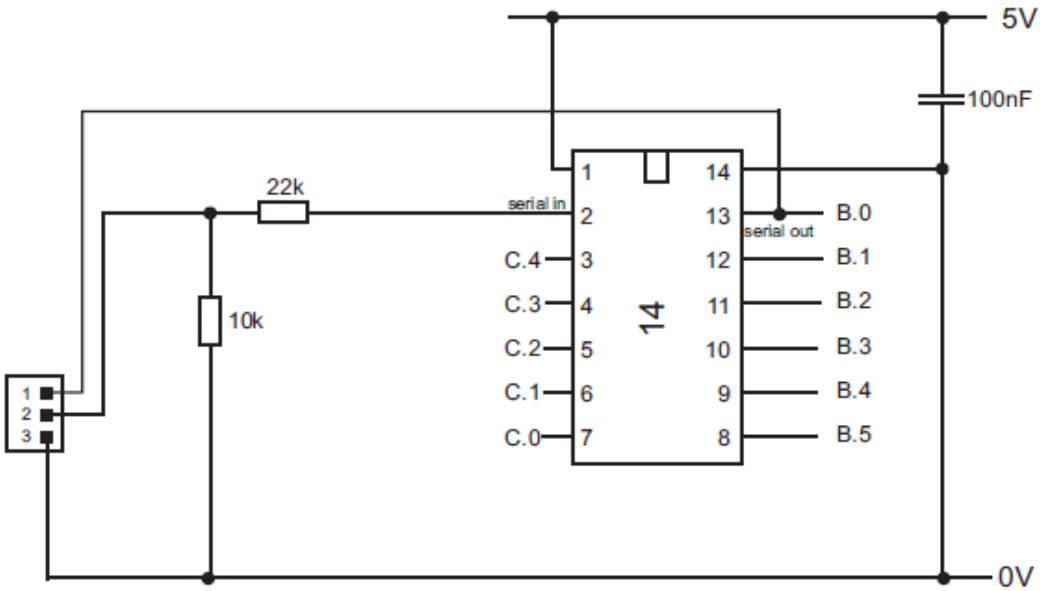
This project was based around the SMD version of the Picaxe 14M2 (AXE017M2SM) , sure the programming gurus are going to to flame me and say "what the hell did you do that for?"
The reasoning is that:

- with little knowledge in micro controllers could modify the program at home in circuit with free tools and there is not a steep learning curve as there is in C or assembler.
- the use of expensive external programmers are not needed; many of the users and modders of Xbox consoles are not electronics engineers or embedded software engineers and this enables them to play and make modifications to the program.

Programming.

The AVIP-MOD comes pre-programmed and no programming is required by the installer, but if a user wishes to customize the program they can. Below is the diagram for the connection to the Picaxe programming cable:

The Picaxe programming cable is fitted with a headphone type 3.5mm male plug and its terminals



are as follows:

Pin 1 tip

Pin 2 ring
Pin 3 ground

when you are finished programming serial in must be tied back to ground to enable normal operation.

Programming Software.

The following software can be used to program the AVIP-MOD board

PICAXE Editor 6 (windows)
PICAXE Programming Editor (windows)
AXEpad (multi platform)

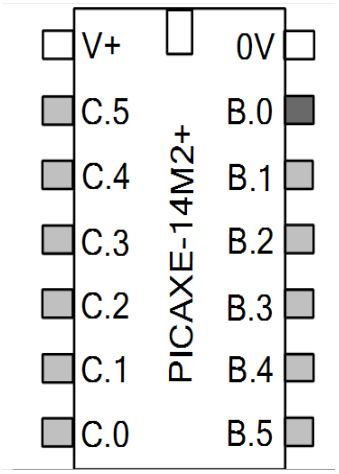
For more information on programming and the Picaxe platform see http://www.picaxe.com/

Installation and configuration.

board layout diagram

Below is the pinout of the Picaxe microcontroller used on the AVIP-MOD board with the standard program (notice this is upside down to the above picture).

