AMSpiriT 2.0

User Manual

Émulateur Amstrad CPC & Amstrad Plus

AMSpiriT 2.0 - Amstrad CPC & Amstrad Plus Emulator

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Development : Version :	RC3 / 09-2025
Website:	https://www.AMSpiriT.fr/

1. INTRODUCTION

AMSpiriT is an Amstrad CPC emulator designed for Windows. It was initially developed from scratch using documentation and technical information freely available on the internet, and has gradually been enhanced with technical assistance from CPC contributors, particularly Serge QUERNE.

AMSpiriT aims to faithfully reproduce the operation and philosophy of the Amstrad CPC 464, 664 and 6128 computers, as well as the Amstrad 464 plus and 6128 plus, marketed in the mid-1980s, by offering an intuitive and refined interface.

AMSpiriT is still in development, and many features remain to be implemented. To stay up to date with the latest developments in the emulator, please visit the following post on the excellent "forum.system-cfg.com" or on the dedicated Discord channel:
https://forum.system-cfg.com/viewtopic.php?f=24&t=11535

You can also send me your improvement requests or report any bugs you encounter via the contact address provided above or on the AMSpiriT Discord channel. I will endeavor to respond to your requests to the extent of my availability, technical skills, and personal preferences.

In any case, I hope that you will enjoy using this emulator on a daily basis as much as I enjoy developing it.

Have fun :)

Table of Contents

2. CHARACTERISTICS

Development and environment

AMSpiriT is designed in C/C++ language and developed on the Microsoft Visual Studio platform.

Compatibility with Windows versions:

AMSpiriT is fully compatible with Windows 10 and Windows 11. No validation has been performed on versions prior to Windows 10, and compatibility outside of these operating systems cannot be guaranteed.

Processor versions:

The application is available in two versions: a 64-bit (x64) version and a 32-bit (x86) version.

Windows-specific APIs:

AMSpiriT relies on proprietary Windows APIs, including Direct2D for video display and XAudio2 for sound effects playback.

Emulation of the electronic components of the AMSTRAD CPC

AMSpiriT emulates the main electronic components of the AMSTRAD CPC as closely as possible to the hardware:

- Zilog Z80A Processor: Emulated at clock signal.
- Gate Array: Management of memory access, video display and interrupts.
- CRTC (Video Controller): Emulation of the five CRTC variants marketed by Amstrad.
- FDC µFD765 (Floppy Disk Controller)
- PSG AY-3-8912 (Sound Generator)
- Intel PPI_8255A: I/O interface with keyboard, PSG and cassette player.
- ASIC (exclusive to the CPC Plus range): Emulation of advanced hardware effects.

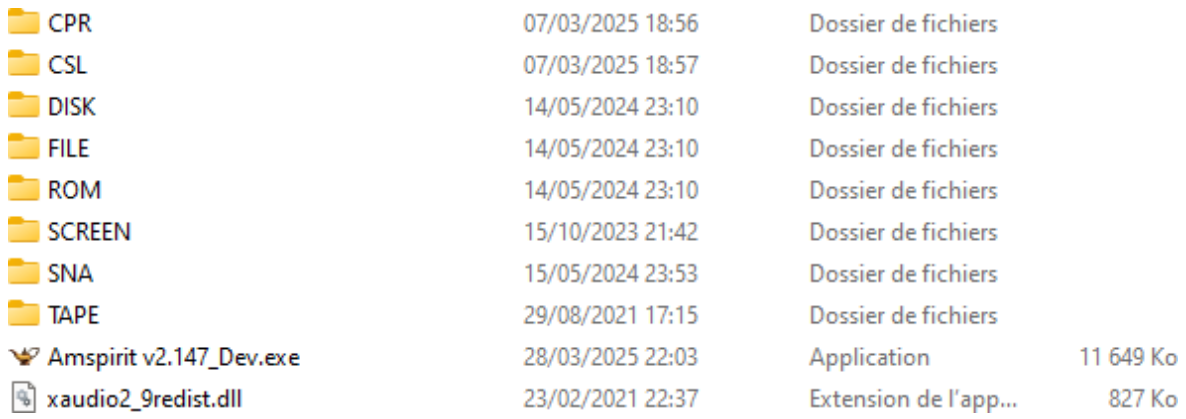
AMSpiriT comes ready to use with all system and BASIC ROMs that have been released by AMSTRAD PLC and Locomotive Software. English, French, Spanish, and Danish versions are included.

AMSpiriT allows reading files in the following formats:

- Cassette files: WAV and CDT
- Floppy disk files: DSK, eDSK, HFE and IPF (read-only)
- Cartridge files: CPR (for the CPC plus range)
- Snapshot files: SNA (allows you to return the machine to a previously saved state)
- Binary files (with AMSDOS header): BIN
- Text files: TXT (allowing automatic entry of listings written in BASIC)
- Script Files: CSL (CPC Script Language) allowing command scripts to be launched.

3. INSTALLATION

After unzipping the archive, the AMSpiriT installation directory contains several default folders organized by file type. Files can be copied into these directories for quick access, but it is also possible to store them elsewhere.



Installation Directory Structure

- CPR: Contains cartridge files, including the CPC Plus "system" ROMs.
- CSL: Contains script files in CSL (CPC Script Language) format.
- DISK: Groups compatible floppy disk files (*.DSK, *.IPF, *.HFE).
- FILE: Contains various auxiliary files (*.TXT, *.BIN).
- ROM: Contains the system and BASIC ROMs for the Amstrad CPC (not Plus).
- SCREEN: Saves screenshots generated by the emulator.
- SNA: Stores memory dump files (*.SNA).
- TAPE: Groups cassette files (*.WAV, *.CDT).

Execution and configuration

AMSpiriT is launched by double-clicking the *.exe executable file. It runs autonomously, without modifying the Windows registry or writing to system directories. It can therefore be used on any type of media.

