Mojo 2 - (4.4 mm) Manual

V.1

CHORD

Chord Electronics Ltd.

Made in **BRITAIN** *established 1989*

1   Contents

2 Introduction

Mojo 2 is a next-generation portable DAC/headphone amplifier that builds on the success of the original and offers exciting new features, enhanced functionality, plus improved sound and battery performance.

2.1 Safety

Please take note of the following safety instructions before using Mojo 2:

- Never allow Mojo 2 to come into contact with water or other liquids.
- Never spray cleaning products onto Mojo 2. Only use a clean micro-fibre cloth to clean the casing.
- Before using this product please read the safety document included in the box.
- There are no user-serviceable components within Mojo 2. Never attempt to open, dismantle or apply internal third-party devices, doing so will invalidate your warranty.

3 Registering Mojo 2

Mojo 2 comes with a one-year warranty that covers defects in materials and workmanship through fair wear and tear.

- Register your Mojo 2 via the Chord Electronics website: www.chordelectronics.co.uk/register-product
- Registering your product helps us to provide you with the best possible after-sales support.

In the unlikely event of a claim, contact your supplying dealer.

4 **Getting to know Mojo 2**
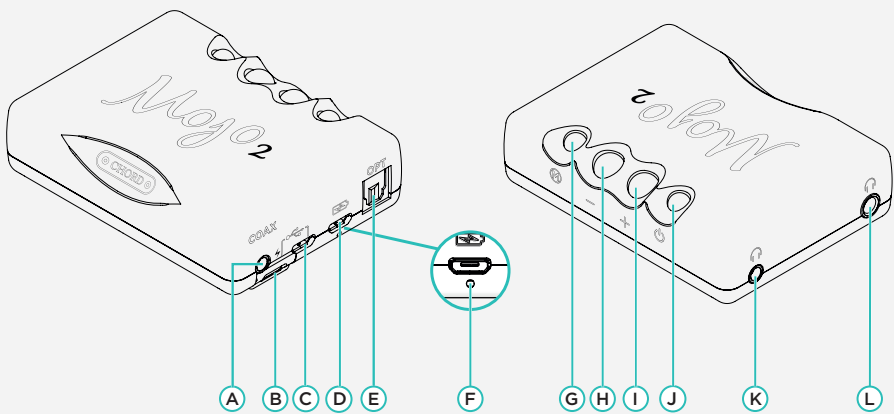
A	Coaxial input (single input or dual data only)	Connect compatible digital devices using a 3.5mm coaxial digital cable. Single coax: tip: signal, sleeve: ground. Dual data coax: tip: signal 1, ring: signal 2 sleeve: ground (for use with Hugo M-Scaler)
B	USB-C input	Connect compatible digital devices using a USB-C cable for playback or charging (use with a charger capable of a 2 A minimum output)
C	Micro-USB input	Connect compatible digital devices using a Micro-USB cable for playback
D	Micro-USB charging input	Connect to power using the supplied Micro-USB cable (use with a charger capable of a 2 A minimum output)
E	Optical input	Connect compatible digital devices using an optical cable for playback
F	Charge status LED	Displays charge and battery status using a polychromatic scale (see section 6.2)
G	Menu	Press to cycle through the menu options
H	Volume down/menu '-'	Decrease volume or adjust the selected menu mode
I	Volume up/menu '+'	Increase volume or adjust the selected menu mode
J	Power button (Displays sample rate)	Press and hold to power on/off
K	Headphone output jack	3.5 mm headphone jack output (now independently controlled)
L	Headphone output jack	4.4 mm headphone jack output (now independently controlled)

5   Getting started

The Mojo 2 manual is divided into two key sections: basic operation and advanced operation. Basic operation (6.0) covers everything needed to get started and enjoy using Mojo 2. More advanced menu options are explained in 7.0.

