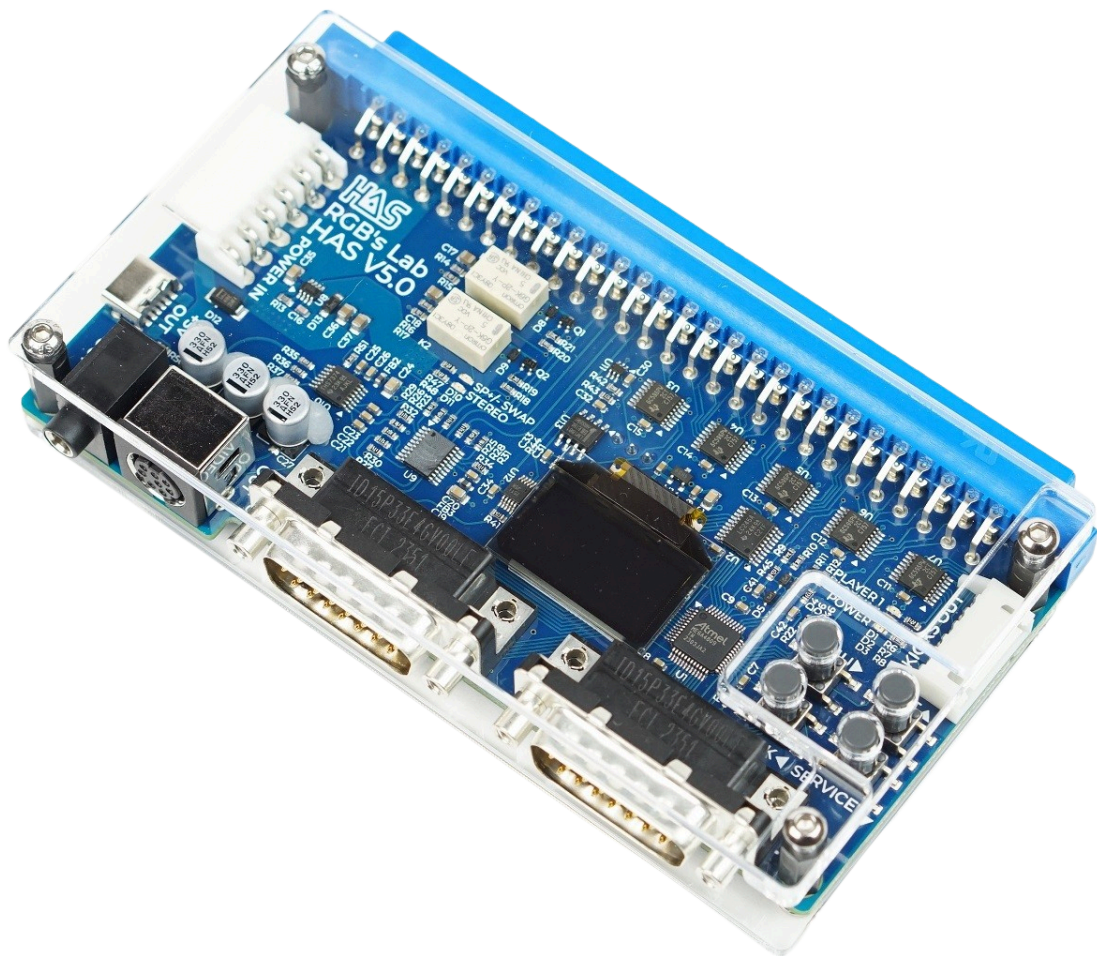


# RGB's Lab

## Home Arcade System V5.0

### User Guide V0.1



# Preface

Home Arcade System, “HAS” for short, is a device that allows you to play original arcade game PCBs without the need of owning a real arcade cabinet. Think of it as of a game console, only instead of cartridges or discs, you insert arcade game PCBs. As of version 5.0, the HAS is equipped with an OLED screen and an extensive Menu System, which offers a wide array of new possibilities.

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# 1. Introduction

## 1.1. Features

### General

- JAMMA, JAMMA+ compatible.
- OLED screen.
- Dual Voltmeter to monitor the +5 V and +12 V power rails (1% tolerance).
- Extensive Menu System.
- 132 x 80 x 27 mm total size with the plexiglass case (132 x 70 mm PCB size), 156 g.
- Comes fully assembled (plexiglass case) and with a power supply harness.