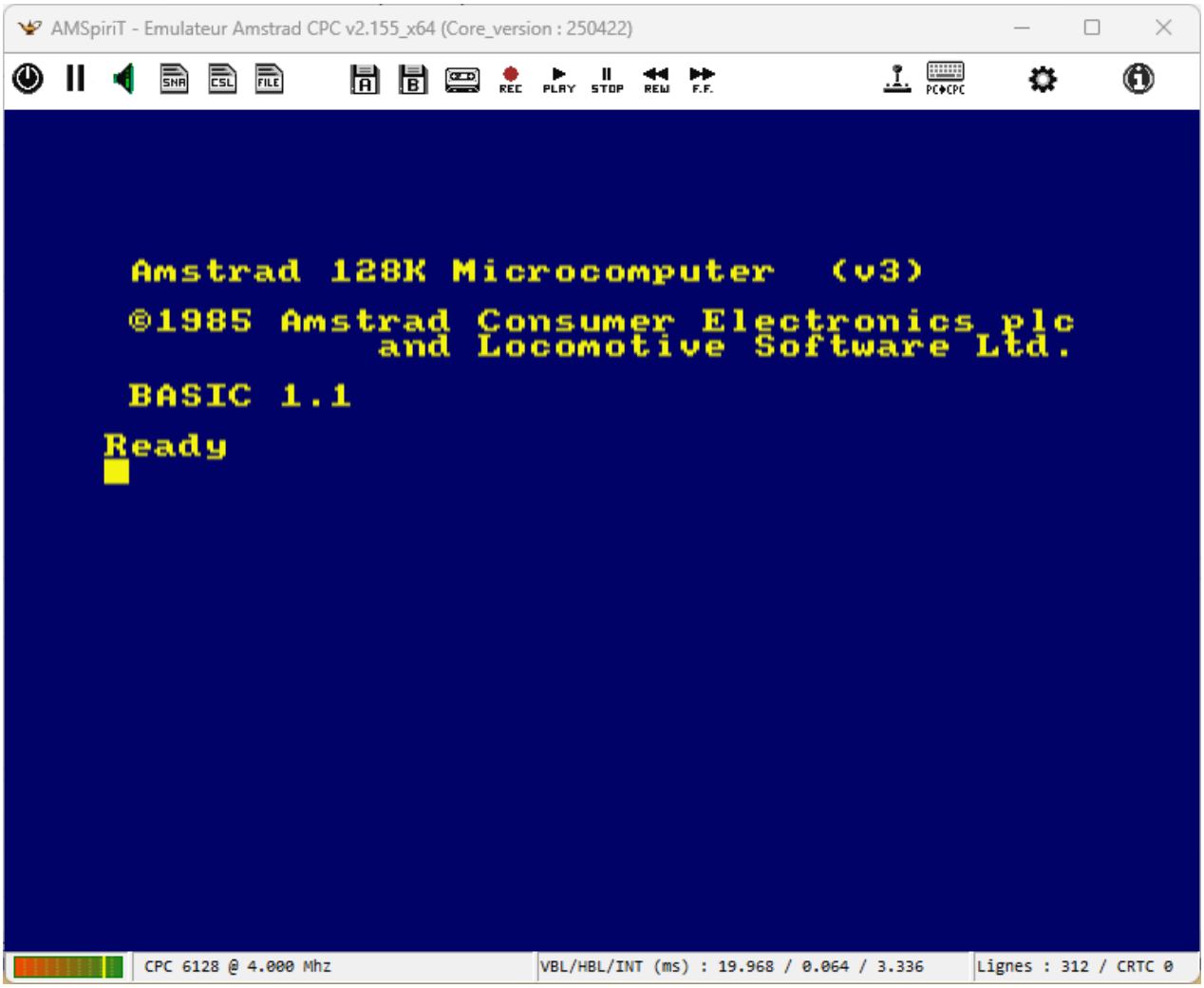
AMSpiriT can also be run via command lines.

Settings Management

A configuration file, AMSpiriT_Config.txt, is automatically updated each time the emulator is closed. This file can be deleted without any problem, it will be regenerated, with the default settings.

4. PRESENTATION

When you first launch AMSpiriT, if no error messages are displayed, the emulator launch window should appear as shown below.



This interface consists of three distinct sections:

- A toolbar, located in the upper part, grouping a series of icons.
- The main window, which simulates the display of the AMSTRAD CPC.
- An information bar, positioned at the bottom of the screen.

By default, AMSpiriT emulates the model CPC 6128 in its English version. However, it is possible to select another CPC model from the various options available.

The emulator initially launches in windowed mode. The user can switch at any time tofull screenor return to windowed mode by pressing the keyF12.

5. PRESENTATION OF THE TOOLBAR

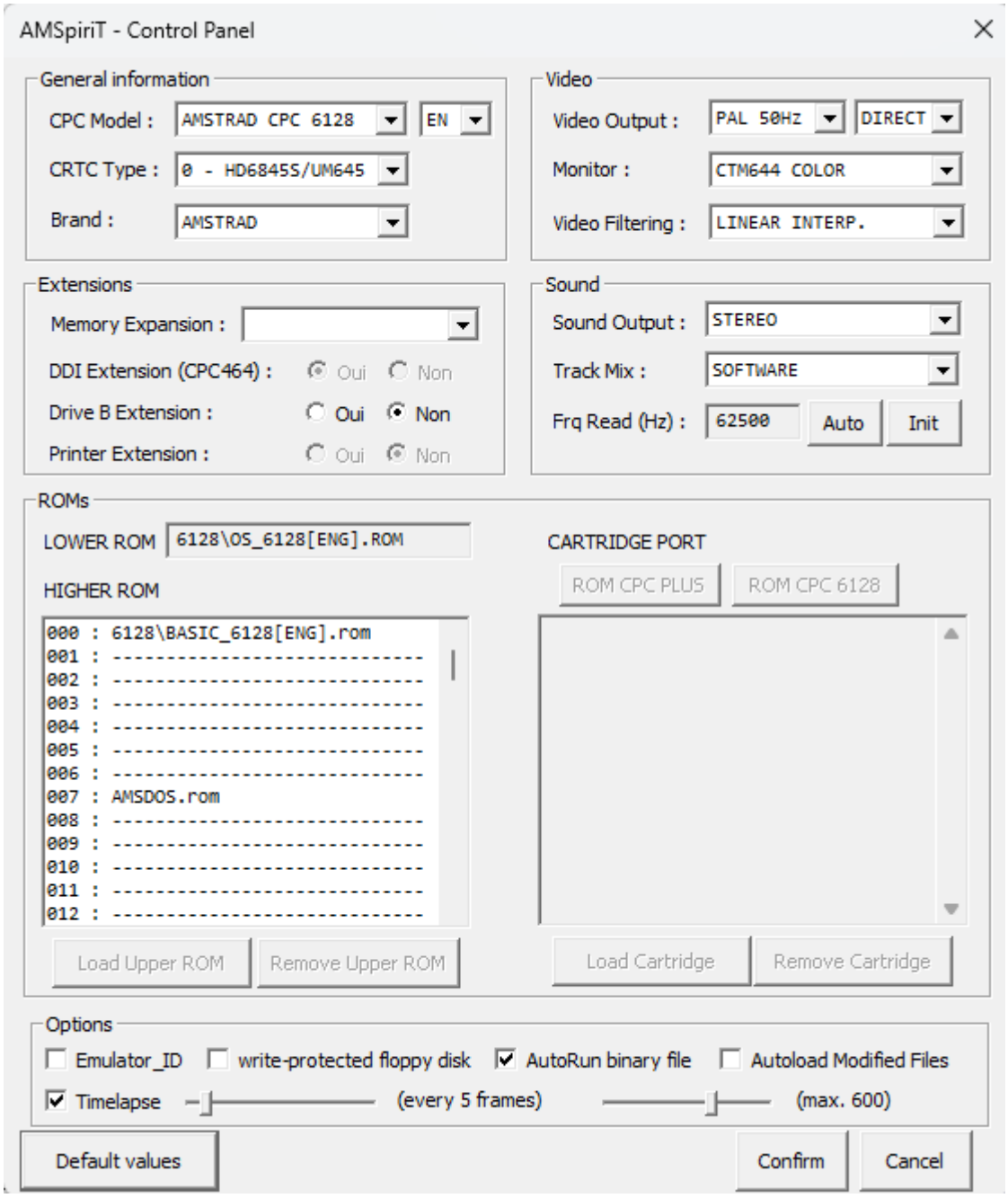
The toolbar controls the emulator's behavior. It contains several icons, the functions of which are described in detail in the following sections. Most icons can be right-clicked to access additional features.