6   Basic operation

6.1   Connecting to power

Mojo 2 can be used while constantly connected to power, or on the go, thanks to powerful, rechargeable batteries. A charger capable of outputting a minimum of 2 A (amps) is recommended for Mojo 2; please check your charger specifications. Connect the supplied cable to Mojo 2's Micro-USB charging input (see D, above) and then to a 5 V power source to begin charging. Alternatively connect a 5 V charger via USB-C.

6.2   **Battery status indicator**

With Mojo 2 connected to power, the charge status LED (see F, above) will pulse and show battery charge status using colour (see chart below); the charge status is also displayed when operating on battery power alone.

NOTE   A blue charge status LED indicates the maximum battery capacity range has been reached. If Mojo 2 is left constantly on charge, it will enter intelligent desktop mode to protect the battery from overcharging. This will be indicated by a purple power button.

Battery status	Battery charge
🔵	75 % to 100 %
🟢	40 % to 75 %
🟡	10 % to 40 %
🔴	2 % to 10 %
🔴 Flashing	0 to 2 %

6.3   **Depleted battery**

Following full depletion of the batteries, the charge status LED will flash red for ten seconds. If coupled with the device shutting down, a recharge is required. If the battery is completely depleted then Mojo 2 will need to be charged via the Micro USB port to restore the battery. Once the battery has enough power to activate the FPGA then charging can be continued via USB-C if desired to restore it.

If following a period of inactivity the device fails to power-on (suggesting a severely depleted battery) then the device needs to be recharged overnight, with the unit switched off.

6.4 **Connectivity: inputs**
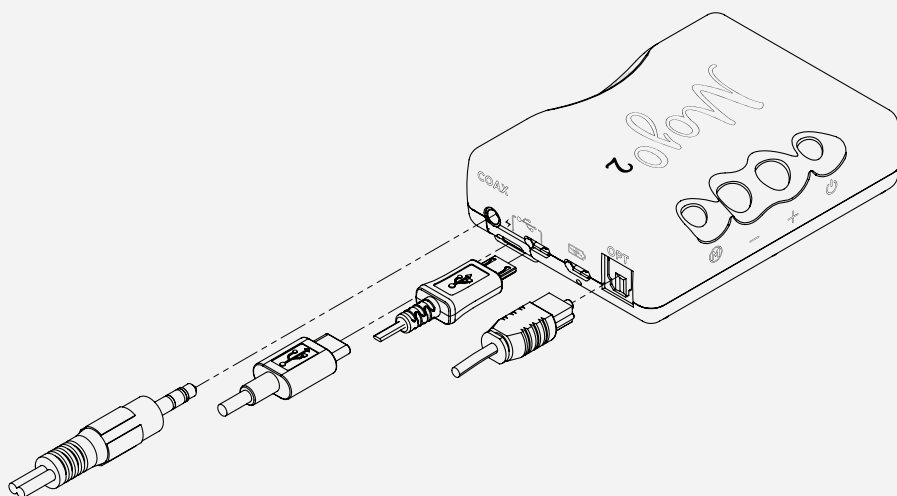
Connect compatible digital devices, including laptops, smartphones, tablets and more to Mojo 2's corresponding digital inputs. These include: 3.5 mm coaxial (single coax: tip: signal, sleeve: ground. Dual data coax [for use with Hugo M-Scaler]: tip: signal 1, ring: signal 2 sleeve: ground), USB-C, Micro-USB and optical inputs. If all four inputs are connected simultaneously, Mojo 2 will auto-select the correct input when music is played to the device. Mojo 2 will prioritise specific inputs if all four are connected simultaneously. USB has priority followed by coaxial and then optical. It is only possible to connect one USB at a time (Micro-USB takes priority over USB-C).