### Controls

- DB15 controller ports (NeoGeo compatible, pinout extended to support buttons 5 and 6).
- Test and Service buttons.
- Button Test mode to check the device I/O and layout mapping.
- Programmable Button Layout.
- Programmable Rapid-Fire (VSync synchronized or asynchronous, 6 different fire rates).
- 5 profiles per player to save the Button Layout and Rapid-Fire Configuration.
- 3 Device Profiles to store your settings.
- 5 Gameplay Modes that significantly change the controls behavior (Default, Tournament, Shmups Arrange, Taps, NeoGeo CP).
- 5 popular Layout Presets.
- Ability to combine/merge Button Layouts.
- Selected buttons can work as ON-OFF switches. Can be applied even to Rapid-Fire enabled buttons.
- Special functions can be assigned to buttons, for example, you can make the buttons work as Coin, Test, a combination of A+B+C, and more.
- Programmable Rapid-Fire on joystick directions.
- 4-WAY joystick restrictor gate emulation.
- Joystick rotation (90 degrees left/right).
- You can assign a special function to Player 1 and Player 2 Start buttons when pressed at the same time.
- The Start button can be used to coin up, either simultaneously, or with a delay.
- Automatic PICKnMIX trigger.
- Coin Chute Emulator for buttons assigned to work as Coin.
- Buttons 1-6 on the JAMMA connector (buttons 4-6 can be disabled), making it a "CHAMMA" compatible output.
- Buttons 4-6 on the JST-XH 6 pin "kick harness" connector.

## Video/Audio

- All Video and Audio settings can be changed using the Menu System.
- Fully buffered consumer equipment friendly RGB video output.
- Brightness regulation.
- Precise calibration for each additive primary color signal (red, green, blue).
- Consumer equipment friendly level CSync at 0.35 Vp-p 75 Ohm impedance (can be set to TTL ~5 Vp-p 470 Ohm impedance).
- Selectable raw JAMMA/unprocessed CSync.
- Selectable Video Low Pass Filter.
  
- Unbalanced audio output, attenuated to line level.
- Selectable stereo support for the NeoGeo MVS.
- Selectable speaker +/- swap for Asura Blade, Power Instinct, and various bootleg PCB, like the popular Battle Garegga boot.
- Video on an 8 pin mini-DIN connector (XRGB mini/NESRGB pinout); audio on a 3.5 mm stereo connector or the 8 pin mini-DIN if the 3.5 mm stereo connector is not in use.

## Power

- Power is delivered through a 6 pin JST-VH power connector (GND, +5 V, +12 V, -5 V).
- +5V output via a USB-C connector (used mainly to provide power to external HAS adapters). The USB-C can be used to power stereo-modded MVS MV-1B/C or other low-power systems that can operate from a single +5V power supply.

# 2. Getting Started

## 2.1. Installation

- Make sure that the power supply unit is disconnected from the electrical outlet. Attach the HAS power supply harness to the power supply unit.
  - Black insulation is GND.
  - Red insulation is +5V.
  - White insulation is -5V.
  - Yellow insulation is +12V.
- Double-check if the HAS power supply harness is correctly attached to the power supply unit. Mixing GND, +5V, -5V, and +12V will permanently damage your HAS unit and your PCB game. Refer to your power supply instructions if in doubt.
- Plug in the JAMMA PCB to the HAS.
- Connect the HAS power supply harness, AV cable, controller, and kick harness to the HAS.

- Power on the HAS by connecting the power supply cable to the electrical outlet. If everything works correctly, both Player status LEDs on the HAS will blink rapidly for a second on the arcade cabinet/supergun start-up.

WARNING:

- NEVER CONNECT OR DISCONNECT THE JAMMA PCB GAME WHILE THE HAS UNIT IS POWERED ON!
- NEVER CONNECT OR DISCONNECT THE HAS POWER SUPPLY HARNESS TO THE HAS UNIT WHILE THE POWER SUPPLY UNIT IS POWERED ON!
- NEVER CONNECT OR DISCONNECT ACCESSORIES LIKE CABLES, CONTROLLERS, ADAPTERS, OR OTHERS, WHILE THE HAS UNIT IS POWERED ON!

## 2.2. Quick Start

There are three types of operation:

1. **Game Mode**, when the OLED screen is OFF. This is the default mode of operation. Buttons TEST and SERVICE on the HAS are active.
  2. **Voltmeter** which displays the +5 V and +12 V power rails voltage. Buttons TEST and SERVICE on the HAS are inactive and will have other functions (explained in [6.2.3](#)).
  3. **Menu System**. Used for configuration of the device. The Menu System will affect the HAS' I/O latency and Rapid-Fire or other timer-based functions; Legacy Mode will not work while in the Menu System. Buttons TEST and SERVICE on the HAS are inactive and will work as the menu navigation buttons UP and DOWN.
- The HAS boots to a Device Info page and then automatically switches to the Voltmeter. You can skip the Device Info page by pressing the MENU button.
  - Pressing the MENU button on the HAS will take you to the Menu System.
  - Changes made in the settings in the Menu System must be saved if you want to retain them after the power cycle (Main Menu -> Save & Exit). The exception is any change made in the Button Layout Configuration or Rapid-Fire Configuration (explained in [4.6](#)).
  - You can go back/exit by pressing the BACK button on the HAS.
  - The OLED screen will turn off after around 10 seconds of inactivity.
  - You can bring back the voltmeter display by pressing the MENU button.

