

Just Add Power



2G+ ADVANCED FEATURES

Revised 2014-01-02



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Physical Connections and Buttons

Case Front and Back

2G+ Transmitters and Receivers have additional ports that are not present on standard 2G devices. The added features in 2G+ can be used individually, or combined, to satisfy the various needs of different installations.

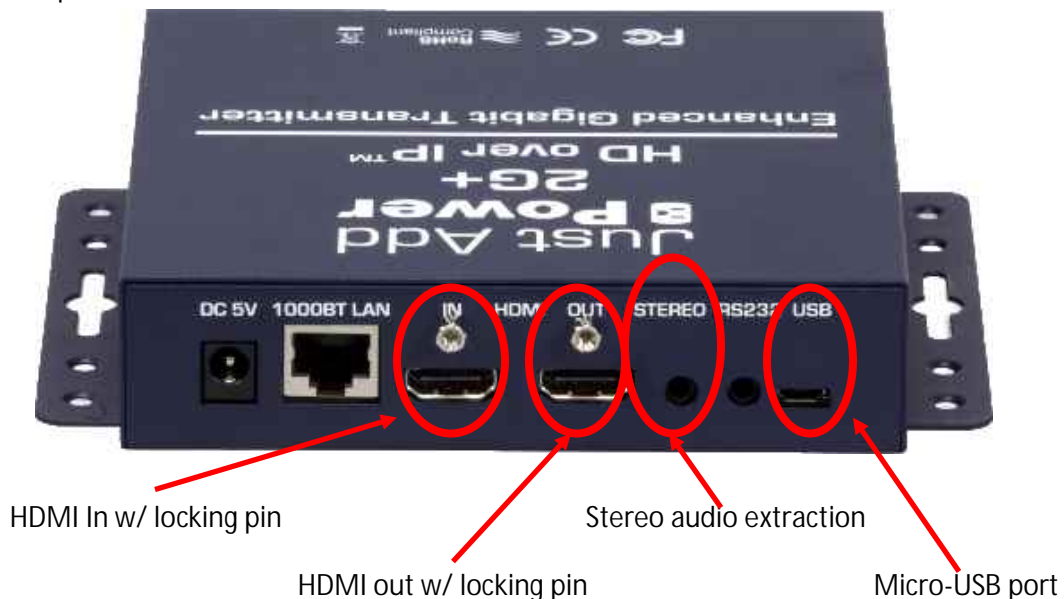
2G+ Receiver ports:

- 2x USB 2.0 ports on front
- 1x Link USB button on front
- 1x HDMI Out locking pin on back
- 1x Stereo audio extraction port on back



2G+ Transmitter ports:

- 1x HDMI In locking pin on back
- 1x HDMI Out port with locking pin for HDMI pass-through on back
- 1x Stereo audio extraction port on back
- 1x Micro-USB port on back

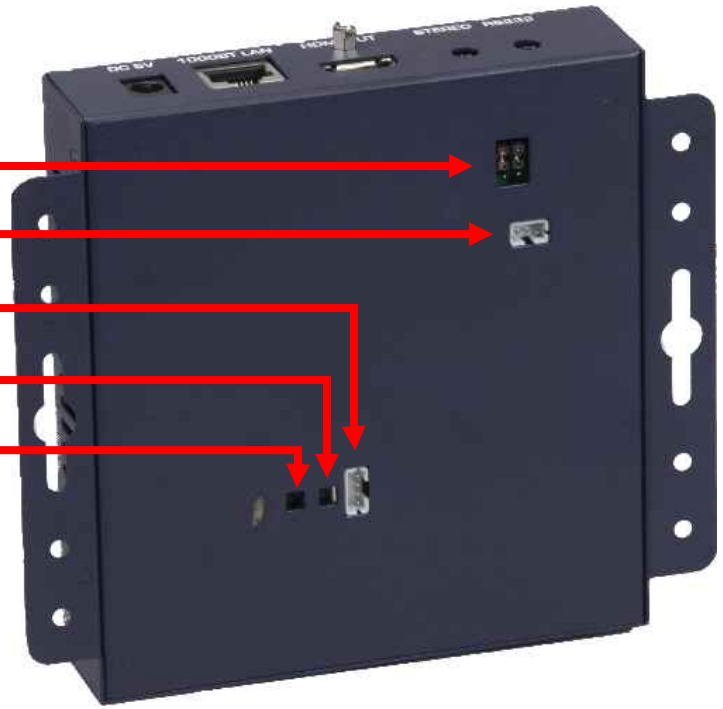


Case Bottom

2G+ Transmitters and Receivers cases also have connectors and buttons on the bottom:

