

# myIFPGA



## 8088 All-in-One Gameboard

### Setup Guide

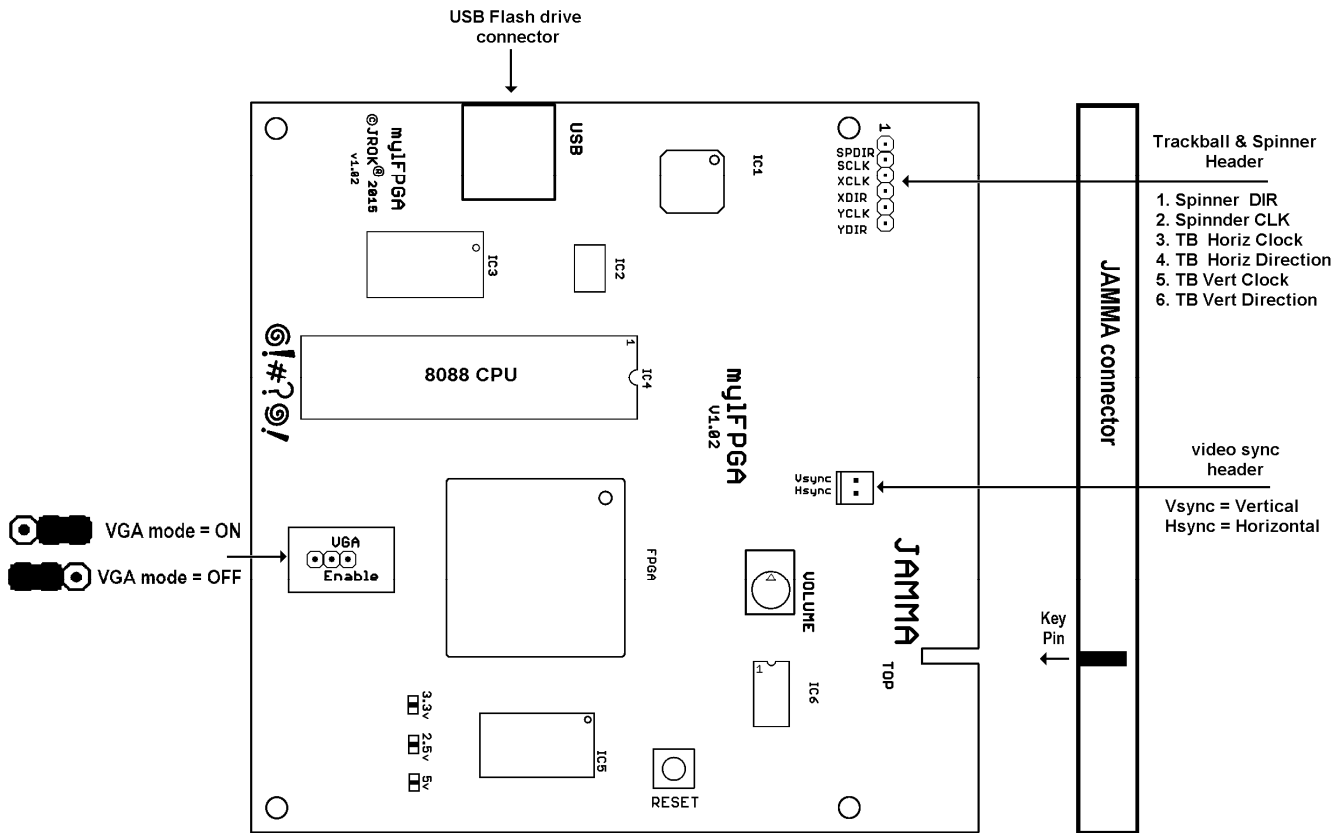
For v1.02 / 1.02 Rev.A / v1.03  
board hardware

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## Board Layout

**Before** plugging the board in make sure the connector is standard JAMMA and not a Capcom 56 way connector or another variation of 2 x 28 way edge connector.



A six pin headers is provided on the board for Spinner and Trackball inputs. If the spinner or trackball is not used this header does not need to be connected.

**NOTE:** Ensure the VGA enable is OFF when used in a standard resolution monitor !

## WARNING

**Plugging in an un-keyed JAMMA adapter the wrong way around may damage or DESTROY the board !**

## Hardware & Connectors

### Connectors

The board uses a standard JAMMA connector, in an upright cabinet player 1 & 2 joysticks and 4 buttons are required.

USB connector is only used for flash drives.

The six pin header on the board is used for trackball and spinner inputs.

Mating connector types are:

6 position = molex kk 0.1" 22-01-3067 or TE Connectivity/AMP CST-100 0.1" 770602-6

Monitor Horizontal and Vertical sync, the 2 pin header provides separate positive going Horizontal and Vertical synchronization pulses. This should only be used if a monitor does not have a composite sync input option.

NOTE: Composite sync is provided on the JAMMA edge connector.

Mating connector types are:

2 position = molex kk 0.1" 22-01-3027 or TE Connectivity/AMP CST-100 0.1" 770602-2

### Voltage & Current

The board requires **only** 5v regulated DC power. Maximum current draw is 400mA when using a 4ohm speaker at maximum volume. A **minimum** 500mA power supply should be used to ensure stable operation.

If long runs of cabling are used significant voltage drop will occur, ensure the power supply is adjusted to provide a reliable 5v at the edge connector of the board.

A voltage at the edge connector of the board under 4.75v will cause the board to suspend and remain in reset mode.

### Power Requirements

5v DC regulated  
400mA

## JAMMA wiring

### Joystick Direction

An 8-way stick must be used to support all games. If a joystick is used without being rotated 45 degrees for q\*bert support the setup option of "Angle stick" can be used. This option requires two joystick switches in the corner positions to be activated before registering a movement. For example UP & LEFT, DOWN & RIGHT.

Player 1 joystick controls, or player 2 in cocktail mode

<u>JAMMA switch</u>	<u>Q*Bert Direction</u>
UP	UP & RIGHT
LEFT	UP & LEFT
DOWN	DOWN & LEFT
RIGHT	DOWN & RIGHT

### 3 Stooges Joysticks Wiring

The game '3 stooges' requires 3 joysticks and 3 buttons. The single button required for Player 1 and 2 are automatically mapped to the JAMMA Player 1 Start and JAMMA Player 1 button 1, for player 1 and JAMMA Player 2 Start and JAMMA Player 2 button 1, for player 2.