Description of the icons:

	Restart the emulator. "Hard Reset" with left click or "Soft Reset" with right click
	Enables/disables Pause mode. When Pause mode is active, the icon turns red.
	Turns the sound on/off. When the sound is muted, the icon turns red.
SNA	Load/save a Snapshot file
CSL	Loads/saves a Script file in CSL (CPC Script Language) format
FILE	Load Text or Binary files
CPR	Loads a cartridge image (specific to the CPC Plus range)
A	Loads a floppy disk image onto drive A (default drive)
B	Loads a floppy image onto drive B(if the option is enabled)
	Loads a cassette image
REC	Enables saving of a cassette recording
PLAY	Activates playback of a cassette recording
STOP	Stops playback of a cassette recording
REW	Fast rewind a cassette recording
F.F.	Fast forward a cassette recording
	Joystick configuration menu (F9 key to activate mapping)
PC▸CPC	Enables/disables keyboard mapping
	Accessing the emulator control panel
	Emulator Information Menu

Configuration menu

This icon provides access to the emulator's control panel, allowing you to adjust its settings according to the user's needs.



General information

The section "General information" allows you to configure the hardware specifications of the emulated CPC.

- CPC Model: This menu offers the possibility to select the AMSTRAD CPC model to emulate (464, 664, 6128, 464+ or 6128+) as well as its language version (English, French, Spanish or Danish). After validation, the corresponding ROMs are automatically loaded into memory.
- CRTC Type: This menu allows you to choose a CRTC model from all the models sold on AMSTRAD CPCs. Their operation is similar in normal use, but some models differ when running specific programs. By default, the type "0"is selected for CPC 464, 664 or 6128. For 464+ and 6128+ models, the type "3"is displayed by default and cannot be changed.
- Brand: This menu allows you to choose the trademark displayed when starting the emulator.

Extensions

The "Extensions" section allows you to enable various additional features.

- Memory Expansion: This menu allows you to choose an amount of extended memory from seven capacities available (64 KB, 128 KB, 256 KB, 512 KB, 1024 KB, 2048 KB, 4096 KB). It should be noted that, on an Amstrad 6128, the 64 KB extension is activated by default.
- DDI Extension: Specific to CPC 464 and 464+, this extension allows you to emulate the presence of a floppy disk controller. It is not necessary on the CPC 664, 6128 and 6128+ models, which already include this functionality.

Video

The "Video" section allows you to configure the display properties of the emulator.

- Video Output: Offers choice between mode PAL (50 Hz) and the mode NTSC (60 Hz), the latter mode being rarely used.
- Display mode:
  - DIRECT: Video display is included in the main emulation loop (recommended for older processors).
  - THREAD: Video display is moved to a dedicated thread, allowing for better performance (recommended for recent processors).
- Monitor: Possibility to choose between a color monitor and one monochrome monitor (green or black and white depending on the CPC model). For the CRTC type "4", a specific choice is proposed in order to have a centered image.
- Video Filtering:
  - Linear interpolation (enabled by default): Provides hardware filtering of adjacent colors, producing a pixel "smoothing" effect.
  - Without filtering:Displays a raw, crisp image with no blurring between pixels.

Sound emulation settings

The "Sound" section allows you to configure the audio characteristics of the CPC emulator.

- Sound Output: This drop-down menu allows you to choose between MONO and STEREO (default mode).
- Mixing the tracks:
  - Software (default): Mixes the three audio channels through a software mixer before transmitting the signal to the PC's sound card, providing a more convincing sound.
  - Hardware: Mixing of the channels is done directly by the PC's sound card, but may produce a less faithful result.
- Reading frequency: This setting adjusts the sound buffer playback frequency. By default, it is set to 62.5 kHz. On some PCs with multi-core processors, crackling may occur if the CPC emulation speed is not exactly 4.000 MHz.
  - "Auto" button: Automatically synchronizes the sound buffer playback frequency with the actual CPC emulation frequency to avoid audio distortions.
  - "Init" button: Resets the playback frequency to 62.5kHz.

These settings allow the sound emulation to be adapted to the user's preferences while faithfully reproducing the sound ambiance of an AMSTRAD CPC.

ROM and Cartridge Management

Additional ROMs can be added depending on the CPC model used:

- Amstrad CPC 464, 664 and 6128: up to 255 additional ROMs,
- Amstrad CPC 464+ and 6128+: up to 128 ROMs.

Each ROM can be up to 16kb in size and must be in ".ROM" format.

Loading and removing ROMs:

- Adding a ROM: Double-click on the desired location or use the "Load High ROM" button.
- Deleting a ROM (excluding system ROM): Click "Delete High ROM".

Cartridge Management (CPC Plus)

The "CPC Plus" range uses cartridge files (in "CPR" format) which are executed automatically when the emulator starts.

- Adding a cartridge: Click on "Load Cartridge".
- Deleting a cartridge: Click "Delete Cartridge".

System ROM Selection: By default, the system ROM is pre-selected when selecting a CPC plus, but it is possible to choose another default ROM by clicking on "CPC Plus ROM" or "CPC 6128 ROM".

Options:

Emulator Identification (ID Emu)

The "Emulator ID" checkbox allows CPC programs to identify AMSpiriT via a specific mechanism used by some CPC emulators. These read the #FEFE port to provide a distinctive signature, facilitating detection and adaptation of software behavior.

- Checked box: The returned value will be#78, corresponding to AMSpiriT.
- Unchecked box: The returned value will be #FF, simulating a real CPC.

By default, this option is disabled.

For more information, check out this resource: https://www.cpcwiki.eu/index.php/Emulator_IDs

Protection of floppy disk type files

The checkbox "Write-protected floppy disk" determines whether floppy disk files loaded by AMSpiriT should be write-protected.

- Checked box: The files will be automatically protected against any attempt at writing.
- Unchecked box: Write protection will not be applied.

Automatic loading of binaries

The checkbox "Auto Run Binary Files" determines whether binary files (*.BIN) loaded by AMSpiriT should be automatically executed after being loaded into memory.

- Checked box: Binary files are executed immediately after loading. If an execution address is specified in the file, the BASIC command `CALL &xxxx` is displayed at the screen and the file is launched.
- Unchecked box: Binary files are only stored in memory without being executed.

Automatic loading of modified files

The checkbox "Auto Run modified files" automatically reloads snapshot files (SNA) or floppy disk files already loaded into the emulator, following their update.

- Checked box: Snapshot files are immediately executed after modification, which causes the emulator to reset. Floppy files are reloaded after modification.
- Unchecked box: Disables automatic loading of files after modification.

Timelapse

The checkbox "Timelapse" allows you to enable or disable the Timelapse function, which allows you to go back in time, once the emulator has been paused.

- Checked box: Activate the Timelapse function. It is then possible:
  - to configure the period of recording of memory images, from 20ms (one recording per frame) up to 1 second (1 recording every 50 frames),
  - to choose the maximum number of memory images that can be stored in memory (minimum 50, maximum 900).

  It is thus possible to go back in time up to 900 seconds (15 minutes).

  By default, the recording period is 5 frames (100ms), with a buffer of 600 memory images.
- Unchecked box: Disables the Timelapse feature, which frees up memory resources.