## 3. Voltmeter

The voltmeter displays +5 V and +12 V power rails voltage. The reading will be updated if the voltage changes by 0.04-0.05V.

It is possible to speed up and increase the sensitivity of the voltage reading by holding down the SERVICE button on the HAS.

If you press the TEST button, it will take you to the Status Pages.

## 3.1. Status Pages

The Status Pages display the basic information about the settings. There are two pages. The first page displays the currently used Profile for both players and the Device Profile; Brightness level, CSync settings, Audio setting, and Gameplay Mode.

If you press the TEST button, it will take you to the second page, which displays individual settings.

- [R] - Indicates that Rapid-Fire is enabled for either Player 1 or Player 2.
- [S] - Indicates that Sticky Button is enabled for either Player 1 or Player 2.
- [C] - Indicates that one of the Players uses the combined button layout.
- [A] - Asynchronous Rapid-Fire is enabled.
- [LL] - Legacy Mode is disabled.
- [4&5] - JAMMA Button 4 & 5 output is enabled.
- [6] - JAMMA Button 6 output is enabled.
- [PnM] - PICKnMIX is enabled.
- [CC] - Coin Chute Emulator is enabled.
- [CS] - Coin on Start Button is enabled.
- [4W] - 4-WAY joystick restrictor gate emulation is enabled.
- [JR] - Joystick rotation is enabled.
- [12S] - Player 1 and Player 2 Function is enabled.
- [DB15] - DB15 Navigation is enabled.
- [LPF] - Video Low Pass Filter is enabled.

Press the BACK button to exit the Status Page and go directly to the Game Mode, or press the MENU button to enter the Menu System.

## 4. Menu System

### 4.1. Main Menu

- Controls
- Audio
- Video
- Device
- Save & Exit

## 4.2. Controls Menu

### 4.2.1. Profile Load

Layout configuration profiles. Five profiles per player. These profiles store only the Button Layout and Rapid-Fire Configuration. Other settings are stored in the device profiles (explained in [4.6](#)).

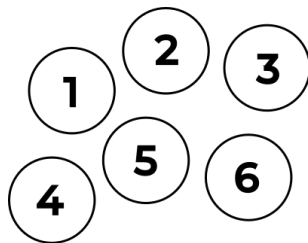
### 4.2.2. Button Test

It allows you to check button inputs of the HAS and see their output mapping. Rapid-Fire is disabled in the Button Test mode. Exit the mode with MENU or BACK buttons.

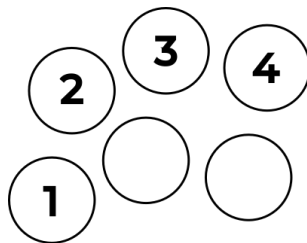
Warning: “Coin Chute Emulator” and “Coin on Start” with the “Hold for ~2 seconds” option will not work properly in the Button Test mode.

### 4.2.3. Layout Presets

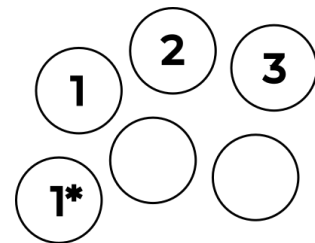
Five layout presets for quick loading. Choosing a Preset with the MENU button will replace the currently used Button Layout and Rapid-Fire Configuration with the chosen Preset and save it to the currently used Profile.



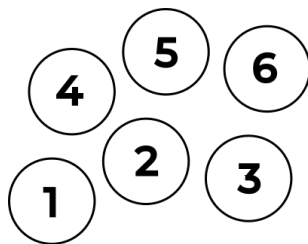
Preset 1



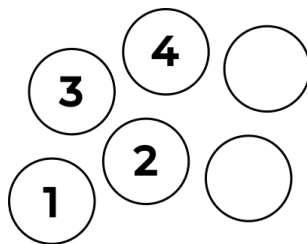
Preset 3



Preset 5



Preset 2



Preset 4

\* Preset 5 uses Rapid-Fire rate 2 on the Button 1 clone.



#### **4.2.4. Button Layout Config**

This core feature allows you to set a custom button layout. The number of button presses corresponds to the button output and is displayed in real-time in the configuration menu. It is possible to press each button up to eight times; the ninth press will start the countdown over.