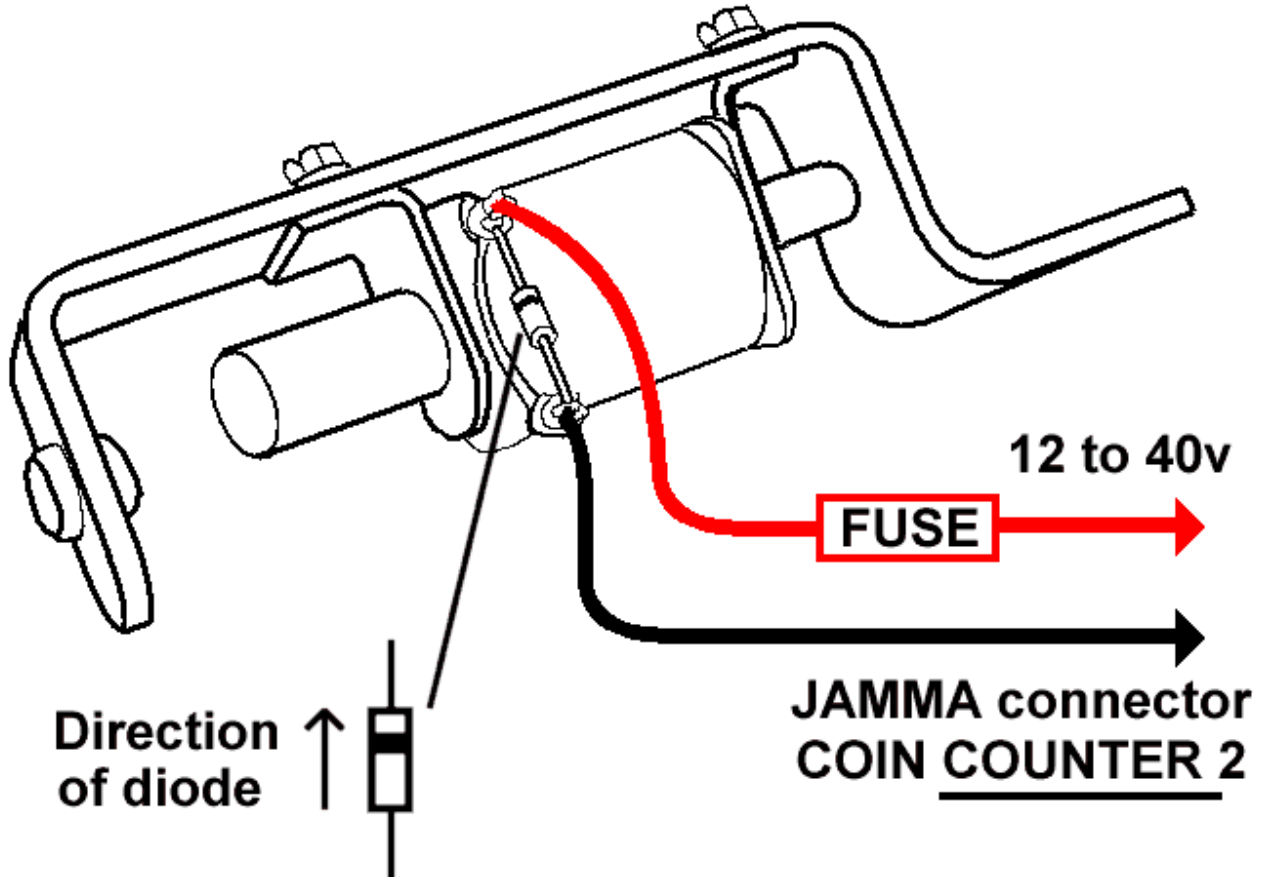
So both JAMMA player 1 start and JAMMA player 1 button 1 act as the player 1 button in the game.

Left Player	Player 1 Joystick Player 1 Button 1 & Player 1 Start
Middle Player	Player 2 Joystick Player 2 Button 1 & Player 2 Start
Right Player	Player 1 button 3 = UP Player 1 button 4 = RIGHT Player 2 button 3 = DOWN Player 2 button 4 = LEFT  Player 1 button 2 ( = start / fire / throw )

## Q\*Bert Klocker

A solenoid knocker ( Kicker ) is supported for Q\*Bert and should be wired to:  
**JAMMA coin COUNTER 2** connector.

- The knocker **MUST BE FUSED** with a 1A slow blow fuse.
- **DO NOT CONNECT THE SOLENOID TO JAMMA COIN 1 or COIN 2 inputs**



**DO NOT CONNECT TO  
JAMMA COIN 1 or COIN 2**

Two possible coils can be used **DEPENDING ON THE VOLTAGE USED !**

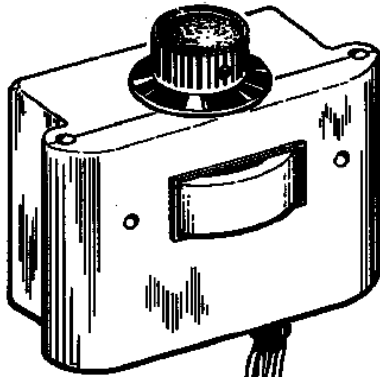
In a system where only 12v is available to drive the knocker solenoid the alternative coil can be used.

30v DC ( Standard Coil )	A-5195	12.3 ohm
12v DC	A-5194	4.8 ohm

## Spinner & Trackball Wiring

### Spinner

Pins 1 & 2 on the 6 pin header are used for a spinner.