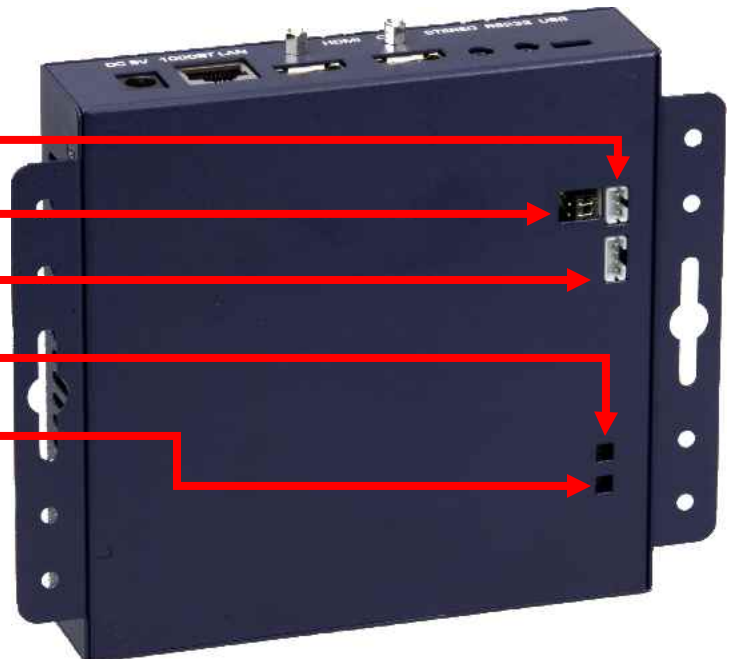
2G+ Receiver

- Null Modem jumper for RS232 port
- JAP console access port (3-pin molex)
- CEC CPU firmware update port (4-pin molex)
- Audio Delay INCREASE button
- Audio Delay DECREASE button



2G+ Transmitter

- JAP console access port (3-pin molex)
- Null Modem jumper for RS232 port
- CEC CPU firmware update port (4-pin molex)
- Audio Delay DECREASE button
- Audio Delay INCREASE button

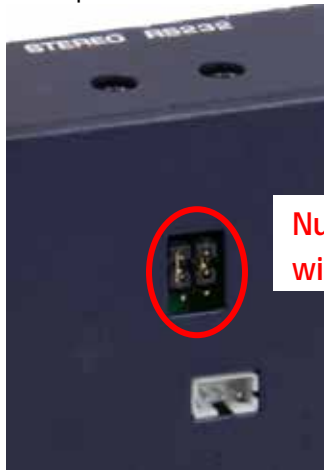


RS232 Pinout

The 3.5mm RS232 connection on the back of Just Add Power devices can be used for serial control of endpoints in the distribution system. The 3.5mm RS232 connection **DOES NOT** give access to the command line of the device. For command line access, you must use the 3-pin molex connector.

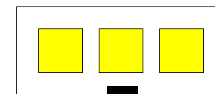
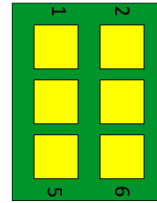
2G+ Receiver

The pinout needed depends on the location of the null modem jumpers on the bottom of the devices.



