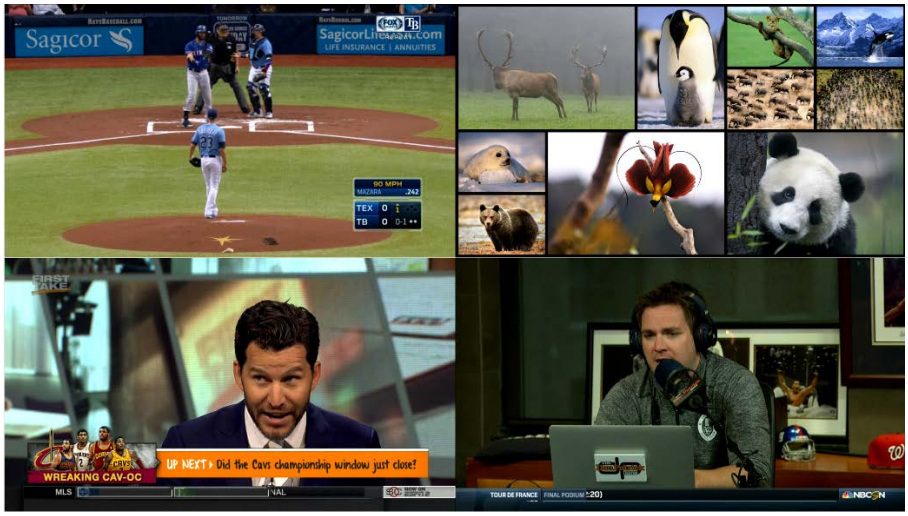
ULTRA HD IP

Just Add Power



3G TILING TRANSMITTER MANUAL

Revised 2020-01-10

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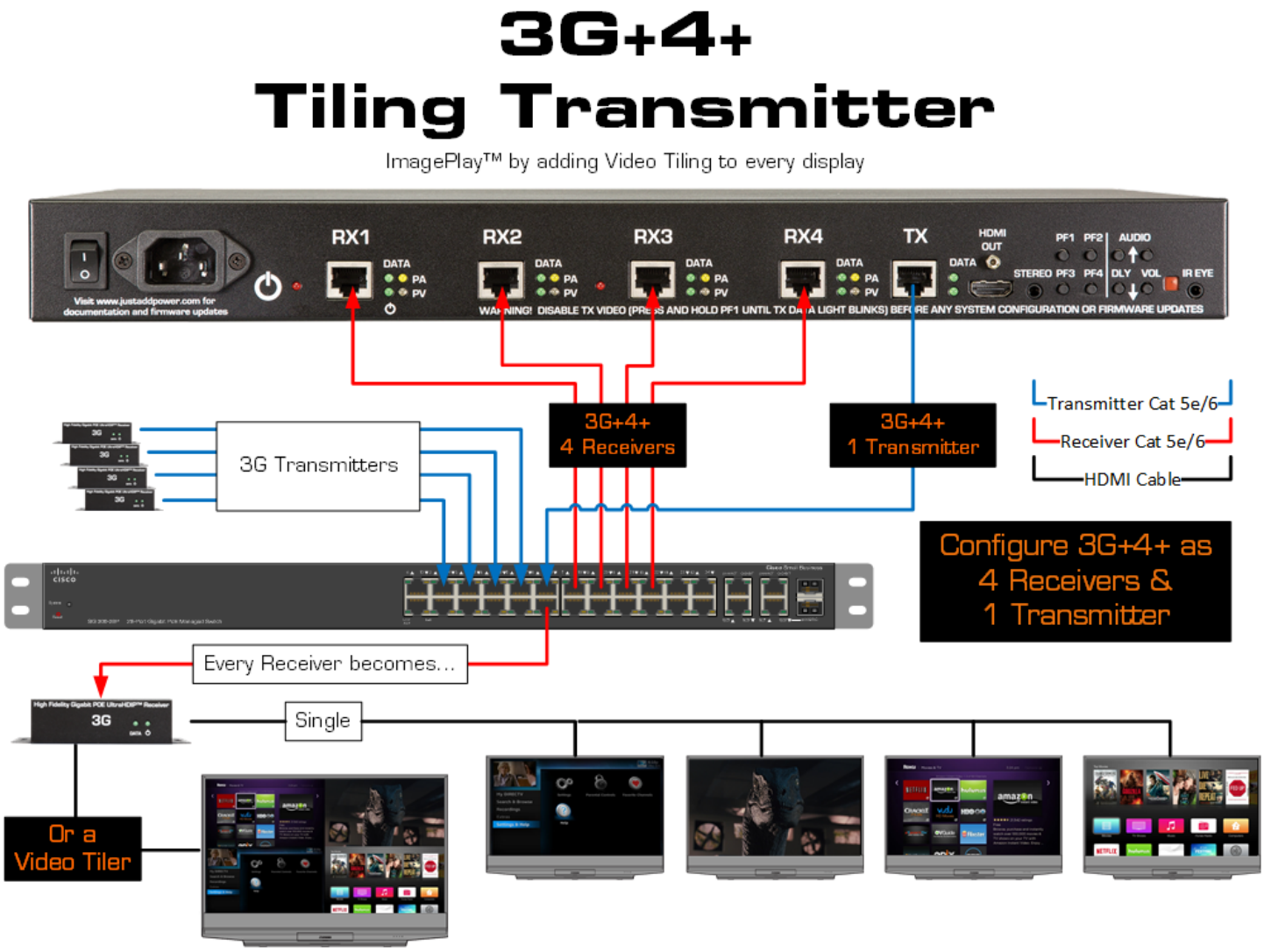
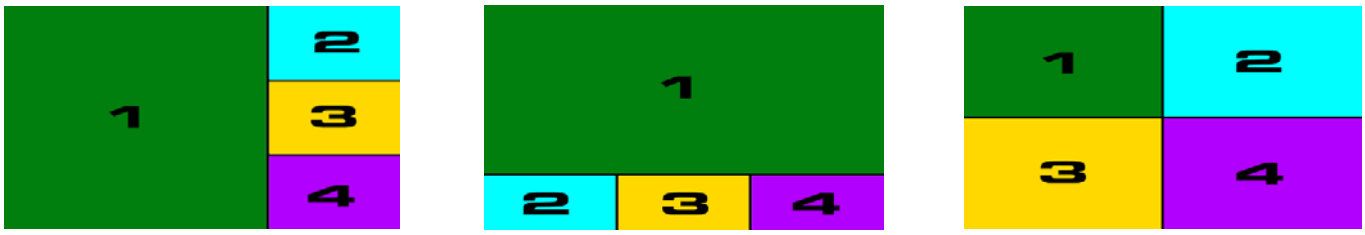
Introduction