## Spinner Wiring

To 6 pin Header

CLK P1

Pin 2 - SCLK

DIR

Pin 1 - SPDIR

+5V DC

Power supply

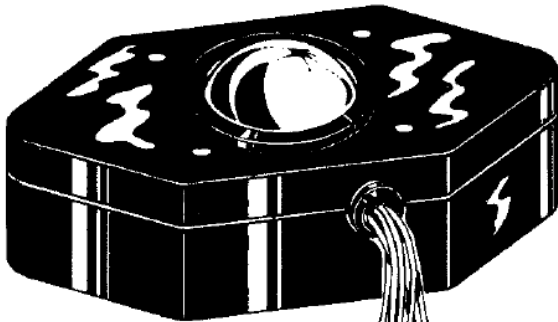
GND

5V and GND

### Trackball

Pins 3, 4, 5, 6 on the 6 pin header are used for a trackball.

## Trackball Wiring



GND P1

+5V DC

Power supply  
5V and GND

Y1

pin 6 - YDIR

Y2

pin 5 - YCLK

X1

pin 4 - XDIR

X2

pin 3 - XCLK

6 pin Header

**NOTE:** boards before version "1.02 Rev.A" may require upgraded opto sensors in the trackball or spinner.

## Select & Play Menu

After power on tests have completed and the “BOOT TO” option is set to “menu” the game select screen will be displayed.

To select a game or Setup use the player 1 joystick up & down, or 2 player start, Press player 1 start to choose the option selected.



During gameplay, when the “BUTTON TIMER” option has been set to 1, 2 or 4 seconds, pressing and holding both “player 1 start” and “player 2 start” buttons together at the same time, the system will restart back to the game menu after 1,2 or 4 seconds.



## Changing Individual Game Setting & Options – “Test Mode”

Each game maintains a set of options & parameters which are independent from the setup menu and DIP switch settings. **Changing game settings must be done from within the game when it is selected and running.** These settings cannot be changed from the system setup menu.

To change in-game options requires the following:

JAMMA TEST - position “15” to be wired to a switch  
JAMMA SERVICE - position “R” to be wired to a button.

After a game has been selected and is running the original Test Mode screens are available through the JAMMA “TEST” switch.

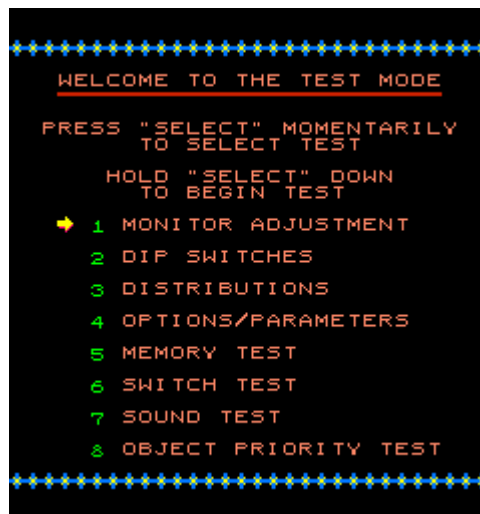
Depending on the particular game the Test Mode is used to change game options, clear bookkeeping or run board tests.

The JAMMA test switch is connected to the game “TEST” switch and when enabled takes the booted game into the “TEST MODE” display. Also the JAMMA service button is connected to the game “SELECT” button.

NOTE: See the board “SETUP MENU” option “TEST SWITCH” that controls if the switch is active closed or active open.

### Q\*bert as an example:

Starting Q\*Bert and activating the JAMMA TEST switch will start the game “TEST MODE”.



The JAMMA “SERVICE” button steps through the options ( a short press ) or selects that option ( a long press). Details of the game option settings can be found in the specific game manual.

## SETUP MENU

Option Setup Menu can be accessed from the Main Menu if “SETUP” is enabled in the “Game Enable Menu”.

If the SETUP menu is **disabled** or “BOOT TO” is set to a game use the following method to get to setup menu.

### Method 1:

- Press and hold the “SERVICE / CREDIT” switch button on the JAMMA harness and press RESET on the board, or power the machine on.

### Method 2:

**NOTE:** This method can be disabled in the setup menu under the “BOOT TO SETUP” option.

- Press and hold Player 1 and player 2 start buttons and press RESET on the board, or power the machine on.

## Options Setup

The setup menu allows the system settings, game setup and dip switches to be changed. Also screen test and Game ROM loading.



## SYSTEM SETUP

```
OPTION SETUP  M:1.00 F:0.00
BOOT TO      : *MENU*
HOLD FOR MENU : 1 SEC
SCREEN SAVER  : ON
QB ANGLE STICK : OFF
SPINNER      : BUTTONS
TRACKBALL    : JOYSTICK
FIRE CONTROLS : JOYSTICK
FLIP SCREEN  : OFF
ROTATE SCREEN : OFF
VGA SCAN LINES : OFF
TEST SWITCH  : ON = RUN
BOOT TO SETUP : 1P & 2P
START BUTTONS : ON PRESS
EXIT
```

### BOOT TO

Select the game the machine should boot to when powered on. Default is the Menu.

If the game ROMs are loaded, any loaded game can be chosen.

It is recommended that when using "Boot To" then the "Button Timer" should be set to "OFF" so the game select menu will be disabled and never displayed.

### HOLD FOR MENU

**1/2/4** Number of seconds that holding down 1P & 2P start buttons together will reset the board and jump back to the game main menu IF the menu is set in "BOOT TO".

**OFF** Disable the option to jump to then main menu when holding 1P & 2P start buttons.

## SCREEN SAVER

### **ON/OFF**

If no buttons are pressed on the game select screen for approximately 10 minutes the screen saver will automatically kick in. When in screen saver mode any button press will restart the menu.

The screen save does not start when in the setup or game enabled menu.

## QB ANGLE STICK

### **ON/OFF**

When using an 8-way joystick not installed at an angle, movement of is only reported when the joystick is moved into the corners. Two joystick switches must be engaged for the game to register joystick movement.

When using a 4 way or 8 way joystick installed at 45 degree angle this option should be disabled.

## SPINNER

Allows for using a spinner for control in Mad Planets, also the use of a trackball or player buttons 1 & 2 to report the trackball.

**BUTTONS** Player 1 buttons 1 and 2 are used for Rotate Left and Rotate Right  
**JOYSTICK 2** Player 2 joystick control left & right Rotate  
**SPINNER** Spinner input is used for spinner control  
**TKBALLH** Horizontal movement of the trackball reports as a spinner

NOTE: use of a spinner uses pins 5 & 6 on the expansion header or pins 1,2,3,4 for trackball control on the expansion header.

