# Minimig Manual – 1.0

## Introduction

The Minimig (short for "Mini Amiga") is a remarkable open-source hardware project designed to replicate the beloved Amiga 500 home computer, an iconic system from the late 1980s and early 1990s. Conceived by enthusiast Dennis van Weeren in 2005, the Minimig project began as a labor of love to faithfully recreate the Amiga’s unique architecture on an FPGA (Field Programmable Gate Array). Over time, it evolved with community contributions and open-source improvements, resulting in a versatile, accessible, and compact recreation of the original Amiga 500 that enthusiasts worldwide could use to relive and preserve classic Amiga software and games.

The Amiga series was revolutionary in its day, offering groundbreaking graphics, multitasking, and sound capabilities. However, as the years passed, finding original Amiga hardware became challenging. The Minimig emerged as a solution, delivering the authentic Amiga experience without the pitfalls of aging components.

The open-source design allows users and developers to continuously improve and expand its capabilities, making it both a practical choice and a nod to the pioneering spirit of the Amiga.

The Minimig you hold is designed for ease of use and portability, making it simple to run Amiga applications on modern hardware while capturing the nostalgia and ingenuity of the original machine. This manual will guide you through the setup and essential functions, helping you start your journey with the Minimig confidently and safely.

A Note on ESD (Electrostatic Discharge): Like any sensitive electronic equipment, the Minimig is susceptible to electrostatic discharge. While some ESD protection is built in, please take precautions to avoid direct static contact with the device.

This short manual will get you going with your Minimig, covering essential steps and tips to enhance your experience. Please read it carefully, and I hope you enjoy this modern take on a classic piece of computing history.

## Configuring the SD card

To get your Minimig started, you’ll need a FAT32-formatted SD card to store the essential files and software. A compatible SD card is provided with your Minimig, preformatted and ready to go. The root directory of this card must contain at least the following core files:

* **MINIMIG1.BIN** - This is the FPGA core file that allows the Minimig to initialize and configure the Spartan FPGA, essentially loading the hardware design that replicates the Amiga system. Without this file, the Minimig cannot properly start up.
* **KICK.ROM** - This is the Kickstart ROM file, which serves as the initial loading ROM for the Amiga environment. The Minimig supports various versions of the Kickstart ROM, including Kickstart 1.3, 2.0, and 3.1. Each version provides compatibility with different Amiga software, so feel free to experiment with the ROM version that best suits your needs. You can purchase the official/legal Amiga Kickstart at <https://www.amigaforever.com/value/>

In addition to these two core files, you’ll want to load some ADF (Amiga Disk Format) files onto the SD card. These files act as virtual disks containing games, software, or utilities in the original Amiga format. With ADF files on your SD card, the Minimig can go beyond displaying the basic Amiga boot screen and provide access to the full range of Amiga applications and games.

Since the Minimig you hold is equipped with an advanced ARM controller, the SD card supports folders, allowing you to organize your software collection neatly. You can create folders for different categories, such as “Games,” “Demos,” or “Utilities,” making it easier to locate and load specific applications.

Also observe the following tips when configuring your Minimig SD card:

1. **File Compatibility:** Ensure that the MINIMIG1.BIN and KICK.ROM files are compatible with your Minimig version. Regularly check the Minimig community for updates, as new FPGA core files and Kickstart compatibility enhancements are periodically released.
2. **Organizing ADF Files:** If your SD card contains a large collection of ADF files, using subfolders will improve navigation. The ARM controller on the Minimig allows you to browse and load ADF files from different folders through the on-screen menu, streamlining your experience.
3. **Back Up Your SD Card:** Before making significant changes, such as updating core files or adding many ADFs, it’s a good practice to back up the contents of your SD card. This ensures you can restore the system if needed.

With the SD card correctly set up, your Minimig is ready to launch into the Amiga experience. Make sure to insert the card into the Minimig’s SD slot securely before powering it on and enjoy exploring the digital heritage of the Amiga on your modern hardware.

## Hooking up the Minimig

To set up your Minimig, you’ll need to connect several peripherals to ensure proper operation. Follow these instructions carefully to prevent damage and get the best experience from your Minimig.