Pin description:



B3,b5,B5 Mode select input output pins used as inputs to detect presence of Xbox AV pack, also used as outputs to force mode during auto select mode.

C2,C1,C0 Mode select jumper for default av pack type to select during auto select mode (see mode selection jumpers to configure pack type)

B2 Reset pin to restart mode detection.

C5 Serial input pin (programming use) ground during normal operation.

C4 Enable toggle mode on start up and toggle mode mode change button during toggle mode.

C5 Serial input pin tie to ground during normal operation.

B0 Serial output pin/ Beep output leave floating during normal operation else connect to piezo buzzer/ led to enable beep code/ flash on mode select or change.

Prior to installation the mode select jumpers need to be configured to select the correct AV mode when a pack is not detected on startup this is done using the mode jumpers M1,M2 and M3 below is a truth table table showing the mode select options:

M1	M2	M3	mode
Off	On	On	Standard AV
Off	Off	On	Advanced AV
On	Off	Off	Component AV
Off	On	Off	VGA AV
Off	Off	Off	RGB AV

Installation may depend on the users needs/wants but basic installation is as below, the only connection that must be made is the connection of the serial in pin to ground to tell the micro to start up in run mode instead of programming mode.

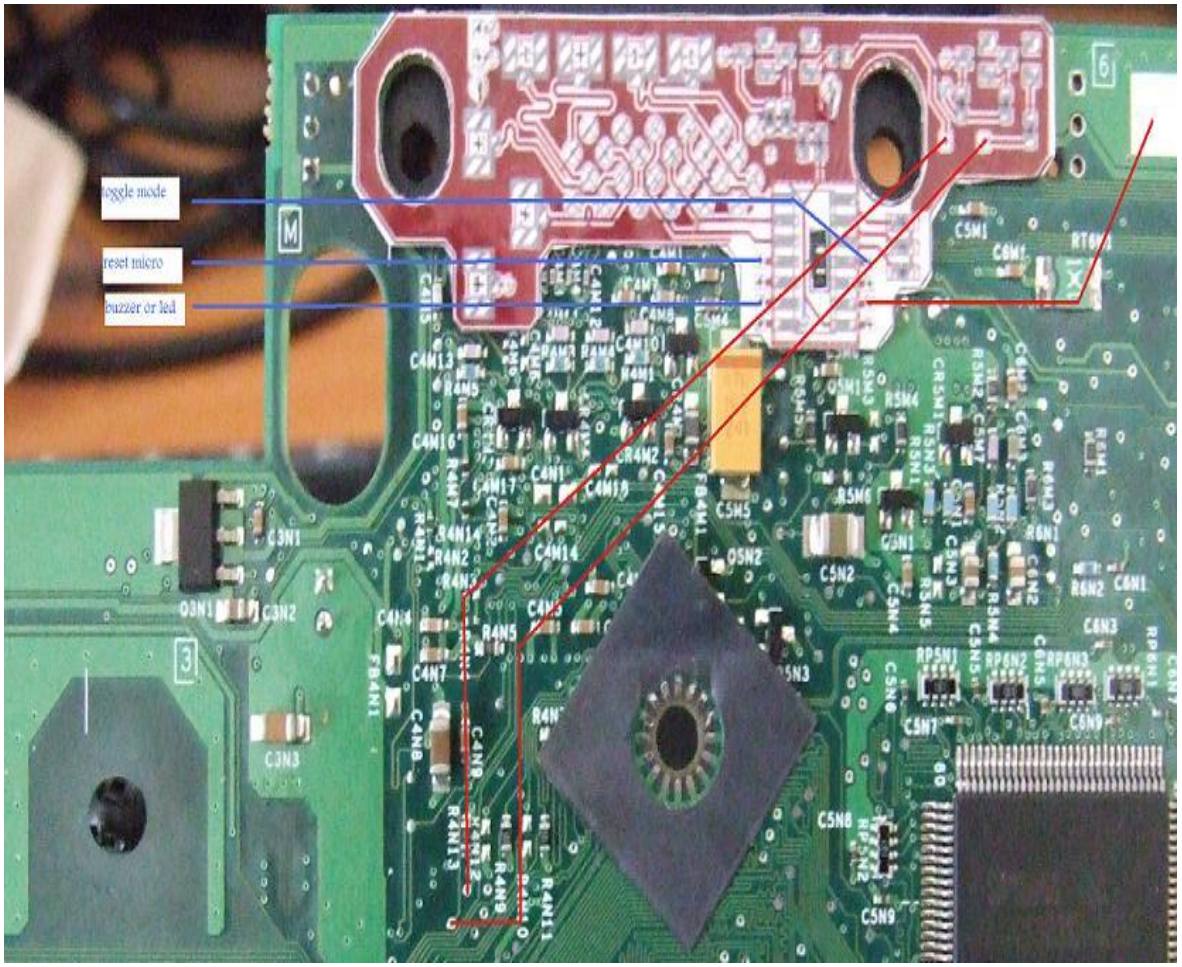
The sync signals are present on pin 35 (H sync) Pin 36 (V sync) on the conexant video encoder chip so there are possibilities that these are not quite the same on all Xbox versions but are in the same general area and the use of a multimeter will confirm this.