Loading a Floppy Image

Charging and status indication

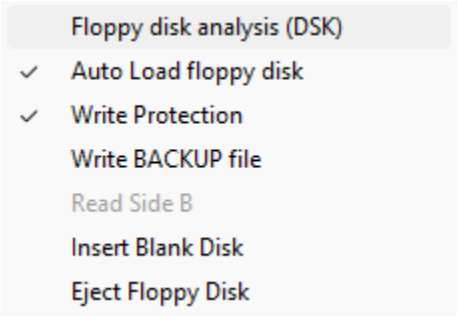
This icon allows you to load a floppy image in format "DSK, HFE or IPF" Once a valid file is loaded, the icon changes appearance to indicate the presence of the floppy disk.

Description of the icons:

	A floppy disk is present.
	Yellow icon: The floppy drive motor is running.
	Green icon: An operation of reading is in progress.
	Red icon: An operation of writing is in progress.

Advanced options accessible via right-click

By right-clicking on the floppy disk icon, a context menu offers several features:



- Floppy Disk Analysis (DSK): Access to the analysis panel (experimental, not detailed here).
- Auto Load Floppy Disk: Charge automatically the last file DSK used when starting the emulator.
- Write Protection: Enables or disables file protection against file modification.
- Backup File Protection: Allows you to save changes to a copy from the floppy disk file, thus preserving the original.
- Reading Side B: Force playback on the side B double-sided floppy disks.
- Insert Blank Floppy Disk: Creating a blank floppy disk AMSDOS (9 sectors per track, single-sided).
- Eject the floppy disk: Unloads the currently used floppy disk image from memory.

Loading a cassette image

This dedicated icon allows you to load a cassette file in "WAV" or "CDT" format. Once a valid file is loaded, its appearance changes to indicate the presence of the cassette in memory.

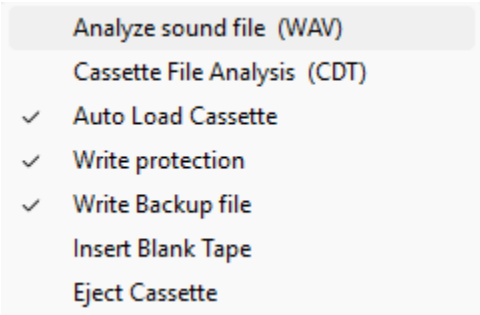
Description of the icons:

	A cassette is present.
	Yellow icon: The cassette player motor is running.
	Green icon: An operation of reading is in progress.
	Red icon: An operation of writing is in progress.

AMSpiriT plays the audio stream in real time, like a real CPC, and can play both protected and unprotected cassettes.

Advanced options accessible via right-click

Right-clicking on the cassette icon brings up a context menu offering several features:



- Sound file analysis (WAV): Access to the analysis panel of a sound recording WAV *(experimental, not detailed here)*.
- Cassette file analysis (CDT): Access to the analysis panel of a cassette file CDT*(experimental, not detailed here)*.
- Auto Load Cassette: Charge automatically the last cassette file used when starting AMSpiriT.
- Write Protection: Enables or disables file protection against file modification.
- Backup File Protection: Allows you to save changes to a copy from the cassette file, thus preserving the original.
- Insert blank cassette: Creating a blank cassette image.
- Eject Cassette: Unloads the current cassette image from memory.

Using the Cassette Player

Like the cassette player of the AMSTRAD CPC 464, playback of cassette recordings is done using the icons below:

Loading and displaying information

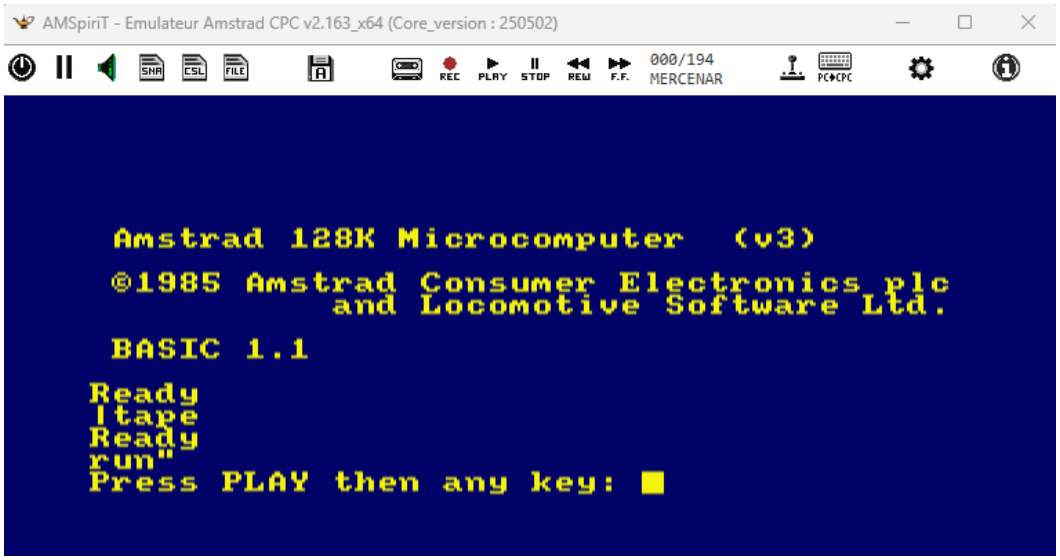
Once upon a time cassette file loaded, this one is analysis and the following information is displayed:

- A counter indicating the reading progress.
- The name of the first file present on the cassette, displayed to the right of the control icons.

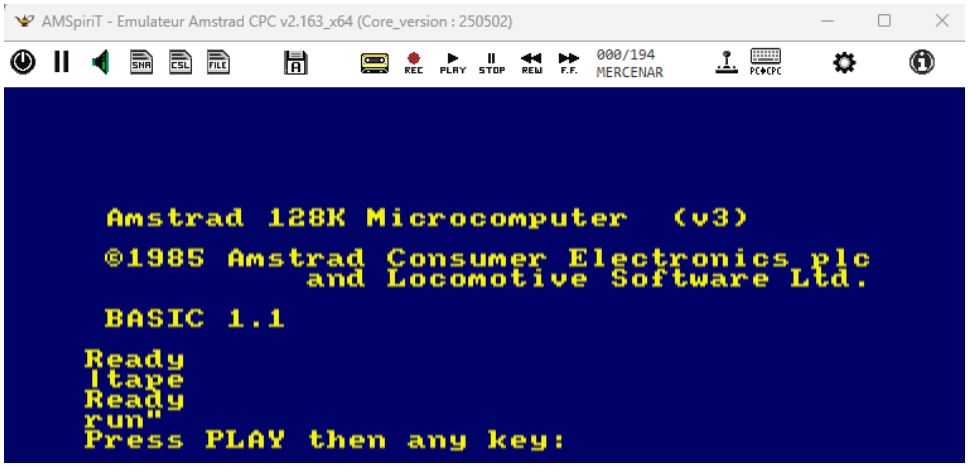
Playing a cassette file

The procedure for loading a cassette file faithfully reproduced the operation of a real AMSTRAD CPC:

1. Execute the BASIC instruction: First type the command |TAPE, if you are on CPC 664 or 6128, then type the command RUN".
2. Waiting for system message: When the message "Press PLAY then any key" is displayed.