The Just Add Power 3G+4+ Tiling Transmitter consists of 6 circuit-boards that work together to produce a tiled video signal: 4 Receivers, one Transmitter, and the Combiner.

The 4 Receivers accept video and audio signals from Just Add Power 3G Transmitters – in the same way that all Receivers do – and pass those signals to the Compiler. The Compiler arranges the video and audio signals and outputs the combined audio/video signal to the Transmitter, which outputs the video onto the network in the same way that all Transmitters do.

Adding a 3G+4+ Tiling Transmitter to a Just Add Power system allows all Receivers in the system to show tiled video.





Basic API

The Basic API includes standard video layouts, primary audio and video, and other basic settings.
All commands are case-sensitive.

Access the Tiling Transmitter

To access the Basic API, telnet into the **IP address of the TX** in the 3G+4+ Tiling Transmitter.

Function List

Set Video Layout

Set the layout of the video signal output by the Transmitter

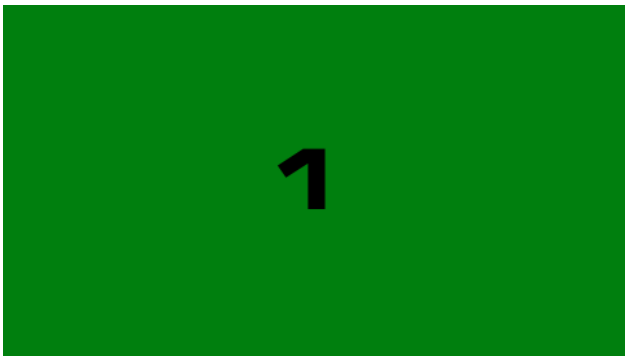
Command

`_4in1_layout.sh` **X**

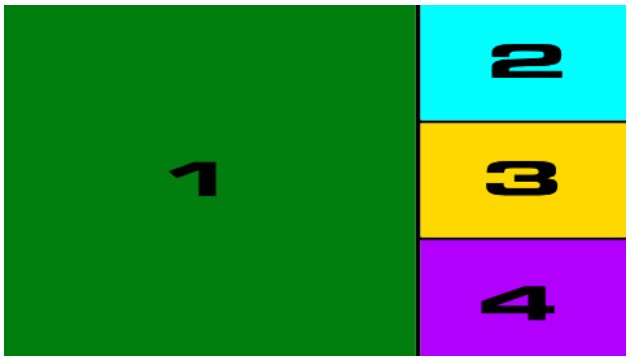
Variable

X = 1-4 or 10

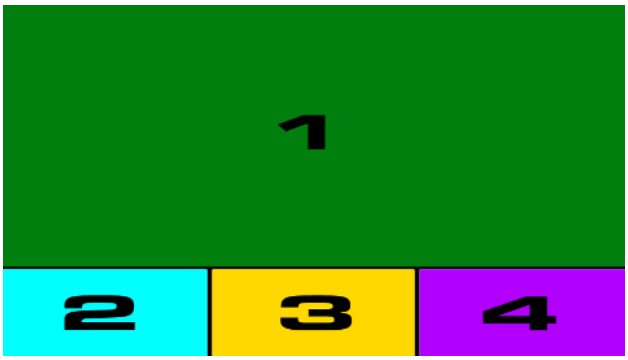
1 = Single-screen
2 = 3 secondaries on right side
3 = 3 secondaries on bottom
4 = Quad view
10 = Recall the last layout built with the Custom API



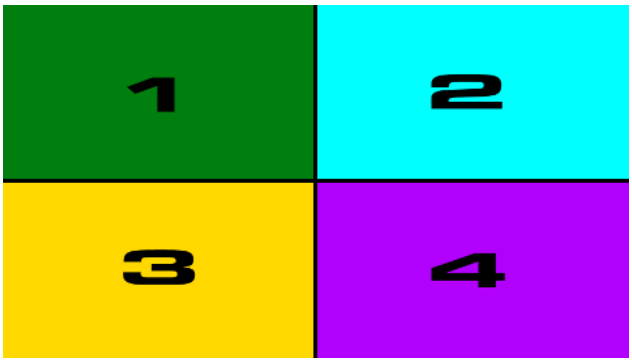
1 = Single-screen



2 = Secondary Video Right



3 = Secondary Video Bottom



4 = Quad View

Set Primary Video

Set which input Receiver will act as the primary video source
Default is 1