Since JAMMA uses only 6 buttons, the 7th and 8th presses give the button a special functionality (explained in [4.2.8-4.2.9](#)).

Pressing the MENU button on the HAS, or the button Start on the controller will end the configuration and save the new configuration to the currently used Profile.

You can also set a temporary Button Layout by exiting the configuration mode with the BACK button. The configuration will be active only during the current session and will not be retained after you power off the HAS.

#### **4.2.5. Rapid-Fire Config**

This core feature allows you to set a custom rapid-fire rate for each button. The number of button presses corresponds to the rapid-fire rate and is displayed in real-time in the configuration menu. Each button can be pressed up to 6 times for 6 different rapid-fire rates; the seventh press will start the countdown over.

Pressing the MENU button on the HAS, or the button Start on the controller will end the configuration and save the new configuration to the currently used Profile.

You can also set a temporary Rapid-Fire Configuration by exiting the configuration mode with the BACK button. The configuration will be active only during the current session and will not be retained after you power off the HAS.

#### **4.2.6. Combine Layouts**

This feature combines one of your custom Profiles or Presets with the currently used layout. It combines only the Button Layout, it does not add Rapid-Fire Configuration to the currently used one.

#### **4.2.7. Sticky Button Config**

This feature enables selected buttons to work as ON-OFF switches. Button status is displayed in real-time in the configuration menu. “1” means the button will work as an ON-OFF switch, and “0” means it will operate as a standard push button. Exit the configuration mode with the MENU, BACK buttons, or the Start button on your controller.

## 4.2.8. 7th Press Function

This feature allows you to assign special functions to buttons that were pressed 7 times during the Button Layout Configuration. You can select one of the following functions:

- Affect Joystick

This setting requires you to additionally set the Rapid-Fire to this button. Holding this button down will Rapid-Fire whatever direction you are currently pressing with the joystick.

The main use is shmups, where the fastest Rapid-Fire on directions will give your ship a new speed. It will also help in certain puzzle games for aiming (eg. Puzzle Bubble).

- A+B+C
- D+E+F
- A+B+C+Start
- P1+P2 Start
- P1&P2 A+B+C
- Start
- Coin
- Test
- Service

## 4.2.9. 8th Press Function

The same as above, but for buttons pressed 8 times.

## 4.2.10. Joystick Config

### 4.2.10.1 4-WAY restrictor

This setting emulates a 4-WAY joystick restrictor gate. It makes the HAS output only a single direction even when a diagonal command is sent from the joystick. For example, if the joystick moves from LEFT to LEFT/DOWN, only DOWN is output and the old direction is ignored. If the joystick is in a neutral position and then moves to a precise diagonal, then the horizontal axis gets the priority.

### 4.2.10.2 Joystick Rotation

This setting rotates the joystick output 90 degrees to the left or right.

## 4.2.11. P1+P2 Start Function

Pressing Player 1 and Player 2 Start buttons at the same time can trigger the following action:

- OFF (Default)
- Player 1 Coin
- Player 2 Coin
- Test
- Service

#### 4.2.12. Coin on Start Button

This feature allows you to coin up using the Start button:

- OFF (Default)
- Simultaneous - Coin will be added the moment you press the Start button.
- Hold for 2 Seconds - Press the Start button for ~2 seconds to coin up. The Start button output will be disabled before the coin up happens so that the PCB game does not see the Start + Coin pressed at the same time.

#### 4.2.13. Gameplay Mode

- **Default Mode.**

All HAS features are available.

- **Tournament Mode.**

No features are available. The only settings that affect this mode are:

- All Audio and Video settings.
- Device Profile Load.
- JAMMA Buttons 4, 5 Outputs.
- JAMMA Button 6 Output.
- PICKnMIX.
- OLED Brightness.
- Flip OLED Display.
- DB15 Navigation.

The button layouts for Player 1 and 2 are mapped 1:1 to JAMMA and cannot be changed.

Recommended for tournaments.

- **Shmups Arrange Mode**

This mode allows to control Player 2 using Player 1 controls at the same time. The mode affects the button layout as follows:

- Player 1 joystick input = Player 1 + Player 2 joystick output

- Player 1, button set to 1 = Player 1 + Player 2 button 1 output ( P1+P2 SHOT).
- Player 1, button set to 2 = Player 1 button 2 output (P1 BOMB).
- Player 1, button set to 3 = Player 1 + Player 2 button 3 output.
- Player 1, button set to 4 = Player 1 + Player 2 button 4 output.
- Player 1, button set to 5 = Player 2 button 2 output (P2 BOMB).
- Player 1, button set to 6 = Player 2 button Start output (P2 START).