## TRACKBALL

Allows for using a trackball or a joystick.

**JOYSTICK** Joystick input is used to simulate the control of a trackball  
**ENABLED** Trackball input is enabled

NOTE: use pin 1,2,3,4 for trackball control on the expansion header.

## FIRE CONTROLS

For games that feature a second joystick for directional fire, this allows the use of either the JAMMA player 2 joystick or player 1 buttons 1,2,3,4 for directional fire.

**JOYSTICK** Player 2 Joystick controls directional fire  
**BUTTONS** Player 1 buttons 1,2,3,4 are use for FIRE UP / DOWN/ LEFT/ RIGHT

## FLIP SCREEN

### **ON/OFF**

Screen is flipped either horizontally or vertically depending on game orientation.

## ROTATE SCREEN

This option allows horizontal games to be played on a vertically mounted monitor, or vertical games to be played on a horizontally mounted monitor

**OFF** No rotation  
**V to H** Vertical games are rotated 90 degrees to be displayed on a horizontal monitor.  
**H to V** Horizontal games are rotated 90 degrees to be displayed on a vertical monitor.

## VGA SCAN LINES

Adds blank lines in the display to simulate a standard resolution monitor. This option is **only** available in VGA mode.

**ON** Blanks every other video line  
**OFF** All video lines are displayed

## TEST SWITCH

Controls if the test switch should be closed for the game to go into test mode, or open to go into test mode.

**ON = RUN** Test switch close (ON) for the games to run  
**OFF = RUN** Test switch should be open (OFF) for game to run(\*)

Default for JAMMA is the test switch is in OFF position for games to run and ON position to start the game's test mode.

## BOOT TO SETUP

During system boot, or reset, the SETUP menu can be access by wither pressing and holding 1P & 2P start, or by holding the credit switch. This option allows the 1P & 2P start option to be disabled.

**1P & 2P** When system is booting from power on or reset holding 1P & 2P start buttons will cause the machine to go into the setup menu.

**SERVICE** If the setup menu has been disabled from the main menu the only way to get into setup is to hold the JAMMA SERVICE/CREDIT switch down during booting.

## **START BUTTON MODE**

**ON PRESS** The player start button are passed directly to the game as soon as they are pressed.

**ON RELEASE** The player start buttons are passed to the game for ½ a second AFTER the start button is released.

Default setting is “ON PRESS” so a game will start when the button is pressed.

## GAME SETUP

This screen allows configuration of game options.



**NOTE:** Speech Freq Adj, Speech Vol Adj, Spinner delay NOT available on Menu version 1.00

### MP FAST BOOT

Allows Mad Planets to perform a fast boot, the ROM test and “clear-ultras scores” at power up is bypassed.

**ON** Fast boot enabled.

**OFF** Long ROM test and clear daily scores is displayed, approx 30 seconds boot time.

Note: This option should be turn ON if ultra-scores are to be cleared.

### REACTOR HS SAVER

When “ON” adds a high-score saving patch to reactor, so scores are saved after the game is exited or the machine reset. To clear scores turn the option “OFF” and restart Reactor.

**ON** Score saving patches are applied.

**OFF** Scores are reset every time the game is booted

### GAME BOOT SPEECH

Enables the startup speech for Q\*Bert, MY Q\*bert, FHMC Q\*bert, Q\*bert's Qubes and Reactor.

**ON** Speech at startup.

**OFF** No speech at startup.



## Menu Version 1.01 Additional Features.

These features are ONLY available with FPGA firmware version 1.03 and MCU firmware version 1.01  
Although the menu is compatible with all version of the FPGA & MCU firmware these options will have no effect.

### SPEECH FREQ ADJ:

Setting from 00 to 0F [\*] shows default value

Allows the speech frequency for Q\*bert and Reactor to be adjusted, 00 is the default frequency, 0F is the maximum frequency.

### SPEECH VOL ADJ:

Setting from 00 to 0F [\*] shows default value

Sets the relative volume of speech to the game sound effects, 00 is the default value with 50/50 mix between speech and sound effects. 0F is the maximum with speech 4x louder than default.

### SPINNER DELAY:

Settings from 0 to 63

To allow for spinners with higher counts per rotation, this controls the number of spinner pulses read before recording the direction of the spinner and passing it to the game hardware.

Press and hold Player 1 Start button to auto-increment the value, joystick left decreases value by 10, joystick right increases value by 10.

For a standard spinner with 24 pulse clock per rotation the value should be set to 0. Depending on the resolution of the spinner used, the delay should be set to give the nearest result to 24.

Examples:

1200 pulses per revolution => spinner delay =>  $(1200/24) = 50$

72 pulses per revolution => spinner delay =>  $(72/24) = 3$

# SET DIP SWITCHES

Game DIP switch options for each game can be configured in this menu,

<p>SET DIP SWITCHES ----- <b>Q*BERT</b> M-Y Q*BERT FHMC Q*BERT Q*BERTS QUBES MAD PLANETS KRULL REACTOR SCREW LOOSE 3 STOOGES QB QUBES [CT] ARGUS EXIT</p>	<p>Q*BERT SETTINGS : Q*BERT ----- <b>AUTO ADVANCE : OFF</b> ATTRACT SOUND : ON FREEPLAY : ON CABINET TYPE : UPRIGHT KICKER : ON EXIT</p>	<p>Mellow Yellow Q*Bert SETTINGS : M-Y Q*BERT ----- <b>AUTO ADVANCE : OFF</b> ATTRACT SOUND : ON FREEPLAY : OFF CABINET TYPE : UPRIGHT KICKER : ON EXIT</p>
<p>Faster Harder More Challenging Q*Bert SETTINGS : FHMC Q*BERT ----- <b>AUTO ADVANCE : OFF</b> ATTRACT SOUND : ON FREEPLAY : OFF CABINET TYPE : UPRIGHT KICKER : ON EXIT</p>	<p>Q*Berts Qubes SETTINGS : Q*BERTS QUBES ----- <b>ATTRACT SOUND : ON</b> COIN/CREDIT : A2/1 B1/2 EXTRA LIFE AT : 15K ADD LIFE EVERY: 25K DIFFICULTY : HARD EXIT</p>	<p>Mad Planets SETTINGS : MAD PLANETS ----- <b>DEMO MODE : OFF</b> ATTRACT SOUND : ON COIN/CREDIT : FREEPLAY LIVES/SHIPS : 3 BONUS : 10K DIFFICULTY : STANDARD EXIT</p>
<p>Krull SETTINGS : KRULL ----- <b>LIVES/SHIPS : 3</b> ATTRACT SOUND : ON COIN/CREDIT : FREEPLAY HEXAGON : ROVING DIFFICULTY : STANDARD BONUS : 30K &amp; 30K EXIT</p>	<p>Reactor SETTINGS : REACTOR ----- <b>ATTRACT SOUND : ON</b> LOGO SOUND : ON CABINET TYPE : UPRIGHT FREEPLAY : ON COIN/CREDIT : 1C/1CRED BOUNCE CHAMBER: 15 PTS BONUS : 15K EXIT</p>	<p>Screw Loose SETTINGS : SCREW LOOSE ----- <b>FREEPLAY : OFF</b> ATTRACT SOUND : OFF HANDS : 5 COIN/CREDIT : 1C/2CRED BONUS HAND : 5K BONUS ATOM : 50K DEMO MODE : OFF EXIT</p>