6.5   **Connectivity: outputs**
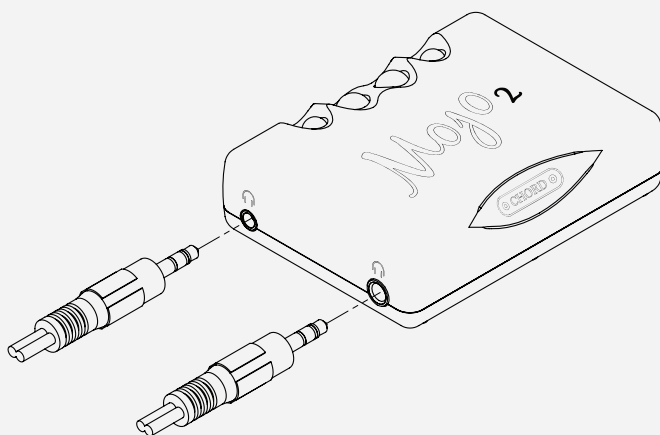
You can connect a 3.5 mm mini-jack headphone or a 4.4 mm headphone jack to Mojo 2 simultaneously. The device's volume control and DSP (see section 6.8) will adjust the outputs separately, priortising the 4.4 mm port.

6.6   **Powering on/off**

Press and hold the power button (see section 4) until it becomes illuminated, then release. Mojo 2 will perform a number of start-up checks indicated by the power button cycling through a range of colours. During this process, the menu button will also automatically cycle through its designated colours; any previously saved menu settings will be displayed using colour on the '+' and '- ' buttons (see section 7 for menu options and a full guide to colours). Mojo 2 is ready to use once the colours have stopped cycling. To power down, press and hold the power button until the lights are extinguished.

TIP Mojo 2 will auto-shutdown after 10 minutes without an input signal.

6.7   **Brightness adjustment**

Mojo 2 offers two levels of button brightness: normal and low. Normal is activated as standard, however, to alternate between low and normal brightness modes, press menu once (menu button will show blue) then '-' repeatedly to move between normal and low modes; any lit buttons will increase or decrease in brightness accordingly. Once chosen, the selection will be remembered and Mojo 2 will automatically exit the menu settings in 10 seconds. Alternatively, press and hold menu to exit the menu immediately.

6.8   **Volume adjustment**

Mojo 2 benefits from two main volume 'ranges': low and high, as indicated by the colour of the menu button: unlit (low); white (high). As the volume is changed, Mojo 2 moves automatically into the respective volume ranges; the menu button colour changes accordingly.

With chosen devices and headphones now connected (but not on/in ear), and Mojo 2 powered on, the volume can be reduced to zero using the volume down '-' controls until both volume buttons and menu button are unlit. From unlit, the volume can be slowly increased by pressing the volume up '+' button. Both buttons slowly change colour with changing volume level.

⚠ **Always set the volume level to zero before commencing initial playback and take precautions when using Mojo 2 in high volume mode to protect from hearing damage.**

⚠ **Both the 3.5 mm and 4.4 mm headphone outputs offer independent volume adjustment and memory when used individually. However, when both outputs are connected simultaneously, the 4.4 mm output takes priority and the Mojo 2 will apply the memorised 4.4 mm volume and DSP level to both outputs. Therefore, if using sensitive 3.5 mm headphones, it is strongly recommended that you unplug them before connecting a 4.4 mm set to avoid a potentially damaging volume spike. Once the 4.4 mm headphones are removed, the 3.5 mm output will automatically restore its own previous volume setting.**

7   Advanced operation

Mojo 2 benefits from a cutting-edge UHD DSP control which provides a number of advanced features, accessible via the menu button. Pressing the menu button sequentially, cycles through the various features explained in this section. Please note, each headphone port has it's own DSP memory that will be recalled dependent on the port in-use.

7.1   **Menu: button colour information**

The menu button changes colour as menu options are selected. The chart below provides a guide.

TIP Lift fingers between menu button presses to see the menu button colour and function selected.

Menu colour	Menu mode
	Volume range
	Brightness adjustment/Crossfeed mode
	Bass 20 Hz
	Bass 125 Hz shelf
	Treble 3 kHz shelf
	Treble 20 kHz
	Lock control
	USB-C charging on/off

7.2   **Menu: button colour information when charging**

Additionally, when Mojo 2 is switched off, the menu button displays a colour when charging to indicate charging current, indicated by the table below. Charging current status can give a useful indicator of the charger/charging quality available to Mojo 2 and/or battery health.