## ● Taps Mode

This mode makes three buttons work as Button 1, but with a limited number of shots, that are synchronized with the VSync and use the Rapid-Fire speed. The layout in this mode changes to the following:

- Button set to 1 = Button 1 (1 tap/shot).
- Button set to 2 = Button 1 (2 taps/shots).
- Button set to 3 = Button 1 (3 taps/shots).
- Button set to 4 = Button 1.
- Button set to 5 = Button 2.
- Button set to 6 = Button 3.

For this feature to work properly, it is required to set Rapid-Fire to buttons 1-3, and to make it more stable, it is recommended to enable “Sticky Buttons” on buttons 1-3 (explained in [4.2.7](#)).

The main use is to compensate for only one rotation direction in certain puzzle games (eg. Sega Tetris, Cleopatra Fortune, Star Sweep).

## ● NeoGeo CP Mode

This Mode allows you to play 6 button games using just a 4 button Control Panel. The button combinations look as follows:

- Button 1 = Button 1 / Punch 1
- Button 2 = Button 2 / Punch 2
- Button 1 + 2 = Button 3 / Punch 3
- Button 3 = Button 4 / Kick 1
- Button 4 = Button 5 / Kick 2
- Button 3 + 4 = Button 6 / Kick 3
  
- Button 1 + 2 + 3 = Button 1 + 2 + 3 / 3x Punch
- Button 2 + 3 + 4 = Button 4 + 5 + 6 / 3x Kick

## 4.3. Audio Menu

Allows you to choose between Mono Audio, Stereo Audio (MVS), and to swap speaker +/- (for Asura Blade, Power Instinct, and certain bootleg PCB games, like the popular Battle Garegga boot).

It is advised to change this setting without any PCB game connected first, then save, power off the HAS, connect the PCB game, and only then power on.

## 4.4. Video Menu

### 4.4.1. Brightness

Video brightness regulation.

### 4.4.2. RGB Calibration

It allows to calibrate individual additive primary color signals (red, green, blue). To cycle between colors, press the MENU button. Changes in brightness are made using the UP/TEST and DOWN/SERVICE buttons on the HAS.

### 4.4.3. TTL CSync Level

Changes the CSync level to TTL. The TTL level is designed in a way that it is still safe for the consumer equipment in case you set it to TTL by mistake.

### 4.4.4. Raw CSync

Bypasses the CSync buffer on the HAS and outputs the CSync coming directly from the JAMMA PCB. The output is safe for the consumer equipment in either of the CSync level settings.

### 4.4.5. Video LPF

Enables the video low pass filter on the RGB signals.

## 4.5. Device Menu

### 4.5.1. Profile Load

Device Profiles. Three profiles are available for use. These profiles store all Device settings except for the Button Layout and Rapid-Fire Configurations (explained in [4.6](#)).

The HAS will detect unsaved changes in the Menu System and ask if you want to save the changes before loading another Profile.

## 4.5.2. Disable Legacy Mode

When enabled, this setting locks the Legacy method of changing the Button Layout, Rapid-Fire, and Profiles (the Legacy Mode is explained in [5.1-5.3](#)).

## 4.5.3. Async Rapid-Fire

This setting disables the VSync synchronized Rapid-Fire rate and makes it asynchronous. It results in the following Rapid-Fire rates:

- 1 press ~ 30 Hz
- 2 presses ~ 20 Hz
- 3 presses ~ 15 Hz
- 4 presses ~ 12 Hz
- 5 presses ~ 10 Hz
- 6 presses ~ 7.5 Hz

## 4.5.4. JAMMA Button 4 & 5 Out

Enables buttons 4 and 5 output for both players through the JAMMA connector (JAMMA pins #c, #25, #d, #26). It does not affect buttons 4 and 5 output through the kick harness connector.

## 4.5.5. JAMMA Button 6 Out

Enables button 6 output for both players through the JAMMA connector (JAMMA pins #e, #27). This setting should be kept OFF unless your PCB game accepts 6 buttons through the JAMMA edge. It does not affect button 6 output through the kick harness connector.

## 4.5.6. Coin Chute Emulator

This feature emulates a real coin chute mechanism by sending only a single fast signal to the PCB game even when the Coin button is pressed and held down (affects the physical Coin button, 7/8th Press Function, P1+P2 Start Function, or “Coin on Start” feature).

## 4.5.7. PICKnMIX Config

This feature automatically presses and holds down the Start button or Button 5 for around 6 seconds during power on, to trigger the “PICKnMIX” feature of the Unibios modded NeoGeo systems. It was tested with the 161-in-1 Multicart Version 3 and the Unibios version 4.0. More information on the PICKnMIX - <http://unibios.free.fr/picknmix.html>.