Primary Video is indicated on the hardware by a blue light

Command

`_4in1_primary_video.sh` **X**

Variable

X = 1-4

Set Primary Audio

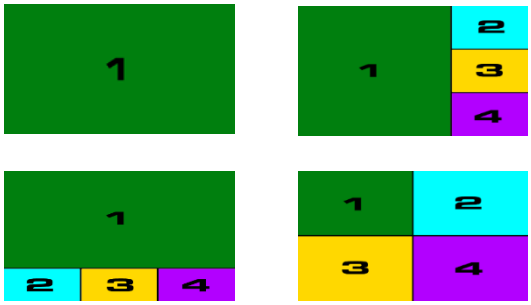
Set which position in the layout will act as the audio source →
Default is 1
Primary Audio is indicated on the hardware by an orange light

Command

`_4in1_focus.sh` **X**

Variable

X = 1-4 according to the icons to the right →



Audio Indiator Enable/Disable

Toggle the audio indicator
Default is off
When set to 'off', any change in layout or primary audio will cause the indicator to appear for 2 seconds and disappear.

Command

`_4in1_focus_onoff.sh` **X**

Variable

X = on

Enable the green border
Example: _4in1_focus_onoff.sh on

X = `off`

Disable the green border (default)
Example: _4in1_focus_onoff

Transmitter Video Disable

Stop the video output of the HDMI and Transmitter network port. Must be used for initial setup, as Holding PF1 for 3 seconds will also disable the TX video output.

Command

```
_4in1_stop_tx.sh
```

Transmitter Video Enable

Enable the video output of the HDMI and Transmitter network port. Power-cycling the 2G+4+ will return it to this state.

Command

```
_4in1_restart_tx.sh
```

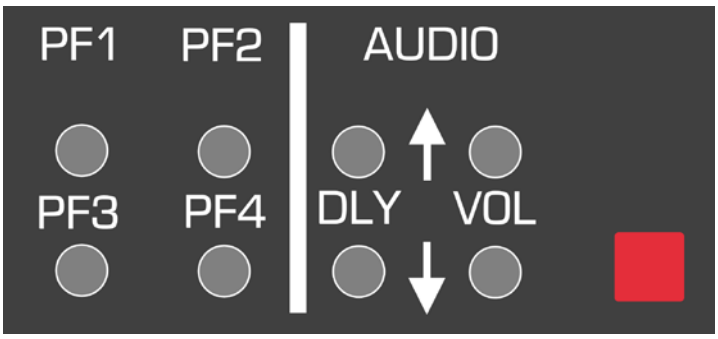
Function Buttons

```
PF1:  Tap to disable tiling
      Hold to disable HDMI output
      (during configuration)

PF2:  Tap to cycle primary audio

PF3:  Tap to cycle video layout

PF4:  Tap to cycle primary video
```



Custom API

The Custom API allows modification of video position, size, layering, transparency/opacity, and fade.
All commands are case-sensitive.

