

M4 BOARD v2.x

Technical User Manual

Firmware reference: v2.0.8 | English Technical Edition



Current Board Revision

This edition uses the latest board layout supplied for this manual. The HACK button is already integrated on the PCB; no external HACK-button wiring modification is required.

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Document scope

This technical English edition is based on the supplied M4 Board Extended User Manual. It preserves the documented commands, file formats, ROM and network concepts, while removing the obsolete external HACK-button wiring procedure because the current PCB revision already includes the HACK pushbutton.

The M4 Board is an expansion interface for the Amstrad CPC and CPC Plus families. It combines Wi-Fi networking, microSD mass storage, ROM management and real-time clock functionality in a single interface, and supports both local and bi-directional network workflows.

Main capabilities

Wi-Fi access • microSD storage • ROM-board functionality • real-time clock • Web UI • DSK disk images • CPR cartridge images • SNA snapshots • BAS / BIN / ROM files

2. Controls and Reset Functions

CARD RESET - upper-right button

Hot-restarts the M4 Board while retaining the current directory, mapped disk and related M4 state. In CTR cartridge mode, it restarts the active cartridge application/game rather than performing a complete CPC restart.

CPC RESET - lower-right button

Cold-restarts the CPC. The current directory and mapping state are not retained; the active location returns to the microSD root.

HACK button - left side

Opens the Hack menu. On the current PCB revision used for this edition, the HACK button is already fitted to the board. No additional soldered button modification is required.