For example, a white menu button indicates the device is charging at maximum capacity. Green indicates charging is slow and can be improved with a different charger/cable. Red signifies insufficient current to charge.

Battery status	VBUS volts	Status
	-	Needs to re-charge overnight with Mojo 2 switched off
	4.01	Poor (please change the charger)
	4.37	Slow charging
	4.61	Intermediate charging
	>4.85	Maximum charging
	Desktop charging	Desktop mode

NOTE   Poly users (see section 8) will not achieve a white charge status whilst the devices are charging simultaneously.

TIP If the charging LED flashes red for ten seconds and the device shuts down, a recharge is required.

TIP If the device fails to power-on (possibly suggesting a severely depleted battery) then it needs to be recharged overnight, with the device switched off.

7.2.1 **Intelligent Desktop Mode**

Mojo 2 can be left connected to a power source at all times if desired. In this mode, when fully charged, Mojo 2's menu button and battery status light displays magenta, indicating the end of the charge cycle and the initiation of Intelligent Desktop Mode which regulates charging to preserve the battery.

7.3 **Mute**

Press '+' and '-' simultaneously to mute the device; Mojo 2's menu button will pulse. Press menu or '+/-' together again to exit mute.

7.4 **Menu: USB-C charging**

To charge the Mojo 2 via USB-C press the Menu button until the orange light shows. When the + and - buttons show green, Mojo 2 is in USB-C charging mode. When the + and - buttons show red, USB-C charging is off. Press either the + or - buttons to switch mode.

If USB-C charging is disabled in the Mojo 2 settings but the device continues to be used via USB-C, charging will automatically resume once the battery level drops below 2% and the battery indicator flashes red. This prevents the Mojo 2 from shutting down. When the battery has gained sufficient charge, the unit will automatically return to the charge off setting. If this happens, it's recommended to connect the Mojo 2 to a dedicated charger before continuing playback (remembering to turn on USB-C charging mode).

7.5 **Menu: equalisation**

Mojo 2 offers comprehensive equalisation adjustment (tone controls) to suit a wide range of partnering equipment and digital file formats. There are four main equalisation modes which can be altered from the factory setting (flat) if desired: lower bass; mid-bass; lower treble and high treble.

For each of the four equalisation modes, there are nine positive (lift) and nine negative (cut) 1 dB adjustment steps (18 in total) available.

To access the equalisation modes, press menu twice until the button displays red: this indicates the first of the four equalisation options: lower bass adjustment. From here, further menu presses cycle through the remaining three modes: yellow: mid-bass; green: lower treble; blue: upper treble and then through the remainder of the menu.

Once the desired equalisation mode has been selected as indicated by the menu button colour, press the volume up '+' OR down '-' buttons sequentially to move through the range of adjustment: up '+' providing 'lift', down '-' providing 'cut'. The respective volume buttons change colour to indicate the chosen level. The chart below shows each of the 18 available adjustment levels for each of the four equalisation modes.

Adjustments will be automatically saved to the headphone port in use. Pressing menu again will move to the next equalisation mode.

NOTE If the buttons remain untouched for 10 seconds when in menu mode, Mojo 2 will automatically revert back to playback mode. Alternatively, press and hold menu to exit the menu immediately.

TIP Referring to the chart below, unlit or grey represents the volume up '+' or down '-' button/s as unlit. If both buttons are unlit, the factory setting (0 dB 'flat') is selected.

Tone settings	-	+
+9 dB	⚪	⚪
+8 dB	⚪	🟣
+7 dB	⚪	🔵
+6 dB	⚪	🔵
+5 dB	⚪	🟢
+4 dB	⚪	🟡

+3 dB		
+2 dB		
+1 dB		
0 dB		
-1 dB		
-2 dB		
-3 dB		
-4 dB		
-5 dB		
-6 dB		
-7 dB		
-8 dB		
-9 dB		

NOTE The following three graphs are simplified for illustrative purposes and should in no way be interpreted as a exact representation of the subject matter.

Please see the next page for examples of the DSP equalisation.