3 Stooges

```
SETTINGS : 3 STOOGES
-----
LIVES/SHIPS : 3
ATTRACT SOUND : ON
COIN/CREDIT : FREEPLAY
DIFFICULTY : STANDARD
BONUS : 10K & 20K
EXIT
```

Q\*Berts Qubes [Cocktail]

```
SETTINGS : QB QUBES [CT]
-----
ATTRACT SOUND : OFF
CABINET TYPE : COCKTAIL
EXIT
```

Argus

```
SETTINGS : ARGUS
-----
FREEPLAY : OFF
ATTRACT SOUND : ON
HUMANS : 4
BONUS : 15K
DIFFICULTY : NORMAL
EXIT
```

## SWITCH TEST

Allows testing of the JAMMA control inputs for both cocktail and upright inputs.

Each button, joystick and switch input state is displayed.



## Trackball & Spinner

When a trackball or spinner is connector rotating or rolling will cause the trackball or spinner counters below the switch display to increase or decrease depending on the direction of spin.

# MONITOR TEST

Use this option to adjust a monitor and check primary colors.

Player 1 Start steps through each test and Player 2 start ends the test.

Grid pattern for image centering



Red, Green, Blue, White color Bars



Red, Green, Blue, White



## GAME ENABLE MENU

This menu allows loaded games to be displayed as options on the main game menu.

If a game ROM has not been loaded that game will display [NO ROM] and cannot be selected.



When a game ROM has been loaded, setting the option to ON will display the game in the main menu list of games, setting to OFF it will not be displayed on the menu.

If the setup menu needs to be disabled from the main list, set that option "OFF" on the list.

### NOTE:

- If the setup menu has been disabled, it can still be booted into, see the "SETUP MENU" section and the "BOOT TO SETUP" option detail in this manual.
- When no games are loaded the SETUP MENU will automatically be enabled and cannot be turned off.

## LOAD GAME ROMS

Using this menu game ROMs are transferred from USB flash drive to the gameboard's internal flash memory storage.

Loading ROMs ROM files must be unzipped raw binary and placed into directory folder on the root of the flash drive.

When a set of game ROM has been loaded successfully the text will change to [LOADED] and the game automatically enabled in the "GAME ENABLE MENU".



- To load a ROM it must be in an unzipped binary format in a specified directory folder on the USB flash drive.

Insert the flash drive with the game ROM images and select that option to load.  
See the following section for details of each directory and file name.

- The option "LOAD mylall.bin IMAGE" loads a single binary file containing all the game ROM images  
See later in this section for details.
- "ERASE ALL ROM IMAGES" will clear the ROM storage area of the internal flash on the gameboard.

### NOTE:

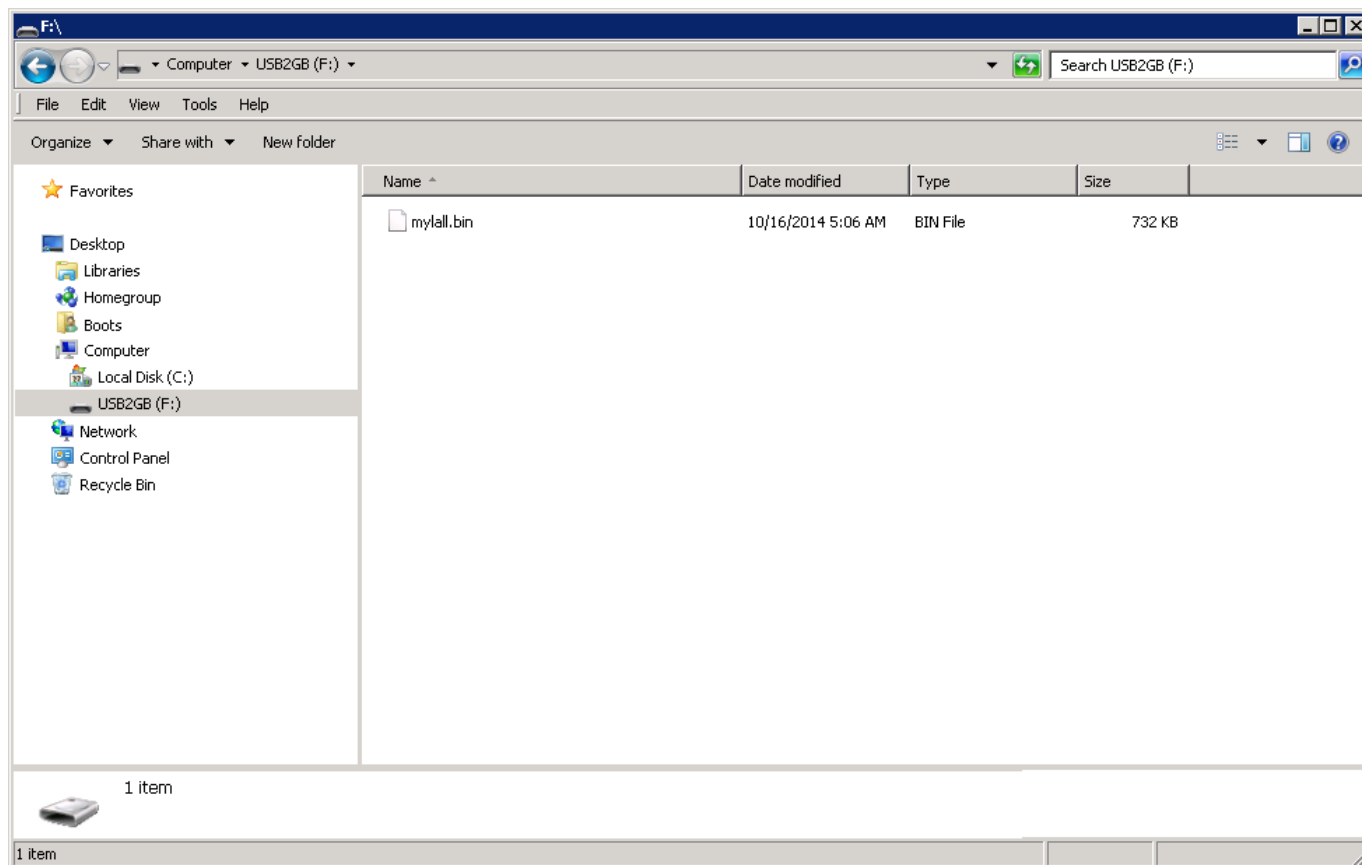
**Q\*Berts Qubes** [ Cocktail version ] is a patch set based on the standard Q\*bert's Qubes ROM set. Once Qubes is loaded the cocktail version is automatically enabled.