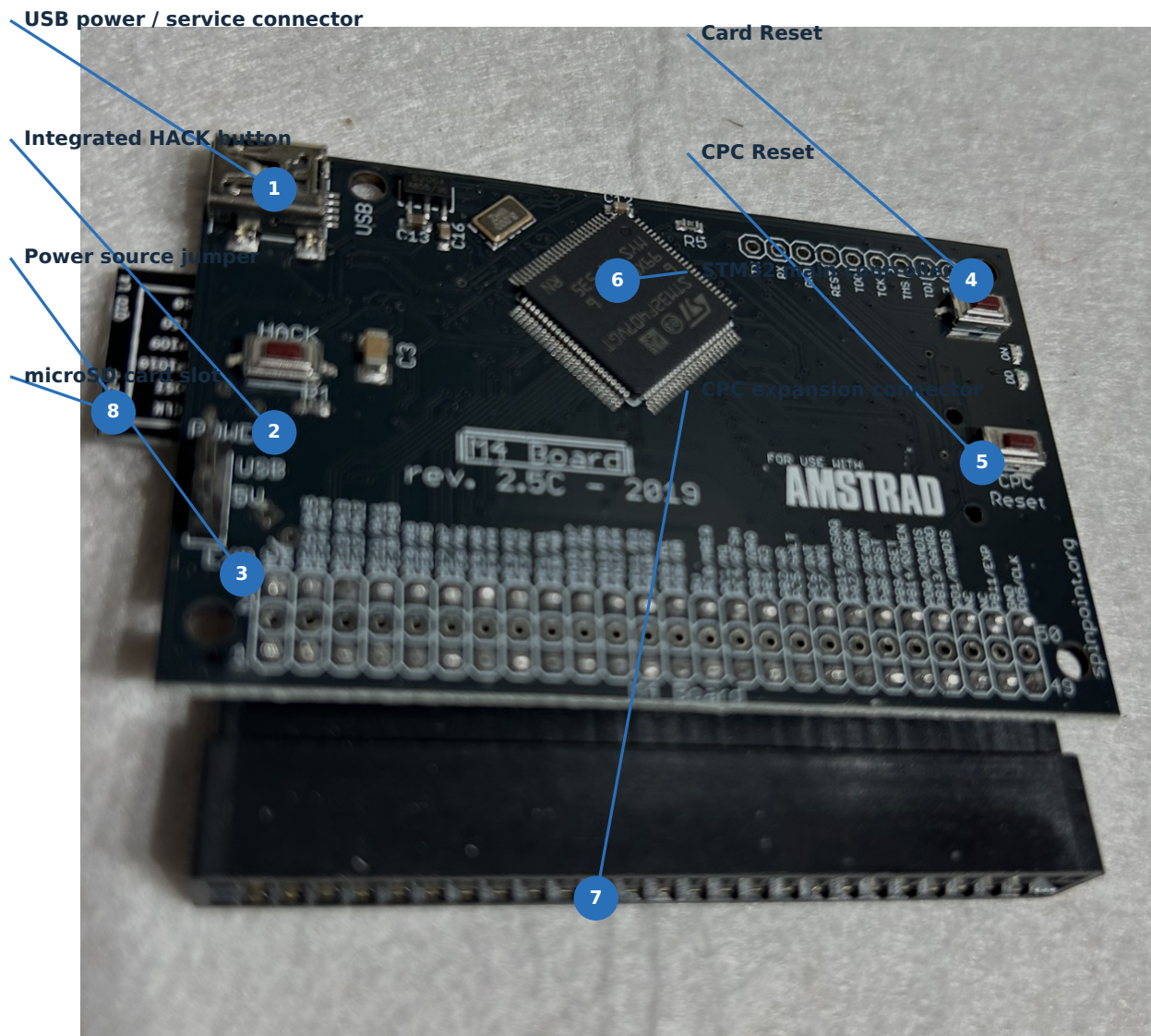


Figure H1 - Current M4 Board hardware layout supplied for this manual

Current revision note

Earlier M4 documentation included instructions for wiring an external HACK pushbutton to the Wi-Fi module. Those instructions are obsolete for the board shown above because the HACK button is already fitted to the PCB. This technical edition intentionally omits the external-button modification.

Recommended Connection Sequence

1 Power OFF the Amstrad CPC

Do not install or remove the M4 Board while the CPC is powered.

2 Check the CPC edge connector

Make sure the expansion connector is clean and free from oxidation or debris.

3 Set the power-source jumper

Use EXT when powering the M4 from the CPC. Use USB when supplying 5 V through the USB connector.

4 Insert the microSD card

Use FAT16 or FAT32; FAT32 is recommended by the source manual.

5 Connect the M4 Board

Align the expansion connector carefully and seat the board fully.

6 Power ON the system

The blue ON LED should indicate power. SD access is shown by the green DD LED.

Important - MX4 installations

When the M4 Board is used in an MX4 motherboard, use an external power supply connected to either the M4 Board or the MX4, as specified in the supplied source manual.

HACK

Launches the Hack menu. On the current board revision this is a factory-fitted PCB button; no external soldered pushbutton is required.

CARD RESET

Hot-restarts M4 while retaining the current directory, mounted DSK and related M4 state. In cartridge mode it restarts the cartridge application/game.

CPC RESET

Cold-restarts the CPC. The current directory and mapping state are cleared and the active directory returns to the microSD root.

Do not confuse the two reset functions

CARD RESET is intended for restarting the M4 subsystem while preserving useful M4 state. CPC RESET performs a full CPC restart and returns the M4 file system to the root directory. Choosing the correct reset can save time when testing software, changing mounted media or working with cartridge images.

Cleaning the edge connector

If you experience unexpected resets, freezes or graphic glitches, the source manual identifies dirty edge contacts as a common cause. Power the CPC off before cleaning or reseating the interface.

1 Insert a microSD card

Insert a microSD card into the M4 Board.

2 Copy CPC software

Copy DSK, CPR, ROM, BIN or BAS files to the card.

3 Boot the CPC

Start the CPC with the M4 Board connected.

4 Use native CPC commands

The microSD file system can be accessed using SAVE, LOAD, RUN, CAT and M4 RSX commands.

SAVE / LOAD behaviour

When an extension is omitted, M4 can automatically add the expected CPC extension, such as .BAS or .BIN. If SAVE overwrites an existing file, a .BAK backup is created.

When network setup is required

Configure Wi-Fi if you want to use the web interface, network ROM management, network time synchronisation or internet download functions.