* **Power** - The Minimig requires a 5V 2A stabilized power supply to function safely. Only use the power supply provided with the Minimig, as power supplies with incorrect voltage or polarity may damage the system irreparably. Insert the power supply’s connector into the 2.1mm jack labeled “DC IN” at the back of the board, ensuring the center pin is positive.
* **Monitor** - The Minimig includes a standard 15-pin VGA connector labeled “VIDEO” at the back. You can use most modern monitors capable of displaying 50Hz video modes. Next to the VGA connector, you’ll find a 3-pin jumper that should be set to 31KHz (default), allowing compatibility with most VGA monitors. For compatibility with 15KHz monitors (such as certain vintage monitors), adjust the jumper to the 15KHz setting. Note that 15KHz monitors are uncommon, so be sure to check your monitor’s specifications if you intend to use one.
* **Audio** - To enjoy audio output, connect speakers or headphones to the 3.5mm audio jack labeled “AUDIO” at the back of the board. This provides stereo sound output, recreating the distinctive audio experience of the original Amiga system.
* **Keyboard** - A PS/2 keyboard is required for navigating the Minimig on-screen display (OSD) and loading ADF files. Connect the keyboard to the 6-pin mini-DIN connector labeled “KEYBOARD” on the left side of the board.
* **Mouse** - To interact with Amiga software effectively, a PS/2 mouse is recommended. The mouse connects to the 6-pin mini-DIN connector labeled “MOUSE” on the left side of the board. Optical mice are supported, though compatibility may vary depending on the model. The mouse is essential for Amiga software, which often relies heavily on pointer-based navigation.
* **Joysticks** - The Minimig supports two standard 9-pin Amiga joysticks, connectable via ports located on the right side of the board. The “JOY2” (upper) port is typically used as the primary joystick port for single-player games, while the “JOY1” (lower) port can be used for multiplayer games or other applications.

**Note:** Avoid connecting joysticks to the 9-pin port on the back of the board, as this is a serial port (female connector) and not intended for joystick use.

Following these set-up instructions will prepare your Minimig for operation, allowing you to enjoy a seamless experience as you explore Amiga software and games.

## Powering up

Before powering on your Minimig, insert the preconfigured SD card into the MMC slot. The Minimig can only recognize the SD card at startup, so ensure it’s inserted before applying power.

* **Power On** - Once the SD card is securely in place, connect the power supply to the Minimig. When powered on, the blue LED (system power indicator) will illuminate, signaling that the system is receiving power and initializing.
* **File Loading** - The Minimig will immediately begin searching for the SD card’s root directory for the MINIMIG1.BIN and KICK.ROM files, essential for the system to boot. The FPGA core (MINIMIG1.BIN) configures the FPGA hardware to run the Amiga hardware, while the KICK.ROM file loads the Amiga’s boot ROM.
* **Kickstart ROM Initialization** - As the Kickstart ROM loads, you may notice the screen flashing—a nostalgic “decrunching” effect reminiscent of the original Amiga boot process. This is normal behavior and indicates that the Minimig is initializing components and setting up the Amiga environment.
* **Amiga Boot Screen** - After the ROM has fully loaded, the familiar Amiga boot screen will appear. If ADF files are present on the SD card, you’ll be able to load them from the on-screen display (OSD) using your keyboard. At this stage, the Minimig is fully operational and ready to run Amiga software.

Once the boot process is complete, enjoy exploring your favorite Amiga applications and games, all faithfully recreated on your Minimig!

## Loading ADF Files Using the On-Screen Display (OSD)

With the Minimig booted up, you’re ready to load Amiga Disk Format (ADF) files—virtual disk images that allow you to run Amiga games and applications. The process of loading ADF files is managed through the on-screen display (OSD), which can be easily accessed using specific keys on your PS/2 keyboard.

The following keys are dedicated to navigating the OSD and loading ADF files:

* **F12 Key** - Press the F12 key to activate the on-screen display. This key works similarly to the UAE emulator, instantly bringing up the OSD. Pressing F12 again will close the OSD, returning you to the Amiga environment. Alternatively, you can also invoke the OSD by pressing the Menu button located at the front of the Minimig board.
* **Page Up / Page Down Keys** - Use the Page Up and Page Down keys to scroll through the options within the OSD. This allows you to browse folders, navigate specific ADF files, and access various settings on the Minimig.

Follow the steps below to load ADF files:

1. **Access the OSD** - Press F12 (or the Menu button on the Minimig) to bring up the OSD.
2. **Navigate to the ADF File** - Use Page Up and Page Down to scroll through the file list on the SD card. If you have organized your files into folders (e.g., “Games” or “Demos”), navigate to the desired folder.
3. **Select an ADF File** - Once you locate the ADF file you want to load, press space or enter key to select it. This will mount the ADF file as a virtual disk in the Amiga environment.
4. **Start the Application** - After selecting an ADF file, exit the OSD by pressing F12 again. The Minimig will automatically begin reading the selected ADF file, and the corresponding Amiga application or game should start shortly.

### Additional Tips

* **Swapping Disks:** For multi-disk games or applications, use the OSD to load additional ADF files as needed. Simply reopen the OSD, navigate to the next disk image, and select it with the Home key. Many games prompt you when to insert the next disk.
* **Settings and Configurations:** Besides loading ADF files, the OSD also allows you to configure various system settings, such as display modes and audio options. These can be adjusted through the OSD to customize your experience.

The on-screen display is intuitive, giving you quick and easy control over the Minimig functions. Once you’re comfortable with the OSD, loading and switching ADF files becomes a seamless part of the Amiga experience.

## Resetting the Minimig

Just as with AOS 4.0, the Minimig is reset by holding down the control, left alt and right alt keys simultaneously. This will only reset the Amiga-side of the system. To reset the system completely or to reload the MMC-card, the power must be switched off/on.