Null Modem with Jumper

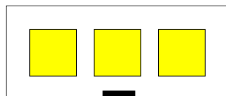
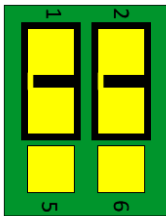
Null Modem (no Jumper)



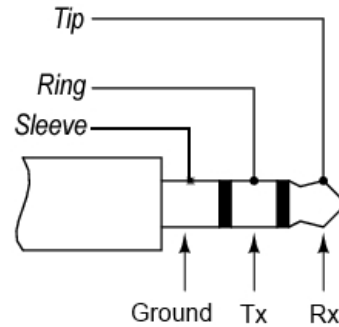
3-pin Molex

When the jumpers are on the top pins, the pinout is:

Null Modem Jumper



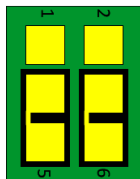
3-pin Molex



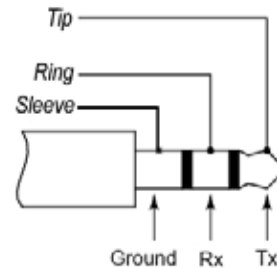
Normal Stereo Plug

When the jumpers are on the bottom pins, the pinout is:

Null Modem Jumper



3-pin Molex



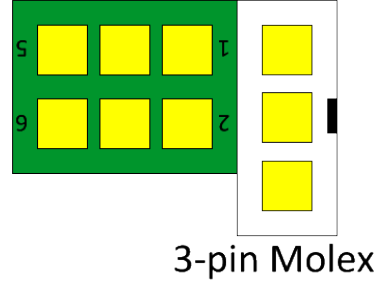
Normal Stereo Plug

2G+ Transmitter

The pinout needed depends on the location of the null modem jumpers on the bottom of the devices.

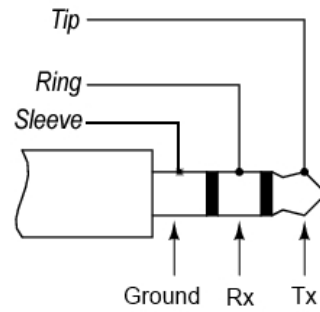
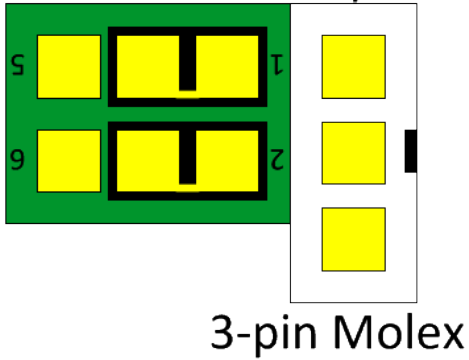


Null Modem (no Jumper)



When the jumpers are on the right pins, the pinout is:

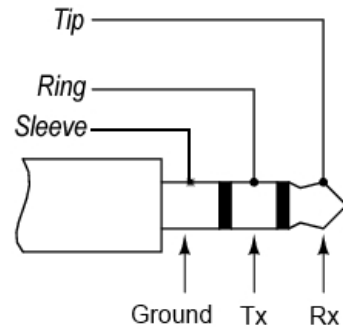
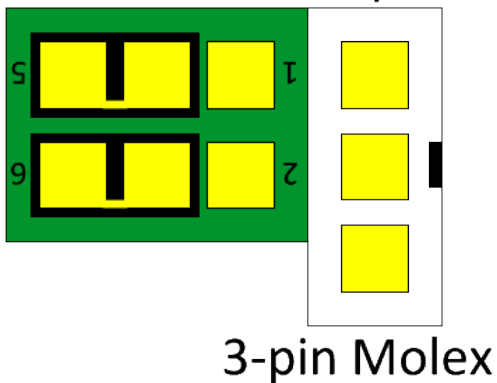
Null Modem Jumper



Normal Stereo Plug

When the jumpers are on the left pins, the pinout is:

Null Modem Jumper



Normal Stereo Plug

Managing Audio Delay

- Audio delay affects **ONLY** the Stereo mini-plug on the back of Just Add Power 2G+ Receivers and Transmitters
- Audio delay can be set in 6-8 ms increments, up to a maximum of 170ms
- Audio can only be extracted if it is in a 2-channel audio format. The Stereo mini-plug **WILL NOT FUNCTION** in multi-channel audio formats.
- There are 2 methods for configuring audio delay: physical buttons and console commands.