The microSD card is addressable as drive C:. The source manual specifies FAT16 or FAT32, with FAT32 recommended. Up to 2048 files per folder are supported.

- Native directory listings use 8.3-compatible filenames.
- Directories shorter than 17 characters can be shown with their full name; longer directory names may use a shortened form.
- A > character is displayed in front of directory names.
- Use |LS for long filenames. The visible filename length depends on the current screen mode.
- ESC pauses or aborts listings; Cursor and COPY can be used to enter filenames.

Powering the Board

A single jumper selects the power source. Set the jumper to EXT to use the CPC supply, or to USB to power the board from a 5 V USB source.

MX4 motherboard

When an M4 Board is installed in an MX4 motherboard, the source manual requires an external supply connected to either the M4 or the MX4.

ON LED (blue): board power present.

DD LED (green flashing): microSD read/write activity.

The M4 environment uses an M4 directory on the microSD card for its configuration. The standard configuration includes the following files:

Core files

```
romconfig.bin  
romslots.bin  
config.txt
```

These files can later be edited or replaced to change ROM and network configuration. The M4reconf utility described later can write ROM configuration files from the CPC itself.

Example CONFIG.TXT

```
ssid=wifi_SSID_name  
pw=wifi_password  
name=CPC  
dhcp=1  
dns1=8.8.8.8  
dns2=8.8.4.4  
tz=1  
ntp=ntp.inet.tele.dk
```

A DSK image can be entered like a directory. DSK images are read-only in the documented M4 workflow.

Typical sequence

```
CAT
|LS
|CD, "DSK"
CAT
|CD, "name.DSK"
CAT
RUN"DISC"
```

Once the image is mounted, CAT displays its contents. BAS programs can normally be started without typing the .BAS extension; other file types may require their extension.

Mounted image after reset

A hot reset leaves the mounted DSK active. To change disk images, leave the mounted image with |CD,".." or return directly to the root with |CD,"/".

Multi-Disk DSK Software

For software distributed across several DSK images, extract the files from every image into the same target directory on the microSD card.

```
|DSKX,"somedisk1.dsk","/mypath"  
|DSKX,"somedisk2.dsk","/mypath"  
|DSKX,"somedisk3.dsk","/mypath"  
|DSKX,"somedisk4.dsk","/mypath"
```

CPR Cartridge Images - CPC Plus

```
|CD,"CPR"  
|CTRUP,"name.cpr"  
|CTR
```

Cartridge image persistence

An uploaded cartridge image remains in M4 flash after reset, restart and power cycling until another cartridge image is uploaded.

Place AUTOEXEC.BAS in the root of the microSD card to launch a BASIC startup script automatically each time the CPC is powered on.

Example

```
10 MODE 2
20 INK 1,26
30 |CD,"DSK"
40 |LS
SAVE"AUTOEXEC.BAS"
```

Create it on the CPC

Create and save AUTOEXEC.BAS on the CPC itself unless you know how to add the correct CPC file header manually.

M4FE and Navigation Software

- M4FE is a ROM-based front end for the M4 Board, supporting keyboard/joystick directory browsing, application launching, text viewing, file search and DSK-to-disk transfer.
- Other navigation options mentioned in the source manual include 8-bit Disk Menu, DISC.BAS, M4 Explorer and YANCC.
- M4FE is started from BASIC with |M4FE after its ROM has been installed.

M4reconf is a native CPC utility that writes romslots.bin and romconfig.bin for alternative M4 ROM configurations.

Basic workflow

```
Copy m4reconf.bin to "/M4"  
Copy the required romslots.bin / romconfig.bin to "/M4"  
RUN"M4RECONF.BIN"  
Power-cycle the CPC
```

romslots.bin

The source manual describes romslots.bin as 32 raw ROM blocks without headers. A ROM image can be located using the slot offset formula:

```
offset = slot * &4000
```

romconfig.bin

The configuration contains global ROM-board settings followed by per-slot status/name data. Status values described by the source include disabled/no ROM, enabled ROM, new ROM to flash, and ROM removal.

