Mad Catz C.T.R.L.^{R} Mobile Gamepad
Including M.O.J.O. app requirements
Developer Information

Version 1.6

Contents

1. Introduction

This document is intended to assist in the implementation of HID controller support into Android OS games, using the Mad Catz C.T.R.L.^{R} Mobile gamepad as a reference. It is intended to provide basic technical information on the controller to assist game developers to ensure that the controller and its mappings are correctly implemented and supported in games.

Mad Catz would like Android game developers to support HID game interactions at an open level. By this, we mean that any HID gamepad should be supported in an Android game. Certain gamepad pre-sets can and should be implemented, but ultimately, gamers should have the freedom to load a game and configure their pad just the way they want, from within the game.

There are two types of C.T.R.L.^{R}. The version supplied with the M.O.J.O console (silver media buttons) is built on a Bluetooth Smart chip. Bluetooth Smart delivers longer battery life and lower latency over existing Bluetooth products. As a result, the pad will only connect to Bluetooth Smart compatible hosts via the HID Over GATT (HOGP) profile. A USB dongle is supplied with this version to enable compatibility with devices that do not support HOGP.

The second version is a Dual Bluetooth variant. It can work with M.O.J.O. but it also targeted at other mobile gaming devices such as smartphones and tablets. It is capable of HOGP connection, but will also work on existing or 'classic' Bluetooth devices.

Both pads have the exact same HID button mappings in all three modes, and both are powered by 2 x AAA batteries.

Both gamepads have the following features:
- Press Home button for 3 seconds to power on/off.
- Press Start button for 5 seconds to clear pairing/enter pairing mode.
- 3 HID Modes selected by slide switch on front of pad.
    - GameSmart Mode – Used for gaming and basic navigation in Android.
    - Mouse Mode – Essential for initial M.O.J.O. setup, virtual keyboard input, browsing and playing touch based games.
    - PC Mode – Gamepad mappings for PC and compatible with programming software (Windows).
- 8 Gaming Buttons
- 2 Analog sticks
- 2 Analog Triggers (Digital Buttons in PC Mode)
- 3 menu buttons (Back, Start, Home)
- 8 way DPAD
- 5 Media keys
- LED Status
    - Discovery/Pairing Mode = Blinking Red to Blue.
    - Blue = Connected. Red = Low Battery

2. Installation

2.1. Mad Catz C.T.R.L.ᴿ (Smart) – Bluetooth Low Energy Chip, USB Nano Dongle, Supplied with M.O.J.O. micro console.

As most current platforms do not support Bluetooth Smart, we have provided a USB nano dongle. This needs to be used with a USB adapter cable on devices without full sized USB ports.

To connect the pad to an Android device:
1. Plug in the dongle.
2. Press and hold the Home Button for 3 seconds to power the pad on.
3. The Home LED will blink blue to red whilst the pad searches for a host.
4. The Home LED will shine blue once a host has been found and a connection has been established.

Now press the DPAD or left analog stick to navigate the icons on the Android device.

Troubleshooting
If the pad does not connect try the following:
1. Replug the dongle into the host device.
2. Press and hold the start button for 5 seconds until the Home LED shines purple. This will clear the pairing information on the pad and it will try to establish a new connection with an available host (dongle or Bluetooth Smart host).

Note! The Bluetooth Smart pad can only store one paired device in its memory. For example, if the pad is paired with the dongle, it will always attempt to connect to it, even if the dongle is not plugged in. If you want to connect directly to a BTLE host (such as Windows 8 tablet):

1. Unplug the dongle.
2. Press and hold the start button for 5 seconds until the Home LED shines purple.
3. Put the Bluetooth Smart host into search mode.
4. Select the pad when it appears in the device list.

Recalibrating the pad:

1. If the pad is on, press and hold the home button for 5 seconds until the pad powers down.
2. Press and hold all four face button down at once, then power the pad on.
3. The Home LED will shine purple, when it does press the Select button on the pad.
4. The Home LED will blink purple. When it does, move both analogue sticks and both triggers through their full range of movement four times.
5. Press the Start button and the pad will continue to pair to its host.

2.2. Mad Catz C.T.R.L.^{R} (Dual) – Dual band Bluetooth chip (Classic and Low Energy connections), standalone pad for M.O.J.O. and smart devices.

This version of the HDK requires 2 x AAA batteries and can to connect to Bluetooth Classic hosts. In classic mode the pad used the HID over Bluetooth profile to handle gamepad controls.

Bluetooth Classic Connection will require Bluetooth 2.1+ and later.