Audio Delay Physical Buttons

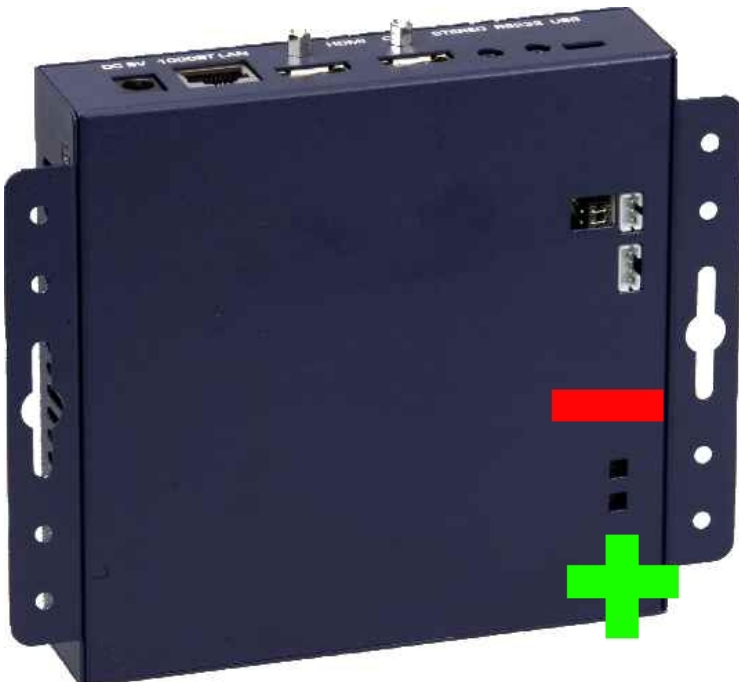
On the bottom of all 2G+ devices are 2 buttons that control the audio delay of the Stereo mini-plug. These buttons can be used to lip-sync the HDMI video with extracted audio.

Buttons increase/decrease the audio delay of the Stereo mini-plug.





2G+ Receiver

	Increase Audio Delay
	Decrease Audio Delay



2G+ Transmitter

	Increase Audio Delay
	Decrease Audio Delay

Audio Delay Console Commands

There are 2 ways to access the console of the 2G+ Just Add Power devices:

- 1) Connect to the 3-pin mox connector on the bottom of the devices with a debug cable. Set the baud rate to 115200-8n1 on a terminal emulator program (PuTTY for example).

Note: If you get a blank screen after connecting then you most likely need a Null Modem.

- 2) Find the IP address with Bonjour Browser (or another similar program) and telnet to the device through the switch.

All commands are entered from the "usr/local/bin #" prompt. This is the default active prompt when connecting with a telnet session or a console cable.

Audio delay values on the console are represented by values that do not correspond to the actual time delay. See the table below for conversions.

Value	Delay (ms)	Value	Delay (ms)	Value	Delay (ms)
1	6	10	67	19	129
2	13	11	74	20	135
3	20	12	82	21	142
4	27	13	88	22	149
5	33	14	95	23	156
6	40	15	101	24	163
7	47	16	108	25	170
8	54	17	115		
9	61	18	122		

Commands must be entered as shown, in **CAPITAL LETTERS**.

Command	Description	Variable	Example
AUD_DLY_SLOW [VALUE]	Increase the audio delay value. Increases by 1 if value not given.	[VALUE]: range of 0-25	Increase audio delay by 5 units: >AUD_DLY_SLOW 5
AUD_DLY_FAST [VALUE]	Decrease the audio delay value. Decreases by 1 if value not given.	[VALUE]: range of 0-25	Reduce audio delay by 5 units: >AUD_DLY_FAST 5
AUD_DLY_SET_VALUE [VALUE]	Set audio delay value directly	[VALUE]:range of 0-25	Set current value to 5: >AUD_DLY_SET_VALUE 5
AUD_DLY_SAVE_VAL	Save current value to flash on board	None	Occurs automatically when pressing manual audio delay buttons
AUD_DLY_RESTORE_VAL	Restores last saved value	None	Occurs automatically when system is rebooted
AUD_DLY_READ_CURRENT	Display current audio delay value	None	If delay is currently set to 15: >AUD_DLY_READ_CURRENT >15

CEC Control

Once the CEC board has been loaded with the CEC firmware, there are several commands that may be entered into the console of the Just Add Power device to send CEC commands.