CD	Change directory. Examples: CD,"games" CD,"games/batman" CD,".." CD,"/"
COPYF	Copy a file within the microSD file system.
FCP	Copy files between the microSD card and floppy drives. C: addresses microSD.
REN	Rename a file/directory or move it to another path.
ERA	Erase files or directories. Wildcards are supported.
MKDIR	Create a directory.
DISC	Switch to AMSDOS / floppy disk access, if present.
SD	Switch back to the M4 microSD environment.
DIR	Directory listing with wildcard support.
LS	Directory listing using long filenames.

SNA	Start an emulator snapshot. Example: SNA,"FRANKIE.SNA"
DSKX	Extract files from a DSK image into a directory.
TAPE	Switch CPC storage access to tape. Use SD to return to M4.
CTR	Start the cartridge image previously uploaded to M4 flash. CPC Plus only.
CTRUP	Upload a .CPR or compatible binary cartridge image to M4 flash. CPC Plus only.
GETPATH	Display the current selected path.
LONGNAME	Resolve and display the complete long name for a short 8.3-style filename.
UDIR	User-directory function intended for software use rather than plain BASIC.
WIFI,0 / WIFI,1	Disable or re-enable Wi-Fi.

Wildcards

Files normally use *.* because they have extensions. Directories normally use *. Supported wildcard characters are * and ?.

TIME	Display current time when NTP is configured and network access is available.
NETSET	Configure network parameters.
NETSTAT	Display the current network status and assigned IP information.
HTTPGET	Download a file from HTTP to the current microSD directory.
HTTPMEM	Download HTTP data directly into CPC memory; supports offsets/chunked reads.
M4ROMOFF	Disable the M4 ROM until the next power cycle; useful when direct floppy or CPC Plus cartridge access is required.
M4HELP	Display ROM entries / commands for a specified ROM.
ROMSOFF	Disable M4 ROMs, optionally retaining a selected ROM and optionally resetting.
VERSION	Display firmware versions for the M4 MCU and ESP Wi-Fi module.
UPGRADE	Perform a firmware upgrade using the M4FIRM.BIN and ESPFIRM.BIN files.
ROMUP	Upload a ROM binary from microSD to a ROM slot.
ROMSET	Enable or disable an already uploaded ROM slot.
ROMUPD	Apply pending ROM changes without requiring a reboot.

The M4 Board provides configurable ROM mapping. Slot choice depends on CPC model and whether AMSDOS or other internal ROM functions must remain active.

CPC 464

Slot 0 is reserved for BASIC replacement. Slots 1-7 are normally available. Slots above 7 require additional ROM-initialisation support. The source manual recommends mapping the M4 ROM to slot 7 for best game compatibility when possible.

CPC 664 / CPC 464+ / CPC 6128+

Slot 0 is BASIC. Slots 1-6 are free. Slot 7 is normally AMSDOS but may be replaced when appropriate. Slots 8-15 are free. Slots 16-31 need additional initialisation support. M4 may use slot 7 for compatibility, or slot 6 when simultaneous floppy and SD access is required.

CPC 6128

Slot 0 is BASIC. Slots 1-6 are free. Slot 7 is AMSDOS and cannot be overridden on most CPC 6128 systems; the source manual explicitly warns not to use it. Slots 8-15 are free. M4 ROM is therefore recommended in slot 6.

Lower ROM replacement

If Lower ROM replacement is enabled, the corresponding slot must contain a valid Lower ROM binary or the CPC can reset/freeze.

With the CPC and M4 Board powered and networked, the M4 front end can be accessed from a browser using the configured NetBIOS name or IP address.

Typical addresses

`http://CPC`

`http://192.168.1.20`

The web interface can upload files to the microSD card, reset the CPC from the Control page, edit M4 settings and configure ROM-board slots.



Example ROM configuration page from the supplied source manual

Uploading ROMs

Select the ROM slot in the web interface, enter a slot name, choose the ROM file and upload it. Many valid ROM configurations are possible; slot selection must respect the CPC model notes in the previous section.