Suggestions for installation/ programming.

The most common method of installation I see is this being used with is a breakout board to fit an internal component to HDMI adapter as new TV models are being released without component inputs. This is a good solution to overcoming this problem and if you have HDMI do you really need any other output modes?

After installation it is recommended that the RF connector plugs are secured so that they may not come loose if the Xbox is dropped or the RF cables pulled. Under normal circumstances they

should never come loose but a short on the motherboard could render the Xbox dead or possibly damage the device the Xbox is connected to.



I would recommend putting foam tape on the bottom shielding to secure the plugs as a precaution and placing tape on any solder point to secure it from fracture or vibration damage.

The mode select jumpers could be connected to a binary switch, Xblast /Smart XX mod chip, Xerc or other such device and with this you could change the default AV pack mode at will, Unused pins on the board could be used for anything the user can think of.

The micro could be adapted to become an Xerc as there are libraries in the Picaxe chip to read an IR remote. This would require a few hardware mods but I'll leave that up to you for a version 2 mod. I look forward to seeing program changes and hardware mods.

One issue with including an XERC on this board is that the Xbox standby is 3.3v and the input voltage from the AVIP mode pins is 5v and as the micro contains EMC/TVs diodes in the input circuit, this means the inputs can't tolerate supply voltages above VCC and damage may result to the micro. This could be fixed with voltage dividers on the mode select pins, a hardware revision would be required for this function.

The program could be modified to include an ADC converter to select an av mode via an adjustment pot, i2c, external Eeprom or control from another device such as a mod chip.

Yes, you could connect A LCD character display display to the AVIP-MOD to show the video mode selected but your programming resources would be best spent integrating those features into Xblast OS or XBMC4XBOX, lets not get too carried away here :-)

Other info.

Warning: this project is offered as is without warranty of any kind either expressed or implied.
I am open to criticism but don't blame me if you blow up your Xbox.

This project is in no way complete. Use caution with any information contained in this document or any info you find about this project I can't guarantee it is accurate. Please take caution as I have not actually built and tested this actually works yet, but I don't see why it would not.

You may contact me as professor_jonny on the XBMC4XBOX forums if you wish if you have any questions or possible feature or programming requests.

This project is released as open source. You can do with this as you like but you must show some love to xbmc4xbox forum donation box, and give me credit where due.

If you modify it this manual or PCB files you must make them available to everyone you may provide me with a copy also or a link to download.

If you start making this for commercial gain you must show some love to xbmc4xbox forum donation box, and give me credit where due, and I would love samples and a small bucket of cash :-).

Note that the routing on the AVIP board is quite tight fit and you may need to do trimming of the black posts on the case and it would be a good idea to place foam on the underside of the motherboard to stop the plugs from coming off and damaging your Xbox by shorting on the Xbox motherboard.

This project is is inspired by my love of the Xbox and my favorite software XBMC4XBOX.