## 4.5.8. OLED Brightness

This feature allows you to change the HAS' OLED brightness. It offers three brightness levels.

### 4.5.9. Flip OLED Display

This feature flips the HAS' OLED display. It also flips buttons TEST and SERVICE while in the Menu System. It does not alter buttons TEST and SERVICE position while in the Game Mode (OLED screen OFF) or the Player 1 controller when the "DB15 Navigation" is enabled (explained in [4.5.10](#))

### 4.5.10. DB15 Navigation

This setting allows you to navigate through the Menu System using the Player 1 controller. Button 1 will work as the MENU button, Button 2 will work as the BACK button, and joystick directions UP/DOWN are TEST/SERVICE.

To enter the Menu System when the OLED screen is off, you need to press and hold down Player 1 buttons 1+2+3 for at least 4 second and then press the Start button.

To exit the Button Test Mode, press Player 1 buttons 1+2+3+Start.

### 4.5.11. Device Info

It displays basic device information like the Hardware Version, Firmware Version, Programming Date, and the unique device Serial Number.

### 4.5.12. Reset to Default

This feature allows you to reset the device to factory settings. Available for the currently used profile and all profiles. It does not reset the Button Layout and Rapid-Fire Configurations.

## 4.6. Save & Exit

Nearly all changes made to the settings in the Menu System are part of the Device Profile and must be saved if you want to retain them after the power cycle. The settings that must be saved are listed below:

- Combine Layouts
- Sticky Button Config
- 7th Press Config
- 8th Press Config
- 4-WAY restrictor
- Joystick rotation
- P1+P2 Start Function
- Coin on Start Button
- Gameplay Mode
- Disable Legacy Mode
- Async Rapid-Fire
- JAMMA Button 4 & 5

- JAMMA Button 6 Out
- Coin Chute Emulator
- PICKnMIX Config
- OLED Brightness
- Flip OLED Display
- DB15 Navigation
- All Audio and Video settings

Features that are saved automatically and are part of the Player 1 and Player 2 Profiles:

- Button Layout Config (unless you exit the config mode with the BACK button as explained in [4.2.4](#)).
- Rapid-Fire Config (unless you exit the config mode with the BACK button as explained in [4.2.5](#)).

## 5. Legacy Mode

The Legacy Mode allows for on-the-fly changes of the Button Layout, Rapid-Fire, and Profile. It can be disabled using the Tournament Mode setting (as explained in [4.3.2](#)).

### 5.1. Button Layout Configuration Mode

- Press and hold down two arbitrary buttons and the Start button for 3 or more seconds. After 3 seconds an appropriate status LED on the board will light up and buttons will no longer register – this means the HAS has entered the button remapping mode, and you can release the buttons (including the Start button).
- Right after you release the last of the buttons held down, you can set a new button layout by pressing the buttons.
- Each button press corresponds to the JAMMA button number and is indicated by the status LED blink.
- If you press a button once, it will be JAMMA button 1, twice - button 2, thrice - button 3, and it works up to button 8. Since JAMMA uses only 6 buttons, the 7th and 8th presses give the button a special functionality (as explained in [4.2.8-4.2.9](#)). The ninth press starts the countdown over. No button press means the button will not be set.
- To exit the button configuration mode and save your new layout, press the Start button.

**Note:** Every time you access this mode, your previous layout will be erased and you will need to set your layout anew. This is an easy and fast way to reset your settings.

### 5.2. Rapid-Fire Configuration Mode

- Press and hold down one arbitrary button and the Start button for 3 or more seconds.



- After 3 seconds an appropriate status LED on the board will light up and buttons will no longer register – this means the HAS has entered the rapid-fire configuration mode, and you can release the buttons (including the Start button).
- Right after you release the last of the buttons held down, you can enable the rapid-fire feature by pressing buttons. Each button press corresponds to the rapid-fire rate and is indicated by the status LED blink. There are 6 rapid-fire rates to choose from, the seventh press disables the rapid-fire; and the eighth press starts the countdown over. No button press means the rapid-fire will not be set.
- To exit the rapid-fire configuration mode and save the settings, press the Start button.