3. Yellow icon: Press ENTER to start the player's engine. The cassette goes into standby mode.



4. Press PLAY: Click on the icon PLAY, which becomes green as well as the player icon.

5. Start reading: THE counter starts incrementing until loading is complete.

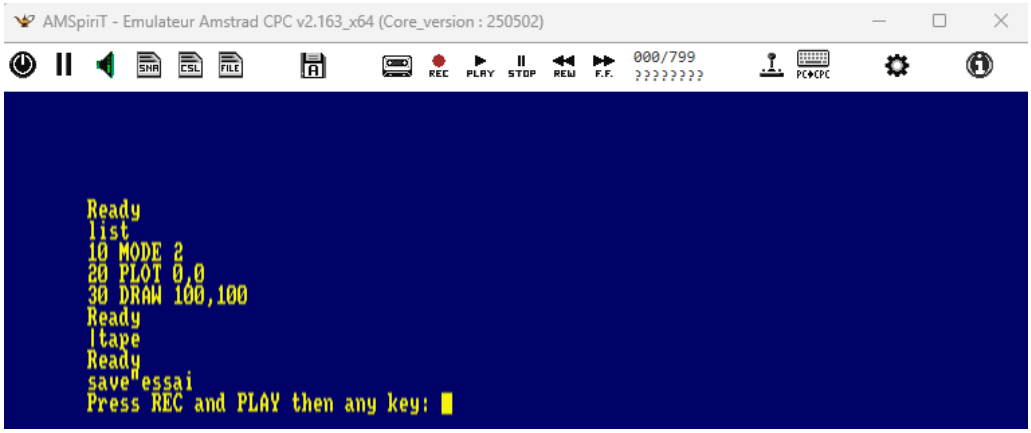
Recording a cassette file

Protection and preparation of recording

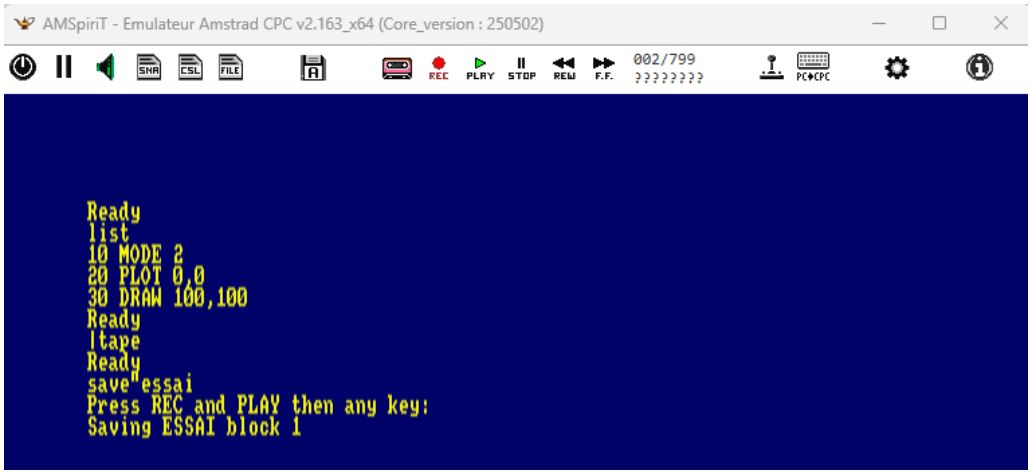
By default, the cassette Is write-protected. To make a recording, it is imperative to disable this protection via aright click on the cassette icon. If the protection remains active, the icon REC will remain blocked and recording cannot be started.

Registration procedure:

1. Execute the BASIC instruction: First type the command |TAPE, if you are on CPC 664 or 6128, then type the command SAVE"XXXX".
2. Waiting for system message: When "Press REC and PLAY then any key" appears, click on the icons REC And PLAY.



3. Red and green icons: The icon REC becomes red and the icon PLAY becomes green.
4. Starting the engine: Press ENTER to activate the cassette player and start recording.



5. Recording Progress: THE counter increments until the end of writing.
6. Stop recording: Click on the icon STOP to finalize the process.

Cassette playback and recording control

Playback and recording features

AMSpiriT offers the possibility of stop, fast forward or rewind when playing a cassette file.

Description of icons when using a cassette recording:

	PLAY icon (green): Indicates that the sound recording is playing.
	REC icon (red): Indicates that writing is enabled (the cassette must first be unprotected).
	STOP icon (red after two clicks): Allows you to stop recording and is used in conjunction with the functions Fast forward And Quick return.
	Fast Forward Icon (Green): Speeds up playback to the next available file on the cassette (works in conjunction with STOP).
	Fast Back Icon (Green): Rewinds the cassette to go to the previous file (works in conjunction with STOP).

Audio playback and management of protected files

AMSpiriT faithfully reproduced the audio behavior of the CPC during a cassette read/write operation, with real-time sound output.

The files protected can be read but, when loading them, the filename maybe inaccessible. In this case, the file name display under the counter will be replaced by"???????".

Joystick management

Joystick Detection and Configuration

AMSpiriT automatically detects when a joystick is connected to a PC. As soon as a joystick is connected, the associated icon changes color to green, indicating that the device is active.

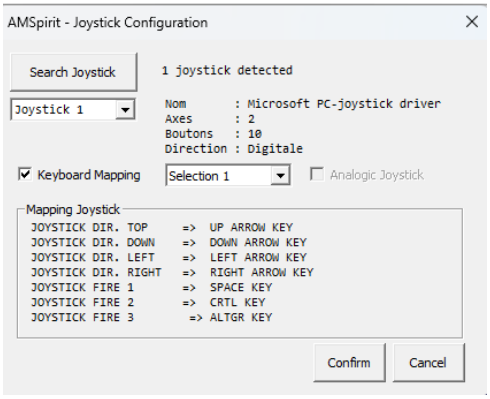
Checking joystick recognition

To ensure the joystick is recognized correctly, simply use it and the "arrow", "X" and "Z" characters will appear on the screen, as shown below.

Accessing the joystick control panel

By clicking on the joystick icon, a control panel appears. This panel allows you to:

- To identify the joysticks connected to the PC.
- To select the joystick to use with the emulator.



Keyboard mapping option

If no joystick is available, the "Keyboard Mapping" option allows you to associate each joystick action with a keyboard key. Two mapping possibilities are offered by default.

The mapping of the joystick to the keyboard can be activated directly by right-clicking on the Joystick icon or by pressing the **function key F9** of the PC.

In this case the joystick icon will look like this: 

Keyboard management

Automatic keyboard mapping

By default, AMSpiriT automatically enables keyboard mapping to ensure optimal correspondence between typed keys and on-screen display, regardless of the country of the selected ROM.

If the character typed on the PC keyboard exists on the emulated CPC keyboard (depending on the selected ROM), it will be displayed on the screen, otherwise no character will be displayed.

It should be noted that the CPC's COPY key, which has no equivalent on our modern keyboards, is mapped to the PC's "ALT" key.

Disabling automatic mapping

To disable automatic mapping, simply click on the icon 

When the emulator identifies the country code of the PC keyboard, the mapping is automatically disabled. Each PC key then displays the character present on the Amstrad CPC key located at the same position (the CPC key layout depends on the installed ROM).

Currently, the keyboards natively supported without the mapping option are:

- French
- American (USA)
- English (UK)
- Spanish
- Danish
- German
- Italian
- Portuguese
- Swiss
- Belgium
- Canada

Additional keyboards can be integrated upon request.