These four graphs below show Mojo2s four DSP equalisation modes, they affect frequency response, providing either lift or cut to the bass and treble across the four main ranges of adjustability: red: lower bass; yellow: mid-bass; green: lower treble and blue: upper treble.

The shape of the coloured areas demonstrate how the DSP lift and cut ('shelf' controls) affect the range of frequencies within each of the four main groupings. The lift/cut effect either tapers off (with bass) or swells (with treble), when moving through the frequency range.

Graph 1
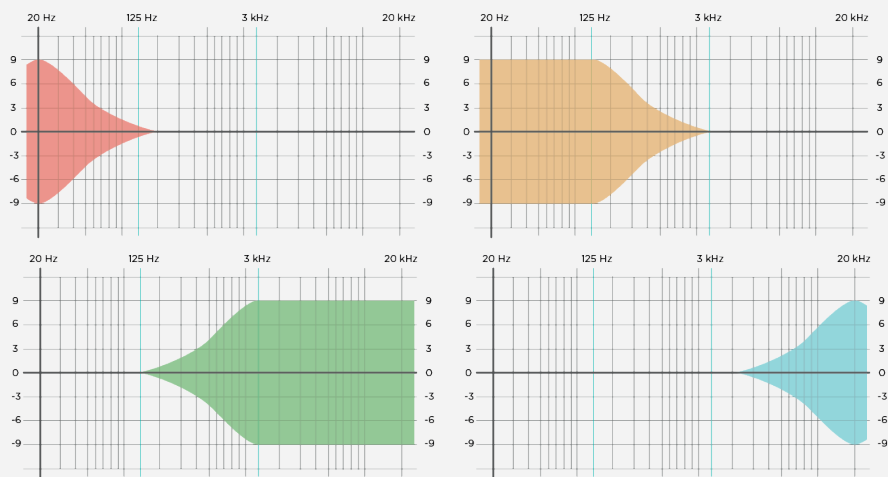
All headphones will have their own frequency response curve, deviating from the ideal. The website RTINGs. com (https://www.rtings.com/headphones/1-4/graph/) lists the frequency response curves of many popular headphones and can be used as a guide for experimentation with Mojo 2's DSP feature. DSP can be used to flatten the response curve for a more neutral sound.

The dotted line seen in Graph 2 shows a frequency response curve: a wavy line with peaks and troughs, that has been altered by Mojo 2's DSP.

The four colours show how the DSP's equalisation tone controls have been used to change the summed output (dotted line). The bass and mid bass have been boosted, the low mid has been reduced, and the treble has been boosted, changing the frequency response (tone) of the device.
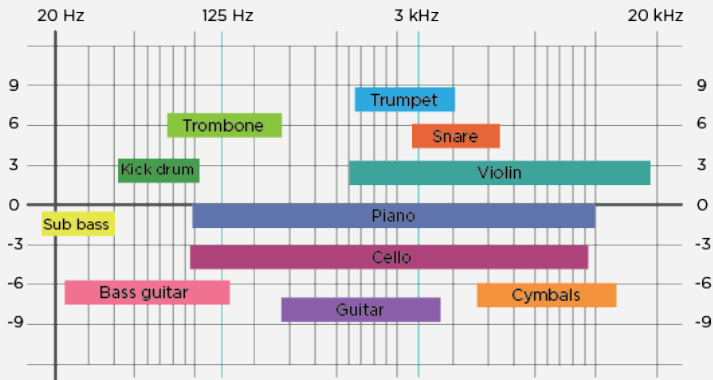
Graph 2
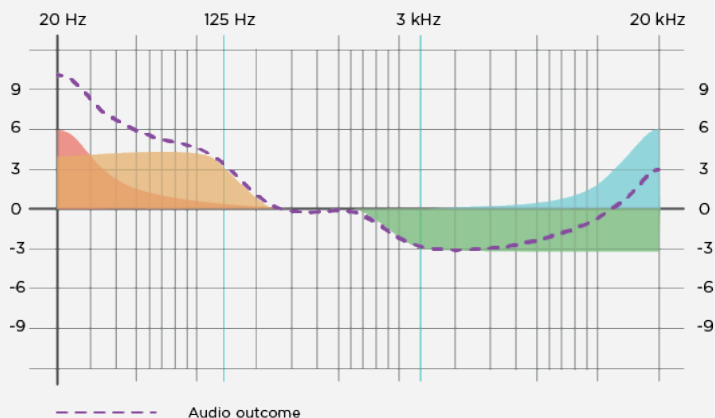
Graph 3 overlays common musical instruments on the frequency spectrum, in a very broad sense, demonstrating how the prominence of instruments might be affected when making adjustments using the DSP tone controls. It is not definitive and is a guide for experimentation only.