To connect the pad to an Android device:

STEP 1 — EN Turn Bluetooth on and search for devices

STEP 2 — EN Press and hold for 5 seconds

STEP 3 — EN Select the gamepad from the list
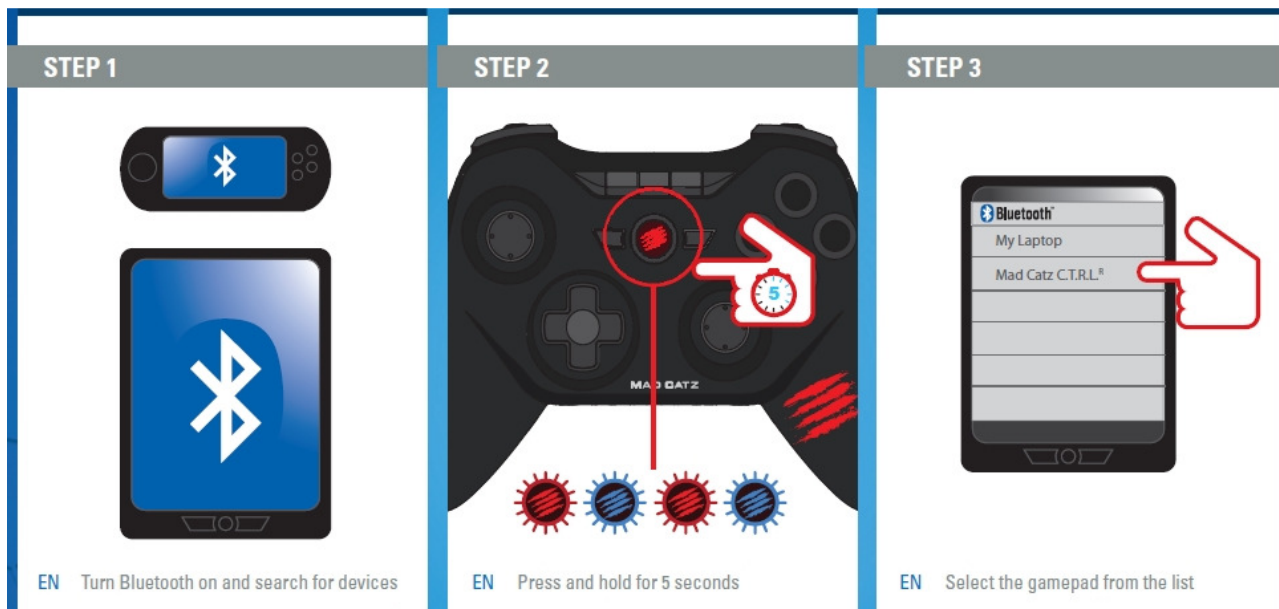
1. Switch the pad to Android Mode.
2. Press and hold the Home Button for 3 seconds to power the pad on.
3. The Home LED will blink blue to red whilst the pad searches for a host.
4. Enable Bluetooth on the host and search for devices.
5. Tap the Mad Catz C.T.R.L.R entry to connect the pad.

Now press the DPAD or left analog stick to navigate the icons on the Android device.

Additional setup information:

LED INDICATOR

SOLID PURPLE	Product is connecting to a device
BLINKING BLUE	Product is connected to a device
BLINKING RED	Product is connected to a device but battery is low
SOLID RED	Pairing Info is removed

BLINKING BLUE TO RED — Product is ON and not connected to a device

CONNECTING VIA BLUETOOTH

1. Press and hold the "Home" button on the controller until its LED blinks blue and red
2. Make sure Bluetooth is enabled on your phone, tablet or computer
3. Select 'search for devices' on your device
4. Choose "Mad Catz C.T.R.L.R" under the Device List to connect
5. Once connected, the LED indicator will blink blue. The controller is ready to use

UNPAIRING THE DEVICE

1. Press and hold the "Start" button for five (5) seconds until the LED shines red. The LED will then blink blue and red indicating paired info is removed and the controller is back in discovery mode
2. Go into Bluetooth Settings, select "Mad Catz C.T.R.L.R" and choose to "Forget the Device"

TURNING THE DEVICE ON/OFF

1. Press and hold the 'Home' button on the controller for 5 seconds.

3. Functionality

When the pad is paired to the Android device, you will be able to use the DPAD and Left analogue stick to navigate the Android OS. Use A to select an item, use buttons B and Back to act as a back button. The Home button will take you back to the main menu.