## Single File Loading [ mylall.bin ]

All ROMs can be loaded at once from the file **MYLALL.BIN**

It contains the concatenated ROM files for all games, loading will automatically enable all loaded games.

The file needs to be placed in the top level directory of the flash drive.

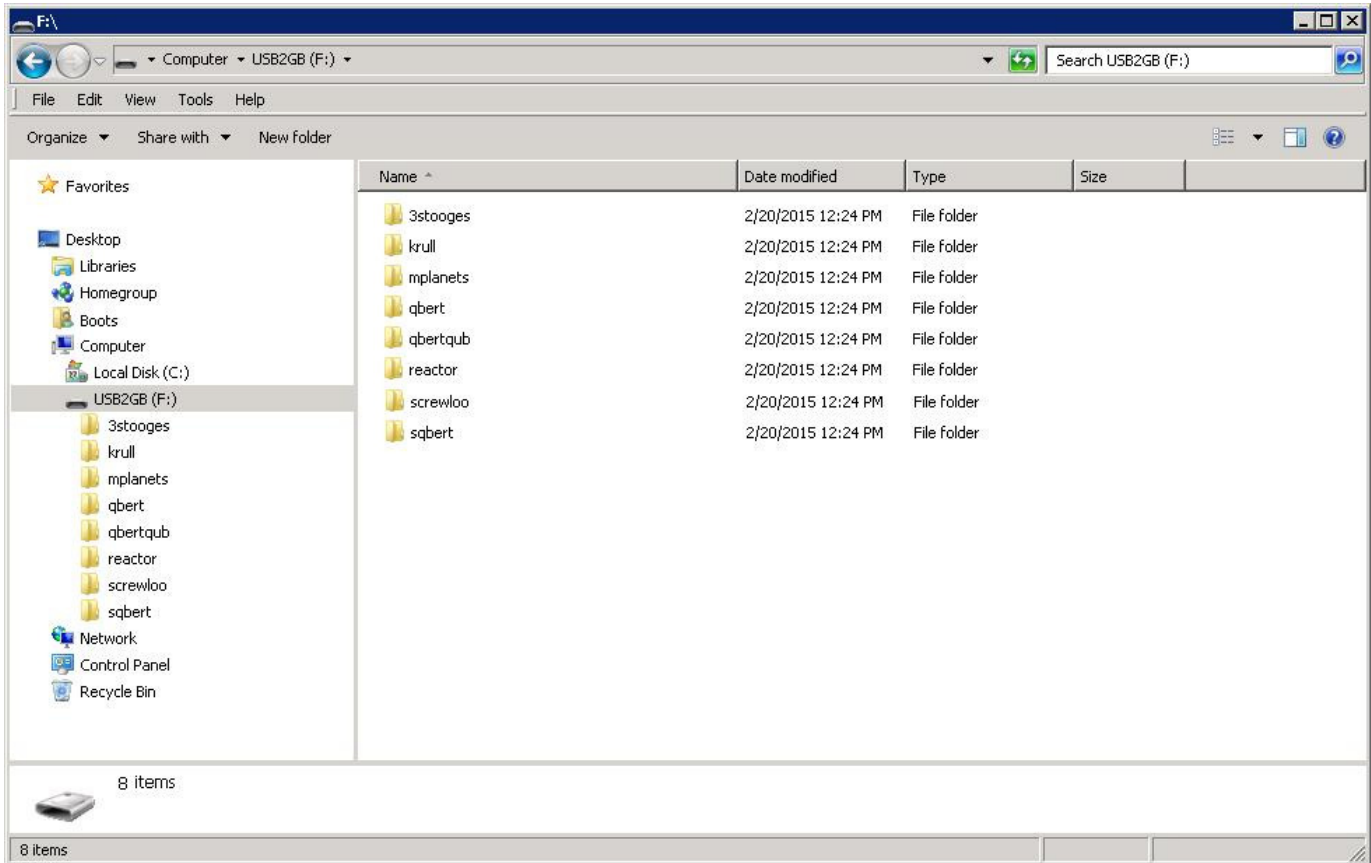




## USB Flash Drive Folder/Directory Structure Layout

This screen shot shows the folder directory structure of a USB flash drive called “USB2GB”.

The files should be placed in the directory folders in this image.



See the next section for the file names for the ROM files required in each directory.

## Game Directory/Folder Name & Filename

The following tables give the name of the directory and the ROM files names that are needed for each game.