The M4 Board uses two firmware components: M4FIRM.BIN for the main MCU and ESPFIRM.BIN for the Wi-Fi module. The source manual recommends updating both together.

Upgrade workflow

1. Obtain the matching firmware package.
2. Copy M4FIRM.BIN and ESPFIRM.BIN to the microSD root.
3. Insert the card and start the CPC/M4 Board.
4. Run |UPGRADE when using the RSX upgrade path.
5. Restart the M4 Board after completion.
6. Verify the installed versions with |VERSION.

Automatic / network upgrade

When the CPC is already configured for internet access, the source manual states that the latest firmware can be obtained through |UPGRADE without using a PC.

Modified Lower ROM

The supplied manual also documents an optional modified CPC 6128 Lower ROM for systems that cannot override AMSDOS ROM slot 7. In that configuration, the M4 ROM is placed in slot 6 for improved compatibility.

Network setup is required for the Web UI, internet downloads, ROM management over the network and NTP time synchronisation.

DHCP example

```
|NETSET,"name=CPC6128, ssid=NETGEAR, pw=12345678,  
dhcp=1, dns1=8.8.8.8, dns2=8.8.4.4"  
|NETSTAT
```

Configuration parameters

name	NetBIOS name; source manual specifies uppercase letters/numbers.
ssid	Wireless access point / router name; case-sensitive.
pw	Wireless network password.
dhcp	1 = DHCP, 0 = static IP settings.
ip / gw / nm	Static IP, gateway and netmask.
dns1 / dns2	Primary and secondary DNS servers.
ntp / tz	NTP time server and time-zone offset.
start	When set to 1, settings are stored but not yet applied.

Static IP

The source manual recommends a static IP when fast, predictable browser access to the M4 Board is desired.

The CPC M4 XFER tool is a command-line utility for sending files to and receiving files from an M4 Board over the network. It can also upload ROMs, upload cartridge images, execute CPC files and reset or reboot the hardware.

Core XFER commands

xfer -u ipaddr file path opt	Upload file
xfer -d ipaddr file path opt	Download file
xfer -f ipaddr file slot name	Upload ROM
xfer -c ipaddr file	Upload CPR/BIN cartridge
xfer -x ipaddr path+file	Execute file on CPC
xfer -y ipaddr local_file	Upload and execute
xfer -p ipaddr	Start CPC Plus cartridge
xfer -s ipaddr	Reset CPC
xfer -r ipaddr	Reboot M4

Telnet

The source manual references both a simple M4 Telnet client and the ANSI-capable M4EWEN client. Telnet software can be downloaded to the CPC with |HTTPGET when the M4 Board is online.

```
|HTTPGET,"spinpoint.org/telnet.bin"
```

Board does not start after configuration changes

Remove the microSD card, open it on a PC and delete the files in the /M4 directory. Power down the board, reinsert the card and allow the standard configuration files to be regenerated.

CPC freezes after ROM configuration changes

If ROM slots or ROM binaries were misconfigured, remove the SD card and delete /M4. After restart the M4 Board regenerates its standard configuration.

Unexpected resets, freezes or graphic glitches

Inspect and clean the CPC edge connector. The source manual identifies dirty edge contacts as a common cause of unstable behaviour.

HACK menu access

The current board revision documented here includes the HACK button directly on the PCB. The obsolete external-button soldering modification from earlier documentation is intentionally omitted.

Developer Reference

For register-level details, assembler programming information and development notes, the supplied manual refers advanced users to the current m4info.txt documentation maintained for the board.

M4 BOARD v2.x

Technical User Manual - English Edition

Document Revision

Technical Manual v0.2

Firmware reference: v2.0.8

Based on the supplied M4 Board Extended User Manual

Original M4 Board and firmware by Duke

Additional source chapters / PDF by Csaba Toth

Current board note

HACK button integrated on PCB - no external button modification required.

Technical documentation prepared for RancanuoTeam