The Mode switch on the front of the pad will allow you to access different functions. GameSmart is tailored for Android, with HID mappings that follow the Nvidia Tegra standard. Mouse Mode can work on both Android and PC platforms. It incorporates mouse cursor, scroll and button control. Mouse mode is ideal for browsing, and playing Android games that only have touch input support. PC Mode is tailored for Windows operating systems and follows established Direct Input button mappings. In PC Mode, you can either setup the pad directly in games that support Direct Input gamepads, or you can configure profiles for the pad using our A.P.P. programming software.

The Media Buttons are HID consumer buttons and work the same across all three modes. These buttons are compatible on both Android and Windows based platforms.

3.1 Gamepad Mappings

This section will outline the button mappings assigned to each of the three pad modes. The chart shows how each control function on the device will report. These reports are divided between raw firmware and HID numberings, and then what these outputs will report to the Android OS. Firmware readings are taken from HID Usage tables.

GameSmart Mode: Assignments

	Firmware Report	Expected Result
A	0x90001	Scancode: (304) Keycode: KEYCODE_BUTTON_A (96)
B	0x90002	Scancode: (305) Keycode: KEYCODE_BUTTON_B (97)
X	0x90004	Scancode: (307) Keycode: KEYCODE_BUTTON_X (99)
Y	0x90005	Scancode: (308) Keycode: KEYCODE_BUTTON_Y (100)
L1	0x90007	Scancode: (310) Keycode: KEYCODE_BUTTON_L1 (102)
R1	0x90008	Scancode: (311) Keycode: KEYCODE_BUTTON_R1 (103)
L2	Brake 0x200c5	AXIS_BRAKE 0 to 1.0
R2	Accelerator 0x200c4	AXIS_GAS 0 to 1.0
L3	0x9000e	Scancode: (317) Keycode: KEYCODE_BUTTON_THUMBL (106)
R3	0x9000f	Scancode: (318) Keycode: KEYCODE_BUTTON_THUMBR (107)
Home	0xc0223	Keycode: KEYCODE_HOME
Back	0xc0224	Scancode: (158) Keycode: KEYCODE_BACK (4)
Start	0x9000c	Scancode: (315) Keycode: KEYCODE_BUTTON_START (108)
Left Stick - Left to Right	X Axis 0x10030 (0-65535)	AXIS_X (-1.0 to 1.0)
Left Stick - Up to Down	Y Axis 0x10039 (0-65535)	AXIS_Y (-1.0 to 1.0)
Right Stick - Left to Right	Z Axis 0x10032 (0-65535)	AXIS_Z (-1.0 to 1.0)
Right Stick - Up to Down	Rz Axis 0x10035 (0-65535)	AXIS_RZ (-1.0 to 1.0)
DPAD - UP	POV 0x10039 0x1	AXIS_HAT_Y -1.0
DPAD - DOWN	POV 0x10039 0x5	AXIS_HAT_Y 1.0
DPAD - LEFT	POV 0x10039 0x7	AXIS_HAT_X -1.0
DPAD - RIGHT	POV 0x10039 0x3	AXIS_HAT_X 1.0
Volume -	0x09, 0xea	Scancode: (114) Keycode: KEYCODE_VOLUME_DOWN (25)

Previous Track	0x09, 0xb6	Scancode: (165) Keycode: KEYCODE_MEDIA_PREVIOUS (88)
Play/Pause	0x09, 0xcd	Scancode: (164) Keycode: KEYCODE_MEDIA_PLAY_PAUSE (85)
Next Track	0x09, 0xb5	Scancode: (163) Keycode: KEYCODE_MEDIA_NEXT (87)
Volume +	0x09, 0xe9	Scancode: (115) Keycode: KEYCODE_VOLUME_UP (24)

Mouse Mode: Assignments

	Firmware Report	**Expected Result**
A	Mouse: 0	Mouse: Left Click
B	Mouse: 1	Mouse: Right Click
X	Mouse: 2	Mouse: Middle Click
Y	n/a	n/a
L1	Mouse: 0	Mouse: Left Click
R1	Mouse: 1	Mouse: Right Click