The keyboard icon will be changed as follows: 

Keyboard clash

When pressing certain key combinations simultaneously, a phenomenon called "keyboard clash" or "ghost key" can occur, causing an unsolicited key to appear on the screen. This behavior is related to the hardware architecture of the keyboard of Amstrad CPC computers.

In the AMSpiriT emulator, this effect is reproduced when keyboard mapping is disabled, allowing for faithful emulation of the original hardware behavior.

Managing snapshot files

AMSpiriT supports reading and saving snapshot files, in format SNA, which contain a copy of the emulator's internal memory at a given time.

- Loading a snapshot: Clicking on the icon or pressing the keyF4allows you to load a snapshot file.
- Saving a snapshot: Right-click on the icon or press SHIFT + F4allows you to save a snapshot file (in the SNA directory of AMSpiriT).

AMSpiriT supports versionsV1, V2 and V3of the standard SNA, allowing compatibility with snapshots from other emulators.

The snapshots generated by AMSpiriT comply with version V2 of the SNA standard for classic CPC models and version V3 for the CPC Plus range.

AMSpiriT adds a specific chunk "SPRT" to the snapshot file, containing its internal variables as well as additional floppy disk, cassette, ROM and RAM images. This additional data allows to reconstruct a complete memory image of AMSpiriT, identical to what it was at the time of the snapshot creation.

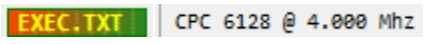
Miscellaneous file management

AMSpiriT supports reading text files, in the format TXT, and binary files BIN. Reading

a Text File

Reading a text file allows the text contained in the file to be automatically written into the CPC's BASIC editor. This avoids the tedious typing of a file written in BASIC, for example.

- Loading the text file: A text file can be loaded by clicking on the File icon.
- Executing the text file: When text is being entered in the BASIC editor, the message "EXEC.TXT" flashes in the status bar.



- Manually stop execution: To stop processing a text file in progress, press the key Escape.

Reading a binary file

AMSpiriT supports reading binary files with headers AMSDOS, while allowing their automatic execution.

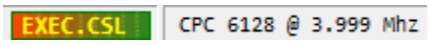
- Enabling AutoRun: To automatically run a binary file, check the option" AutoRun Binary Files "in the menu Options.

Script File Management

AMSpiriT supports reading and saving Script files, in CSL format (*CPC Script Language*, specified by Longshot). These files allow you to control the emulator's actions through the execution of scripts, composed of customized instruction sequences. The specifications of the CSL format are available in the following document: CSL Standard Specifications

Reading a Script File

- Loading a script: A script file can be loaded by clicking the CSL icon or pressing the F3 key.
- Running the script: When a script is running, the message "EXEC.CSL" flashes in the status bar.

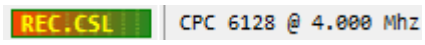


- Error handling: If an error occurs, the script execution is interrupted immediately.
- Manually stopping the script: To stop a running script, press the key Escape, or right-click on the CSL icon and select "STOP CSL" in the drop-down menu.

Saving a Script File

AMSpiriT allows real-time script recording, capturing keyboard interactions.

- Start recording: To start recording a script file (in the directory SNA), right-click on the CSL icon and select "CSL Creation", or use the keyboard shortcut SHIFT + F3.
- Recording indicator: During recording, the message "REC.CSL" flashes in the status bar.



- Stop recording: To stop the process, right-click on the CSL icon and select "STOP CSL" from the drop-down menu.

Additional option: Screenshot management (***ScreenShot Management – SSM***)

An advanced feature allows automatic saving of screenshots when the processorz80executes certain specific instructions. This option, activated by right-clicking on the CSL icon ("Activate SSM"), is mainly used for non-regression testing and testing shaker developed by Longshot.

Pause emulation and enable the “Timelapse” function

Pause the game

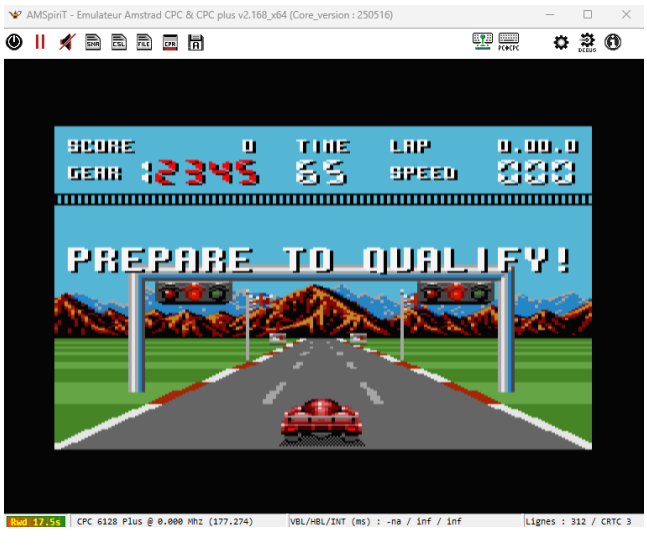
To pause AMSpiriT, click the icon "Break" or press the key"F1 ". When pause is activated, the icon "Break " turns red and a flashing message "Break" appears in the status bar.

Enabling the Timelapse function

Once the game is paused, you can activate the function "Timelapse”, allowing you to go back to60 seconds before pausing. This feature is useful for revisiting a specific moment in the game.

- Step back in time: Press the key left arrow.
- Return to the present time: Press the key right arrow.

When using Timelapse, a message "Rwd xx.xs” appears in the status bar, indicating the rewind time in seconds.



Emulation resumes

To resume execution from the last breakpoint, press the key again"F1” or click on the icon "Break ".

TIP: If a joystick or gamepad is connected, AMSpiriT assigns the "PAUSE" function to joystick button #4 and back/forward switching is done with the directional buttons.

6. PRESENTATION OF THE STATUS BAR

The status bar displays information about the emulator's operating status. It consists of four separate sections, which are updated periodically.

In the AMSpiriT interface you will find the following information:

Performance indicator panel

The Performance Panel displays a graphical representation of the CPU resource usage required to run AMSpiriT optimally.

Performance indicators

- Optimal performance zone: As long as the yellow line is oscillating in the red-green zone, it means that the host PC has enough power to maintain optimal emulation speed.

- Low performance alert: When CPU resources become insufficient, the flashing message "LOW.PERF "is displayed, indicating a risk of slowdown. 

- Impact of poor performance: A decrease in resources causes emulation to slow down, which can cause sound glitches recurring.

CPC Model:

The following section indicates the AMSTRAD CPC model being emulated, the extended RAM capacity (if RAM expansion is selected in the options menu) and its running speed (in MHz).

Period of synchronization signals and interrupts:

The third part transcribes the period of the HBL (Horizontal Blank), VBL (Vertical Blank) synchronization signals and the interrupts. The values are expressed in milliseconds.

In the example above, one frame is displayed every 19.968 ms, or 50.1 frames/second, which is consistent with PAL video output.

Number of lines displayed and type of CRTC:

The last part indicates the number of lines displayed on the screen as well as the type of CRTC currently in use.

A PAL monitor typically displays 312 lines per frame, but some demos may vary this number.