Pre-Programmed Commands

Command	Function
<code>cec_tv_on.sh</code>	Turns television on
<code>cec_tv_off.sh</code>	Turns television off
<code>cec_audio_on.sh</code>	Disables mute function
<code>cec_audio_off.sh</code>	Enables mute function
<code>cec_watch_me.sh</code>	Changes HDMI input to the connected device
<code>CEC_SEND_BYTES</code>	Sends a specific set of CEC hex values. See below for more detail.

CEC_SEND_BYTES

The “Send Bytes” command has the ability to send multiple hex commands that can be modified to communicate with the attached device. With a list of the correct CEC commands, `CEC_SEND_BYTES` can be used to perform any function possible with CEC.

The general format of the command is:

```
CEC_SEND_BYTES aa bb cc dd
```

Where aa, bb, cc, and dd are 2 hex values (from 0-f). Multiple commands can be strung together to perform more than 1 operation at once.

Shell Commands

All of the `.sh` (SHELL) commands perform the same function as the `CEC_SEND_BYTES` command, but with set hex values being sent every time. The SHELL commands are modeled after what we have found to be the most common codes among devices. If they do not work, then it is likely that the attached device does not respond to the pre-programmed hex codes being used in the SHELL commands. In that case, it will be necessary to discover the proper hex codes and use the `CEC_SEND_BYTES` command instead.

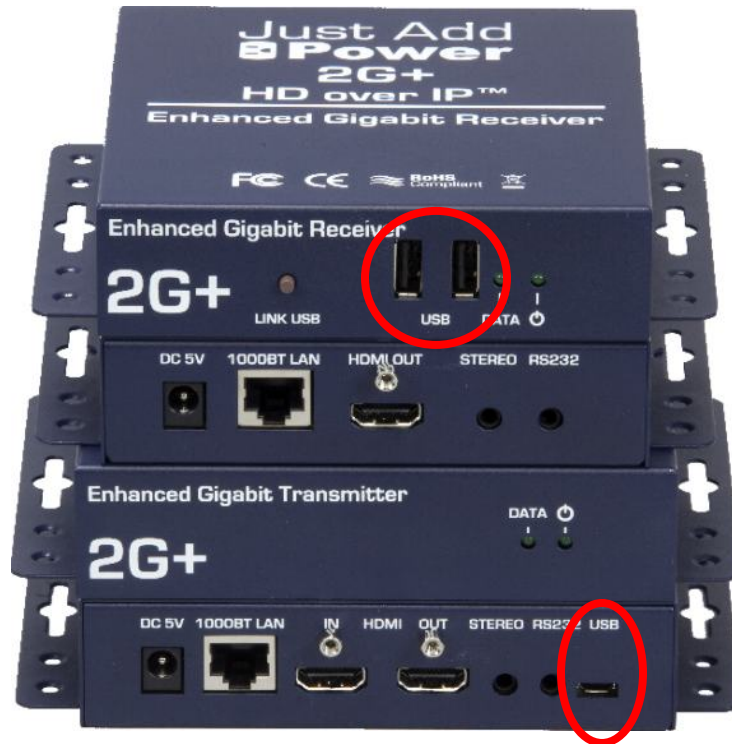
SHELL Command	CEC_SEND_BYTES Equivalent
<code>cec_tv_on.sh</code>	<code>CEC_SEND_BYTES e0 04</code>
<code>cec_tv_off.sh</code>	<code>CEC_SEND_BYTES e0 36</code>
<code>cec_audio_on.sh</code>	<code>CEC_SEND_BYTES e0 72 00</code>
<code>cec_audio_off.sh</code>	<code>CEC_SEND_BYTES e0 72 01</code>
<code>cec_watch_me.sh</code>	<code>CEC_SEND_BYTES ef 82 10 00</code>

CEC-o-Matic

There is an excellent bank of commands made available by Kwikwai that can be used to discover viable CEC commands. Go to www.cec-o-matic.com to begin.