Button	Value 1	Value 2
L2	n/a	n/a
R2	n/a	n/a
L3	n/a	n/a
R3	n/a	n/a
Home	0xc0223	Keycode: KEYCODE_HOME
Back	0xc0224	Scancode: (158) Keycode: KEYCODE_BACK (4)
Start	0x9000c	Scancode: (315) Keycode: KEYCODE_BUTTON_START (108)
Left Stick - Left to Right	Mouse: X Axis	Mouse: X Axis
Left Stick - Up to Down	Mouse: Y Axis	Mouse: Y Axis
Right Stick - Left to Right	n/a	n/a
Right Stick - Up to Down	Mouse: Scroll (120/-120)	Mouse: Scroll Up/Down
DPAD - UP	Menu Up (Consumer Button)	Scancode: (103) Keycode: KEYCODE_DPAD_UP (19)
DPAD - DOWN	Menu Down (Consumer Button)	Scancode: (108) Keycode: KEYCODE_DPAD_DOWN (20)
DPAD - LEFT	Menu Left (Consumer Button)	Scancode: (105) Keycode: KEYCODE_DPAD_DOWN (21)
DPAD - RIGHT	Menu Right (Consumer Button)	Scancode: (106) Keycode: KEYCODE_DPAD_DOWN (22)
Volume -	0x09, 0xea	Scancode: (114) Keycode: KEYCODE_VOLUME_DOWN (25)
Previous Track	0x09, 0xb6	Scancode: (165) Keycode: KEYCODE_MEDIA_PREVIOUS (88)
Play/Pause	0x09, 0xcd	Scancode: (164) Keycode: KEYCODE_MEDIA_PLAY_PAUSE (85)
Next Track	0x09, 0xb5	Scancode: (163) Keycode: KEYCODE_MEDIA_NEXT (87)
Volume +	0x09, 0xe9	Scancode: (115) Keycode: KEYCODE_VOLUME_UP (24)

🖥 PC Mode: Assignments

	Firmware Report	Expected Result
A	1	2
B	2	3
X	0	1
Y	3	4
L1	4	5
R1	5	6
L2	6	7
R2	7	8
L3	10	11
R3	11	12
Home	12	13
Back	8	9
Start	9	10
Left Stick - Left to Right	X Axis (0-65535)	X Axis (0-65535)
Left Stick - Up to Down	Y Axis (0-65535)	Y Axis (0-65535)
Right Stick - Left to Right	Z Axis (0-65535)	Z Axis (0-65535)
Right Stick - Up to Down	Rz Axis (0-65535)	Rz Axis (0-65535)
DPAD - UP	POV: 0 -1 -1 -1	POV: 0 -1 -1 -1
DPAD - DOWN	POV: 18000 -1 -1 -1	POV: 18000 -1 -1 -1

DPAD - LEFT	POV: 27000 -1 -1 -1	POV: 27000 -1 -1 -1
DPAD - RIGHT	POV: 9000 -1 -1 -1	POV: 9000 -1 -1 -1
Volume -	0x09, 0xea	Decrease System Volume
Previous Track	0x09, 0xb6	Skip to previous media file
Play/Pause	0x09, 0xcd	Play/Pause current media file
Next Track	0x09, 0xb5	Skip to next media file
Volume +	0x09, 0xe9	Increase System Volume

3.2 Product Descriptor

The product descriptor information includes the name of the product, as the host device will see it, and the unique identifications codes assigned to a peripheral device.

M.O.J.O Pad
Device Name: Mad Catz C.T.R.L.R (Smart)
Vendor ID (Mad Catz): 0x0738
Product ID: 0x5263

Standalone Pad
Device Name: Mad Catz C.T.R.L.R
Vendor ID (Mad Catz): 0x0738
Product ID: 0x5266

3.3 Specific APP Adjustments for the M.O.J.O. Micro Console

In order for your game to be compatible with M.O.J.O., a slight tweak is required in the feature report of the app.

The app must not have a requirement for a touch-screen device in order to function. Any touch based features would still work in your app. The tweak will make sure that your app can be downloaded and used on the console via Google Play.

The code that will need to be altered is:

```
<uses-feature
  android:name="android.hardware.touchscreen"
  android:required="false"/>
```

For more information please visit this link:

http://developer.android.com/guide/topics/manifest/uses-feature-element.html

The hardware configurations that M.O.J.O. does not support are the following:

Camera
Microphone
Screen.portrait
Sensor
Touchscreen
NFC
GPS

Clearly if your app relies on any of those features then it may not be possible for it to be compatible with M.O.J.O. but both Sensor and GPS are features that can be covered by alternative means on M.O.J.O. (Network discovery of location covers a lack of GPS hardware – correctly implemented gamepad controls in an app can replace a sensor).

4. Useful Links

For more detailed information on adding gamepad support to Android games, please visit the NVIDIA Tegra Developers Zone.
http://docs.nvidia.com/tegra/index.html#AN_GC_Supporting_Android_Game_Controllers.html

For links to Mad Catz GameSmart development, please visit the Mad Catz site.
http://www.madcatz.com/products/gamesmart/hdk/index.html