7. KEYBOARD SHORTCUTS

Keyboard shortcuts used by AMSpiriT

F1	Enables or disables the emulator's PAUSE
F2	Capture a screen image of AMSpiriT (in the SCREEN directory)
SHIFT F2	Capture a reduced screen image of AMSpiriT (without displaying the window)
F3	Loads a Script (CSL) file
SHIFT F3	Saves a Script (CSL) file
F4	Load a Snapshot file (SNA)
SHIFT F4	Saves a snapshot file (SNA)
F5	Loads a floppy disk file to drive A (DSK, HFE, or IPF)
F6	Loads a floppy disk file to drive B (DSK, HFE, or IPF)
F7	Decrease the volume of AMSpiriT
F8	Increases the volume of AMSpiriT
F9	Enables or disables the joystick (via keyboard mapping).
F10	Increases the emulation speed to maximum. Returns to normal speed when the key is released.
SHIFT F10	Increases the emulation speed to maximum. Use F10 to return to normal speed.
F11	Switch between color and monochrome screen mode.
F12	Toggles between full screen and windowed mode.

8. COMMAND LINE

AMSpiriT can be launched in console mode, allowing its execution by command lines and the automation of certain startup sequences.

```
D:\Projets Visual C++\Emulateur AMSTRAD\Emulateur Amstrad CPC\x64\Release>"Emulateur Amstrad CPC" --joystick
```

Available commands:

Online orders are standardized.

- - autorun	Automatically executes a Cassette file or binary file
- - cpc	CPC Model (0 = 464, 1 = 664, 2 = 6128, 4 = 6128+, 5 = 464+, 6 = GX4000)
- - cpr=file	Load a cartridge (CPC Plus)
- - crtc=X	Sets the CRTC type at startup (X = 0, 1, 1b, 2 or 4) - CPC no longer
- - file=file	Loads a dsk, ipf, hfe, cdt, wav, sna, bin file (path must be full)
- - csl=file	Loads a "Cpc Scripting Language" script file (path must be complete)
- - fullscreen	Run AMSpiriT in full screen mode
- - joystick	Enables the joystick (Keyboard Mapping)
- - keybPC	Keyboard in PC mapping mode => CPC
- - keybCPC	Keyboard in CPC mode (no mapping)
- - nojoystick	Disables joystick mapping
- - mute	Turn off the sound
- - romX=file_rom	Loads a ROM file into location X (X varies between 1 and 15) Note that loaded ROMs will not be memorized by AMSpiriT
- - run=Filename	Launches a program on a floppy disk or ROM.
- - config-file=rep	Sets the AMSpiriT directory where the configuration file is located

9. ACKNOWLEDGMENTS

This emulator would certainly never have seen the light of day without the valuable contribution of the many AMSTRAD CPC enthusiasts who allowed me to glean and exchange a lot of technical information.

Major contributions

A special tribute to Serge Querné (@Longshot) of the legendary group Logon System, whose extraordinary documentation work has considerably improved the quality of the emulator. Author of the CRTC Compendium, he compiled technical data of unparalleled precision, verified and tested on the different models of Amstrad CPC. Its daily support and the provision of tailor-made test games (notably the famous Shaker) have made it possible to refine the emulation of the different types of CRTC, including obscure and poorly documented features.

The compendium is available at the following address: Logon System

Development support

- Stéphane SIKORA (@Siko): Creation of the official portalAMSpiriTAMSpiriT.fr, development advice and participation in the cross-platform porting project.
- Cédric QUETIER (@CED): Design of the website visuals and logo AMSpiriT.
- Carlos PARDO (@Made): Cover page illustration & internet portal
- CPC Discord Community: A huge thank you to the kind members who supported and enriched the project (@CheshireCat, @BDCIron, @Candy, @Floboune, @Overflow, @FredCrazy, @tronic, @Ricolaoz, @LDIR_Hector, @darkSteph, @LordHeavy, @Doctor_Plissken, @Lzamu, @hlide…).
- FORUM.SYSTEM-CFG Forum: Thanks to the contributors involved in improving the emulator (@lone – author of SugarBox, @markerror, @sebiohazard, @Zebulon…).

This project has grown thanks to ongoing research and exchanges within the community. If some names have been omitted, please be assured of my deepest gratitude.

- QUASAR.NET: http://quasar.cpcscene.net/
- BALTASAR STUDIO: https://baltazarstudios.com/zilog-z80-undocumented-behavior/
- AMSTRAD CPC WRITTEN MEMORY (ACME): https://acpc.me/#
- GRIMWARE: https://www.grimware.org
- SUGAR CUPS: http://cpc.sylvestre.org
- CPC POWER: https://www.cpc-power.com/
- CPC RULEZ: https://cpcrulez.fr/
- CPC FORUM WIKI: https://www.cpcwiki.eu/forum/index.php
- FORUM FORUM.SYSTEM-CFG: https://forum.system-cfg.com/index.php

10. The Future of AMSpiriT

Thanks to community feedback, the quality of emulation of AMSpiriT is refined with each new iteration. Although it can never replace a real machine, the goal is to make its behavior faithful enough that it becomes indistinguishable from an Amstrad CPC computer. After7 years of development, AMSpiriT continues its evolution with the aim of achieving as faithful an emulation as possible across the entire range CPC.

Finalizing the emulation engine

In recent years, efforts have been focused on the emulation engine ("Core"). With support for the range CPC Plus, this development phase is now almost complete, marking the end of the first stage of the project AMSpiriT.

Next steps

The future of the project looks towards:

- Multi-platform opening, allowing increased accessibility.
- Adding new development features, in order to meet the needs of developers.

Linux version

A version Linux (Linux-Lite) is currently under development and will be available "soon". Many thanks to Stéphane SIKORA (@siko) for his work on this highly anticipated adaptation.

11. QUICK START

Using a microcomputer emulator requires a more technical approach than using a game console emulator, involving entering keyboard commands for it to work properly.

To better understand the AMSTRAD CPC environment, it is strongly recommended to consult its user guide before launching the emulator. These guides are easily accessible online, notably on the ACME website, which is a valuable resource by referencing all the documentation available on the AMSTRAD CPC, in many languages.

https://acpc.me/#ACME/LITTERATURE_MANUELS/[FRA]FRENCH

Before you can run a program, you need to download it. Many websites offer images of "floppy disks" or "cassettes" that allow you to access various software. Among them, CPC POWER stands out as one of the most comprehensive and reputable, offering a vast collection of content dedicated to the AMSTRAD CPC. https://www.cpc-power.com/)

Once the file has been identified, it should be placed in the appropriate AMSpiriT directory: the DSK folder for a floppy disk image, or the TAPE folder for a cassette image. This step is essential to ensure proper program support by the emulator.

Running a program on floppy disk

To run a program from a floppy disk, it is first necessary to load it into memory. To do this, click on the "Floppy Disk" icon, then type the BASIC command "CAT". This will display the catalog of the disk's contents, allowing you to select and run the desired program.

If everything goes well, the floppy disk catalog should appear on the screen. To launch the desired program, simply enter the command "RUN "file_name" in the BASIC interface.