<b>QBERT</b>		
<b>Directory/Folder Name</b>	<b>ROM File Name:</b>	<b>Size</b>
<b>qbert</b>	qb-fg0.bin qb-fg1.bin qb-fg2.bin qb-fg3.bin  qb-rom2.bin qb-rom1.bin qb-rom0.bin  qb-bg0.bin qb-bg1.bin  qb-snd1.bin qb-snd2.bin	8192 8192 8192 8192  8192 8192 8192  4096 4096  2048 2048

<b>M-Y Q*BERT</b>		
<b>Directory/Folder Name</b>	<b>ROM File Name:</b>	<b>Size</b>
<b>qbert</b>	mqb-fg0.bin mqb-fg1.bin mqb-fg2.bin mqb-fg3.bin  mqb-rom2.bin mqb-rom1.bin mqb-rom0.bin  qb-bg0.bin qb-bg1.bin  mqb-snd1.bin mqb-snd2.bin	8192 8192 8192 8192  8192 8192 8192  4096 4096  2048 2048

**FHMC Q\*BERT**

Directory/Folder Name	ROM File Name:	Size
<b>sqbert</b>	qb-fg0.bin	8192
	qb-fg1.bin	8192
	qb-fg2.bin	8192
	qb-fg3.bin	8192
	qb-rom2.bin	8192
	qb-rom1.bin	8192
	qb-rom0.bin	8192
	qb-bg0.bin	4096
	qb-bg1.bin	4096
	qb-snd1.bin	2048
	qb-snd2.bin	2048

**QBERT'S QUBES**

Directory/Folder Name	ROM File Name:	Size
<b>qbertqub</b>	qq-fg0.bin	16384
	qq-fg1.bin	16384
	qq-fg2.bin	16384
	qq-fg3.bin	16384
	qq-rom3.bin	8192
	qq-rom2.bin	8192
	qq-rom1.bin	8192
	qq-rom0.bin	8192
	qq-bg0.bin	4096
	qq-bg1.bin	4096
	qq-snd1.bin	2048
	qq-snd2.bin	2048

**MAD PLANETS**

Directory/Folder Name	ROM File Name:	Size
<b>mplanets</b>	fg0.k4	8192
	fg1.k5	8192
	fg2.k6	8192
	fg3.k7-8	8192
	rom4.c16	8192
	rom3.c14-15	8192
	rom2.c13-14	8192
	rom1.c12-13	8192
	rom0.c11-12	8192
	bg0.e11-12	4096
	bg1.e13	4096
	snd1	2048
	snd2	2048

**KRULL**

Directory/Folder Name	ROM File Name:	Size
<b>krull</b>	fg0.bin	8192
	fg1.bin	8192
	fg2.bin	8192
	fg3.bin	8192
	rom4.bin	8192
	rom3.bin	8192
	rom2.bin	8192
	rom1.bin	8192
	rom0.bin	8192
	ram2.bin	4096
	ram4.bin	4096
	snd1.bin	2048
	snd2.bin	2048

<b>REACTOR</b>			
<b>Directory/Folder Name</b>	<b>ROM File Name:</b>	<b>Size</b>	
<b>reactor</b>	rom0	4,096	
	rom1	4,096	
	rom2	4,096	
	rom3	4,096	
	rom4	4,096	
	rom5	4,096	
	rom6	4,096	
	rom7	4,096	
	snd1	2,048	
	snd2	2,048	
	fg0	4,096	
	fg1	4,096	
fg2	4,096		
fg3	4,096		

<b>SCREWLOOSE</b>			
<b>Directory/Folder Name</b>	<b>ROM File Name:</b>	<b>Size</b>	
<b>Screwloo</b>	fg0	8192	
	fg1	8192	
	fg2	8192	
	fg3	8192	
	rom4	8192	
	rom3	8192	
	rom2	8192	
	rom1	8192	
	rom0	8192	
	bg0	4096	
	bg1	4096	
drom1	8192		
yrom1	8192		

### 3 STOOGES

Directory/Folder Name	ROM File Name:	Size
<b>3stooges</b>	gv113fg0	8192
	gv113fg1	8192
	gv113fg2	8192
	gv113fg3	8192
	gv113rom.4	8192
	gv113rom.3	8192
	gv113rom.2	8192
	gv113rom.1	8192
	gv113rom.0	8192
	gv113ram.4	4096
	drom1	8192
	yrom2	8192
	yrom1	8192

### ARGUS

Directory/Folder Name	ROM File Name:	Size
<b>Argus</b>	arg_ram2_2732.c7	4096
	arg_ram4_2732.c9c10	4096
	arg_rom4_2764.c16	8192
	arg_rom3_2764.c14c15	8192
	arg_rom2_2764.c13c14	8192
	arg_rom1_2764.c12c13	8192
	arg_rom0_2764.c11c12	8192
	arg_fg3_2764.k7k8	8192
	arg_fg2_2764.k6	8192
	arg_fg1_2764.k5	8192
	arg_fg0_2764.k4	8192
	arg_snd1_2716.u5	2048
	arg_snd2_2716.u6	2048

## SYSTEM UPDATE

This menu option is only used when there are updates to the firmware of the board.

Selecting an update option will check the USB flash drive for the type of update file, verify it, load the file and reboot the system.

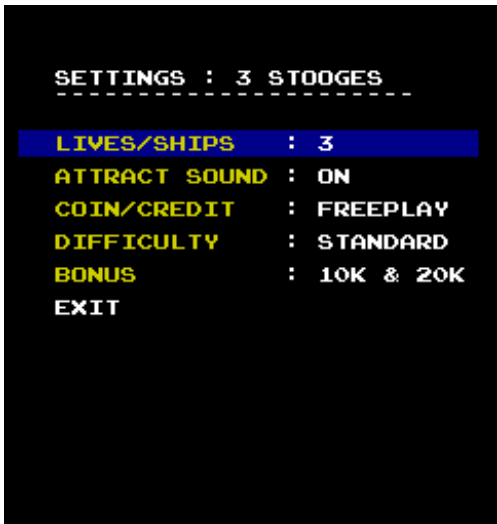


The unzipped Update files should be placed in the top level ( root ) directory of the flash drive and the option for each type of update selected.