Graph 3

7.5 Menu: crossfeed

Mojo 2 offers three levels of crossfeed to improve spatial effects for a more 'speaker-like' sound-stage when using headphones. Each headphone port will remeber its own crossfeed setting. Press menu once (menu button will show blue), then press the volume up '+' button to cycle between the four available options: red: minimum; green: moderate; blue: maximum; unlit (crossfeed off). Once chosen, the selection will be remembered and Mojo 2 will automatically exit the menu setting in approximately 10 seconds. Alternatively, press and hold menu to exit the menu immediately.

NOTE When changing crossfeed, the '-' button also illuminates to show the button brightness level (white: normal; unlit: low) as per section 6.7.

7.6   **Lockdown mode**

Mojo 2 benefits from a button-lock option where all controls can be disabled for travel use. To activate button lock, press the menu button six times until magenta is displayed, then simultaneously press both the volume up '+' and volume down buttons '-' once, until all three Mojo 2 buttons display magenta; the controls are now disabled. After two seconds, the volume buttons will revert to displaying the set output volume once again, however, the menu button will continue to display magenta to indicate button-lock mode is active.

With button-lock mode activated, a single press of the (magenta) menu button will immediately return to the button-lock menu. From here, simultaneously press both volume up '+' and volume down buttons '-' once to unlock the buttons (indicated by the volume buttons returning to unlit) and press menu again to exit button-lock mode and proceed through the menu.

**NOTE**   When in button-lock mode, the power button is temporarily disabled, however, the auto power-shutdown feature is still functional.

7.7   **Restore factory settings**

Mojo 2 features a factory reset mode that restores the device to the original factory settings: DSP flat and Crossfeed off. To reset the device, press both the '+' and '-' simultaneously from either the DSP menu mode, or the Crossfeed menu mode.

7.8   **Power button sample rate information**

Mojo 2 is capable of playing files up to 768 kHz 32- bit and DSD 256. This is indicated by the following colours on the power button when music is playing.

Sample rate	Power button colour
44.1 kHz	
48 kHz	
88.2 kHz	
96 kHz	
176.4 kHz	
192 kHz	
352.8 kHz	
384 kHz	
705.6 kHz	
768 kHz	
DSD	

8   Adding wireless streaming with Poly

Mojo 2 is compatible with Chord Electronics' Poly streamer/server (available separately) which adds a world of wireless music streaming, network audio compatibility and SD card library playback. Contact a Chord Electronics retailer for more information or find full details on the Chord Electronics website. Existing Poly owners should refer to the supplied Poly manual (also available on the Chord Electronics website) in order to use Poly with Mojo 2.

NOTE   Poly must be updated to at least version 3.0 firmware to function with Mojo 2.

9   Technical specifications

Please refer to www.chordelectronics.co.uk for the most recent specifications.

Dimensions	83 mm x 62 mm x 22.9 mm
Weight Mojo 2	185 g
Weight Mojo 2 + Poly	270 g
Battery life	8 hours (approximately)
Operating voltage	5 V DC
Charging current	2 A
Output power @ 1 kHz/300 Ω	90 mW
Output power @ 1 kHz/30 Ω	600 mW
Output impedance	0.06 Ω
Dynamic range	125 dB
THD @ 2.5 V/300 Ω	0.0003 %

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