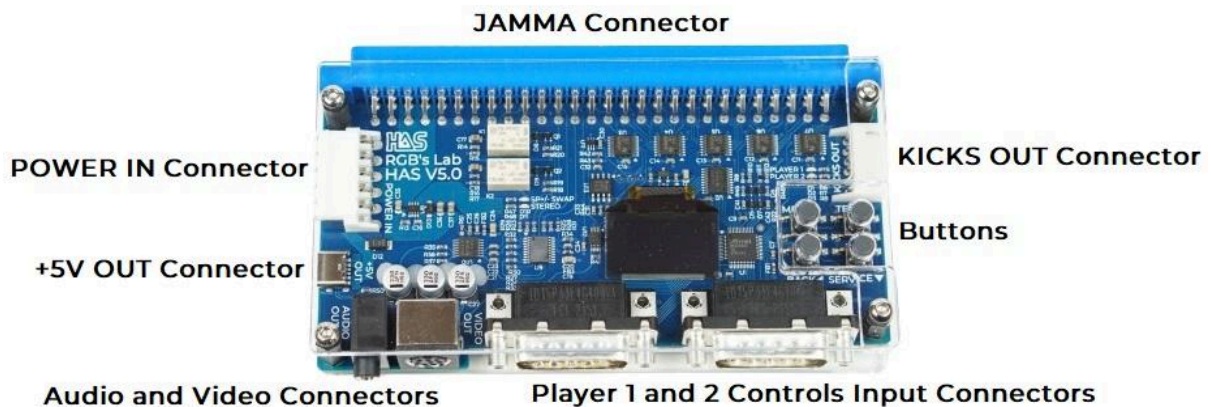
**Note:** Just like in the button remapping mode, your previous rapid-fire settings are erased the moment you access the rapid-fire mode. Consequently, if you want to reset all rapid-fire settings, just enter the rapid-fire mode and exit it without pressing any button.

### 5.3. Saving and Loading Profiles

- Press and hold down three arbitrary buttons and the Start button for 3 or more seconds. After 3 seconds an appropriate status LED on the board will light up and buttons will no longer register – this means the HAS has entered the profile selection mode, and you can release the buttons (including the Start button).
- Right after you release the last of the buttons held down, you can select the profile by pressing one of the five buttons on your arcade cabinet's control panel. For example, by pressing button 1 while in the profile selection mode, the HAS will load and use profile 1. If you press button 2, it will load the profile 2, and so on; button 6 has no use. You will automatically leave the profile selection mode when you press a button. There are 5 profiles available for each player that store both the button layout and rapid-fire configurations. The HAS will remember the last used profile and automatically load it when you power on the HAS.

**Note:** By default, all profiles except for Profile 1 are blank. This means that when you switch to a new profile, you will need to create a new button layout using the button Layout Configuration Mode or by selecting a Preset.

## 6. Hardware User Guide



### 6.1. Connectors

#### 6.1.1. JAMMA Connector

The JAMMA connector outputs up to 6 buttons. Buttons 4-5 and 6 output can be configured in the Menu System.

#### 6.1.2. POWER IN Connector

The main power input connector. 6 pin JST VH series type. The pinout of the connector is printed on the bottom side of the HAS.

#### 6.1.3. +5V OUT Connector

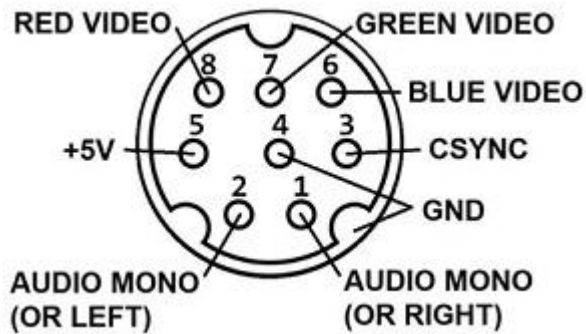
It outputs +5V via a USB-C connector. It is used to provide power to external HAS adapters. This connector can be used to power stereo-modded MVS MV-1B/C or other low-power systems that can operate from a single +5V power supply.

#### 6.1.4. Audio Output Connector

3.5mm Audio Jack connector. Use it only to drive amplified speakers/headphones, do not connect 4/8 Ohm speakers directly to this connector.

#### 6.1.5. Video Output Connector

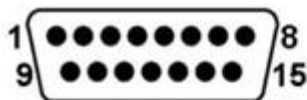
8 pin mini-DIN. The pinout of the connector is as follows:



**Note:** The connector has the same pinout as the XRGB mini and you can connect the HAS to the XRGB mini using an 8 pin mini-DIN cable. Pins of the cable must connect straight through end to end (1:1). When you connect the cable to the 3.5mm audio jack connector, it will override the audio that goes through the 8 pin mini-DIN.

### 6.1.6. Player 1 and 2 Controls Input Connectors

Player 1 and Player 2 controller ports, DB15. NeoGeo compatible, extended to support buttons 5 and 6. The diagram shows the connector looking at the HAS.