USB over IP

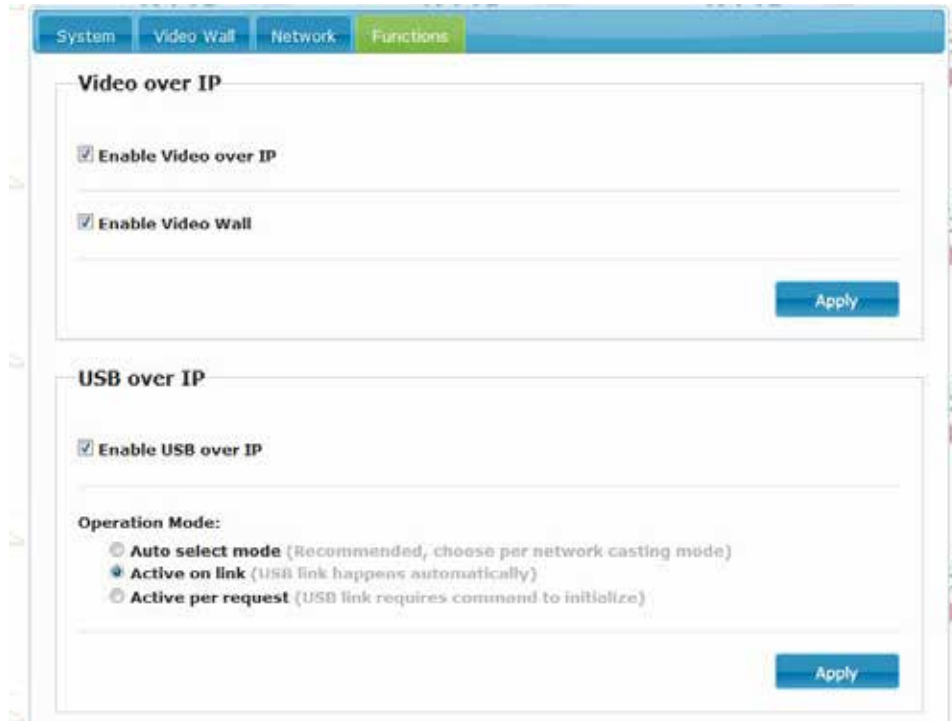
Each Receiver has 2 USB ports on the front that are used to transmit a USB signal through the network to a Transmitter. Each Transmitter has a micro-USB port on the back to connect USB to the source device.



Specifications

- USB over IP enables **non-isochronous** USB devices to be used remotely. Great for human interface devices, including keyboard, mouse, USB storage devices, etc.
- USB over IP follows the USB 2.0 specification and provides 5 volts of power
- USB over IP is **active** by default on Firmware **A5.13d** and later. USB over IP is compatible with all Just Add Power features.
- USB over IP is **disabled** by default on Firmware **A3.54c** and earlier, and USB over IP is incompatible with Video Wall. USB-enabled devices **cannot** communicate with USB-disabled devices. Please **upgrade** to A5.13d or later to get the full feature set of USB over IP.
- **Isynchronous** USB device like webcams or XBOX Kinect are unsupported.

Web Interface



The above screenshot shows the default state of the USB over IP functionality of Just Add Power devices running firmware [A5.13d](#) or later.

Operation Mode

There are 3 operation modes for USB over IP:

1. Active on link – the USB connection initiates once a Receiver and Transmitter are communicating. Multiple Receivers can communicate with the same Transmitter, potentially leading to a case of “dueling mouses (mice?)”.
2. Active per request – the Link USB button on the front of the Just Add Power Receiver, or its logical equivalent, must be activated in order for a Receiver to take control of the USB connection. Only one Receiver can communicate with the Transmitter at once.
3. Auto select mode – the device will choose between Active per request or Active on link mode based on the casting mode (Multicast or Unicast) chosen. This mode is not typically chosen.
 - Multicast will use Active per request
 - Unicast will use Active on link

Change Log

2013-02-08

- Added A3.20c firmware changes.

2013-03-13

- Reformatted for easier navigation

2013-05-23

- Added pinout for RS232 3.5mm pin and null modem jumper information
- Removed 3D Display information (all 2G are capable of side-by-side 3D by default)
- Added CEC Information

2014-01-02

- Updated USB information