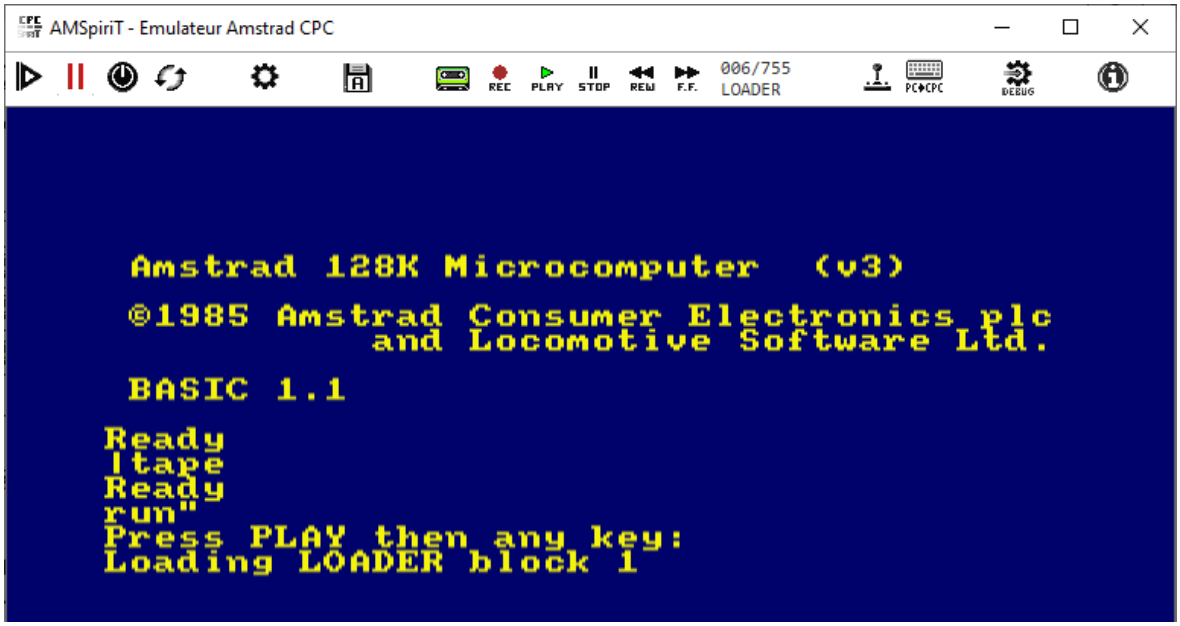
However, if the catalog does not appear or an error message appears, the diskette may be formatted in CPM mode. In this case, try running the "|CPM" command to initiate the program startup in this environment.

Running a program on cassette

To run a program on a cassette, you must first load it into memory by clicking on the "Cassette" icon.

If the emulator is an AMSTRAD CPC 664 or 6128, the BASIC command "|TAPE" must be entered to activate the cassette player. On the other hand, on an AMSTRAD CPC 464, this step is unnecessary since this medium is already configured as the default playback medium.

Then enter the BASIC command "RUN": the message *Press PLAY Then any key* will be displayed. Then simply press the key *ENTER* and click on the icon *PLAY* to start loading the file. You will hear the characteristic sound of the cassette, and the screen will display the message *Loading xxxx*.



Please note that the reading speed closely matches that of a real CPC, which means... you will have to be patient before you can access the program!

12. VERSION HISTORY

09/13/2025: v2.02b
- Improved joystick support
- Various ergonomic improvements

03/08/2025: v2.01b
- CRTC 3: Fixed a bug in SSCR (ASIC) management
- Fixed a regression in CTM emulation
- Fixed a bug when importing SNA v3 files
- Fixed a bug when detecting a modified file
- Improved support for protected DSK files
- Added a setting option for the "Timelapse" function
- Various ergonomic improvements

=> Thanks to @CrackY, @Andycadley, @Jean-Marie, @Doctor_Plissken

01/07/2025: v2.00b
- Emulation of the CPC Plus range (464,6128, GX4000)
  - Emulation of all ASIC functions
  - Monochrome Monitor Support (MM12)
  - Analog Joystick Support
- Cartridge file management (.CPR)
- Support for an additional floppy disk drive (B)
- Added "Timelapse" function
- Support for writing script files (.CSL)
- Various fixes on the emulation of CRTCs 0, 1, 2 and 4
- Improved CTM emulation
- Improved FDC emulation
- Optimization of the emulation engine
- Keyboard Clash support
- Added new online commands
- Improved support for additional ROMs
- Various ergonomic improvements

04/24/2024: v1.01_RC
- Various fixes on CRTC 0,1 and 2 (thx to Fred_Crazy)
- CRTC 4: split-border support
- Fixed memory corruption bug
- Fixed a joystick detection bug
- Better support for CDT files
- Various ergonomic improvements

01/04/2024: v1.00_RC
- Management of files in HFE and IPF format (read-only)
- Management of binary files (.bin) (with AMSDOS header)
- Support for RAM expansions up to 4MB.
- Fixed a bug on PSG command registers
- Improved Z80 emulation
- Improved FDC timings
  - Improved support for external ROMs
  - Adding new online orders
  - Support for new regional keyboards
- Various ergonomic and aesthetic arrangements

03/12/2023: v0.967b
- Improved floppy drive emulation
- Various fixes on CRTCs 1, 2 (meow mode) and 4
- Support for accented characters in .txt files
- Emulator-ID support
- Aesthetic modifications

10/10/2023: v0.953b
- Management of snapshot files (.SNA)
- Management of Script (.CSL) and text (.txt) files
- Various fixes (CTM, FDC, PSG and CRTC 0/1 emulation)
- Improved e-dsk support
- Improved management of Additional Roma
- CPU load optimization: single or multi-threaded option
- Added Drag and drop functionality

12/05/2023: v0.863b
- Various fixes on FDC, CRTC and PSG emulation
- Improved management of Additional Roma
- Order line management

04/16/2023: v0.845b
- Full emulation of CRTC type "4" (pre-ASIC)
- Added management of additional ROMs
- Improved CTM emulation (CSYNC signal management)
- Export of the AMSpiriT Core to a dedicated library
- Fixed HSYNC signal handling (all CRTC)
- CDT file: Added management BLOC_ID 0x15: Direct Recording

09/19/2022: v0.704b
- Various fixes in the emulation of CRTC 0, 1 and 2
- Adjusted R52 (Gate Array) update timing
- Ergonomic modification (icons / addition of English language)
- Code optimization

08/15/2022: v0.677b
- Full emulation of CRTC type "2"
- Various fixes in CRTC 0 and 1 emulation
- Emulation of FDC write functions (WRITE DATA/ID)
- Emulation of writing "Cassette" files
- Small fixes in FDC emulation (engine management)
- Evolution in CTM emulation ("wave" effects)
- Ability to take screenshots (F2/F3 keys)

04/21/2022: v0.590b
- Complete rewrite of CRTC 0 and 1 emulation
  - Code based on @longshot's compendium
  - Universal code, without any patches
  - Integration of interlace management
- Major rewrite of GA emulation
  - 16 MHz pixel processing
  - Fixed rendering in mode 2 (advance 1 pixel)
  - Fix on GA interrupt register
- Improved PPI emulation
- Fix on z80 emulation (OTIR OTDR instructions)

11/12/2021: v0.473b
- Z80 instructions timing correction
- CRTC emulation fix

11/28/2021: v0.466b
- Correction of the FDC "READ DIAGNOSTIC" function
- Fixed bug when loading cassette in full screen
- Added keyboard shortcuts (F1 - F5 and F9 keys)