Note: If the version of the update file found on the flash drive is older than the loaded version, the file will not be loaded.

### NOTE:

Menu version 1.01 and above will display the version of the MENU, FPGA and MCU in the lower half of the screen.



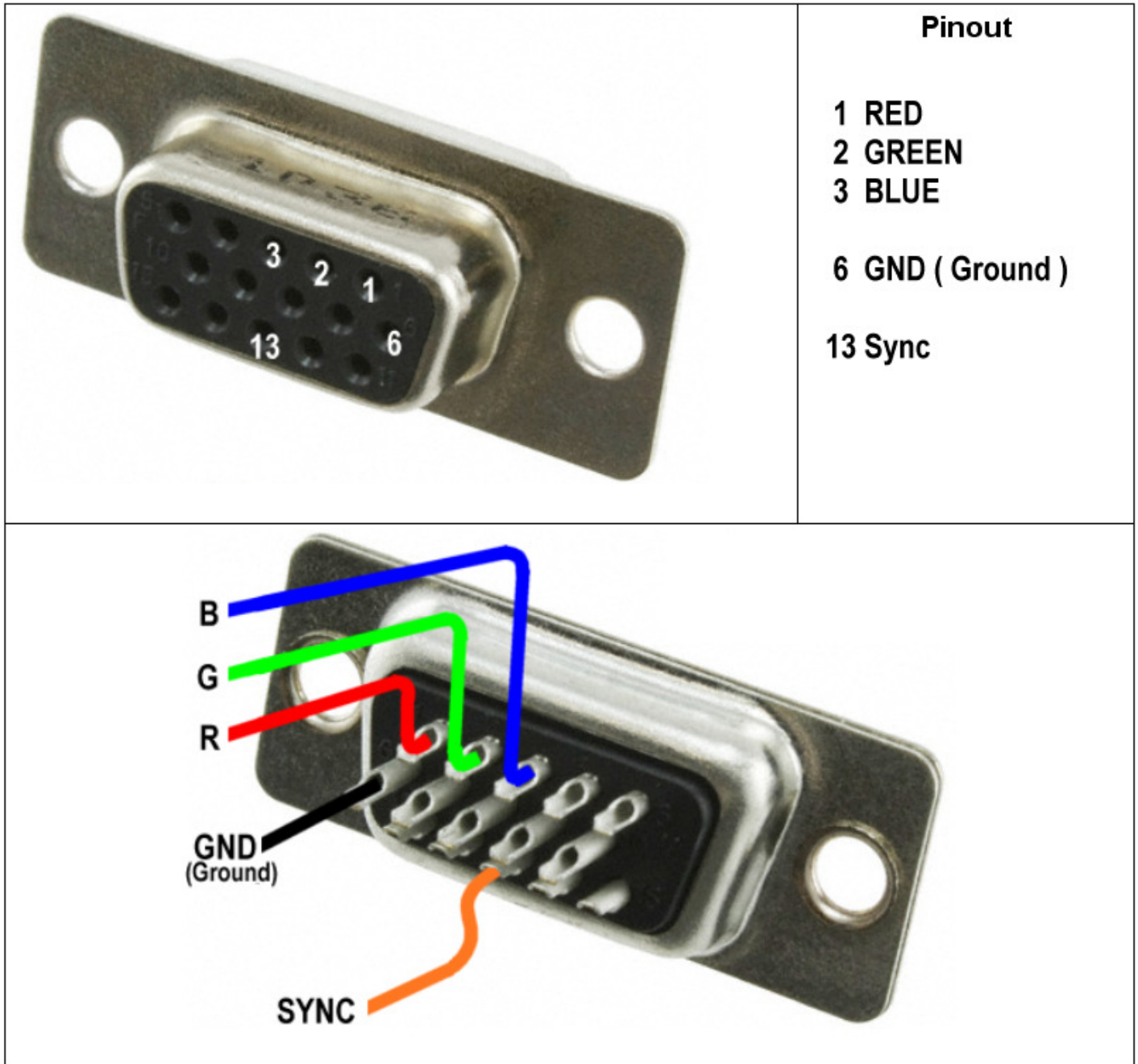
## VGA Monitor Support & Socket Wiring

The board supports native VGA support without the use of an additional adapter or scan converter. To use a standard 15 pin VGA cable the RGB, composite sync and GND from the JAMMA connector should be wired to a female 15 pin high-density D connector. The diagram on this pages shows the necessary connections.

The standard JAMMA pins for Red, Green, Blue & composite video sync are used for VGA output.

The VGA Enable jumper must be set to the upper ( ENABLE ) position. See page 2 for the jumper location.

### VGA connector & pins used





## Current Versions

Current Firmware and Menu revisions

- MENU v1.04
- FPGA v1.09
- MCU v1.04

## Revision History

### FPGA Revisions

- 0.xx BETA release
- 1.02 Initial Release
- 1.03 Feature Update: Spinner delay added
- 1.04 Q\*bert Qubes crash bug fix
- 1.05 Krull sound trigger bug fix
- 1.06 Screwloose joystick 2 fire direction bug fix
- 1.07 Video vertical sync adjustment, start at same time as vertical blank ( match with original hardware )  
Improved joystick mode for Reactor ( seriously it should only be played with a trackball ).
- 1.08 Corrected timing issue between main CPU and USB MCU which could cause corrupted text during ROM loading and system update operations.
- 1.09 Support for ARGUS added

### MENU Revisions

- 0.xx BETA release
- 1.00 Initial Release
- 1.01 Support for spinner delay, speech volume and frequency adjustment  
Bugfix: Reactor display flipped when in H to V rotation mode
- 1.02 Patch Loader option added
- 1.04 Support for ARGUS

### MCU Sound Controller

- 1.00R Initial release
- 1.01 support for speech volume & frequency adjustment
- 1.03 MCU reflash update pause & wait bug fix
- 1.04 Support for ARGUS added

### Manual Revision

- 0.1 Initial Release
- 0.2 Addition of VGA wiring diagram
- 0.3 New features of firmware updates
- 0.4 Firmware updates
- 0.5 Stooges joystick wiring
- 0.6 Argus added, game test/setup mode added