Pin	Description	Pin	Description
1	GND	9	N/C
2	Configurable button 6	10	Configurable button 5
3	Coin	11	Start
4	Configurable button 4	12	Configurable button 3
5	Configurable button 2	13	Configurable button 1
6	Right	14	Left
7	Down	15	Up
8	+5V	-	-

### 6.1.7. KICKS OUT Connector

This connector is used to connect to PCB games that require kick harnesses for extra buttons. The connector used on the HAS is JST S6B-XH-A and the pinout is as follows.

- Pin #1 - Player 2 Button 6
- Pin #2 - Player 1 Button 6
- Pin #3 - Player 2 Button 5
- Pin #4 - Player 1 Button 5
- Pin #5 - Player 2 Button 4

- Pin #6 - Player 1 Button 4

The pinout is also printed on the backside of the HAS.

## 6.2. Peripherals

### 6.2.1. OLED Screen

### 6.2.2. Status LEDs

- The POWER LED is always ON if the device works properly.
- PLAYER 1 and PLAYER 2 LEDs turn on when you enter either of the Legacy Mode configuration modes or when you enter the Button Layout Configuration and Rapid-Fire Configuration through the Menu System.
- SP+/SWAP - indicates that the Speaker +/- swap is enabled
- STEREO - indicates that the Audio is set to MVS Stereo

### 6.2.3. Buttons

The HAS is equipped with four buttons. The functions of the buttons are as follows:

Button	Game Mode	Voltmeter	Menu System
MENU	Brings up the Voltmeter	Forwards to the Menu System	Enter/Select/Cycle
BACK	-	Turns off the OLED	Back/Exit/Cancel
TEST	Test Button	Shows the Status Page	Up
SERVICE	Service Button	Increases the speed and sensitivity of the Voltmeter when held down	Down

## 6.3. Miscellaneous

### 6.3.1. CSync Input Hysteresis (JP1, bottom side)

You can change the CSync buffer input hysteresis by changing the buffer's power supply. The default is +5V. When you change it to +3.3V, it is recommended to set the CSync level output to TTL. Do not change it unless you know what you are trying to accomplish.

## 7. Care, Use, Safeguards

The HAS, just like every other device with exposed electronic components, is ESD-sensitive and prone to physical damage. Improper handling can permanently damage the device. Below is a list of the most basic rules that can help you prevent damage:

- Please read the manual BEFORE you start setting up and using the HAS.
- Do not use the HAS without its acrylic glass covers.
- When connecting the HAS to a PCB game, ensure the JAMMA connector is aligned correctly to avoid damage.
- Disconnect the HAS slowly and carefully, do not force it.
- Do not wear any clothing that conducts electrical charge when you hold or touch the HAS or your PCB game.
- Do not place the HAS on fabric, or any other fibrous surface, like carpets, etc. Place it on a clean dry table, wooden floor, cardboard, etc.
- It is a good practice to wear an antistatic wrist strap whenever you are handling the HAS or the PCB games in general. The end of the wrist strap should be attached to a good grounding point - the metal chassis of the PC, pipes, the radiator, etc.
- When not used, you should store your HAS in an antistatic bag.
- Do not keep the HAS in an antistatic bag when you are using it! The surface of the antistatic bag is conductive.
- Try to hold the acrylic case along its edges or at least near the bolts. Do not apply force directly to the center of the acrylic glass.
- Do not touch the contacts or surface mount components, especially the microcontroller.
- Never wipe the HAS's PCB, wiping can induce ESD. Use clean canned compressed air and an ESD-safe soft bristle brush instead.
- Do not change jumper positions or use built-in switches while the HAS is powered ON.
- Never connect or disconnect cables, controllers, or adapters while the HAS is powered ON. This may result in a short circuit or inrush current and can damage or even destroy the HAS and your PCB game.
- Never leave your HAS set up unattended, especially when it is powered ON!
- Make sure you read the PCB game instruction manual BEFORE you connect it to the HAS.
- Make sure you read the Power Supply Unit instruction manual BEFORE you connect it to the HAS.
- Keep the HAS away from children and animals.
- Any modification to the HAS is at your own risk and responsibility, you will be liable for any damage incurred.
- Do not use cheap hardware with the HAS. Using subpar-quality hardware with the HAS (be it the power supply unit, controller adapters, audio/video cables, JAMMA harness extension, and so on) will most likely result in equipment damage or more serious implications.
- The HAS is not a toy. You must never give it to your children or allow them to use it.
- Non-adherence to the instructions may result in equipment damage or even more catastrophic failure, like electrocution or fire!

## 8. Document Revision History

Document Version	Date	Comments
0.1	29.04.2024	<ul style="list-style-type: none"><li>Initial Document release.</li></ul>

## Customer Service

Technical Support is available through the Contact Form at:  
<https://rgbslab.com/pages/contact>