Access the Tiling Transmitter

To access the Custom API, telnet into the **IP address of the TX** in the 3G+4+ Tiling Transmitter.

Function List

Video Positioning, Size, & Layering

Description

The `p4p.sh` command can modify the position, size, and layering of video signals – referred to here as Channels. Channels are not the same as Receivers. Channels reference the relation of a specific video input to the primary video input, where the Primary Video is always Channel 1. See the table below for matching:

When primary video is… →	…Receiver 1…	…Receiver 2…	…Receiver 3…	…Receiver 4…
…Channel 1 is →	Receiver 1	Receiver 2	Receiver 3	Receiver 4
…Channel 2 is →	Receiver 2	Receiver 3	Receiver 4	Receiver 1
…Channel 3 is →	Receiver 3	Receiver 4	Receiver 1	Receiver 2
…Channel 4 is →	Receiver 4	Receiver 1	Receiver 2	Receiver 3

Note: The command to set Primary Audio follows Channel numbers in the same way.

Command

`p4p.sh [layer:ABCD] [chX] [hpos:HPOS] [vpos:VPOS] [width:WIDTH] [height:HEIGHT]`

Options

1. `layer:ABCD`
   - Set the overlapping order for Channels 1-4 where they overlap. Not necessary if video does not overlap.
   - **A**,**B**,**C**,**D** are variables for Channels 1-4
   - Examples:
     i. `p4p.sh layer:1234`
        - Sets the layering order as Channel 1 on top, Channel 2 underneath Channel 1, Channel 3 underneath Channels 1 & 2, and Channel 4 on the bottom

     ii. `p4p.sh layer:3142`
        - Sets the layering order as Channel 3 on top, Channel 1 underneath Channel 3, Channel 4 underneath Channels 3 & 1, and Channel 2 on the bottom
2. `chX`
   - Choose the Channel that the subsequent `hpos`, `vpos`, `width`, and `height` commands will modify
   - **X** is the variable for the Channel (1-4) to be modified
   - The options `hpos`, `vpos`, `width`, and `height` can all be set in the same command, or a single option can be set. Unlisted options will not be changed.
   - Multiple Channels can be modified in the same command
   - Examples:
     i. `p4p.sh ch1 hpos:320 vpos:0 width:1280 height:720`
        - Sets Channel 1 horizontal starting position to 320 pixels from the left side of the screen, vertical starting position to the top of the screen, with a width of 1280 pixels and height of 720 pixels. Channels 2-4 are unchanged.

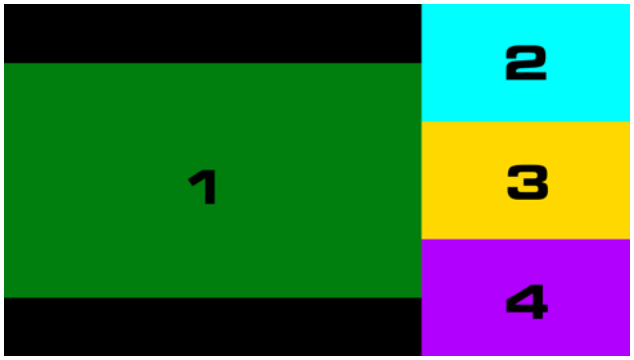
     ii. `p4p.sh ch4 hpos:1280 vpos:720 width:640 height:360`
        - Sets Channel 4 horizontal starting position to 1280 pixels from the left side of the screen, vertical starting position to 720 pixels from the top of the screen, with a width of 640 pixels and height of 360 pixels. Channels 1-3 are unchanged.

3. `hpos:`**HPOS**
    - Set the horizontal pixel position of the top-left corner of the Channel
    - Custom layouts output at 1920x1080
        i. Left side of the screen is pixel 0
        ii. Right side of the screen is pixel 1920
    - Examples:
        i. `p4p.sh ch1 hpos:320`
            o Sets Channel 1 horizontal starting position to 200 pixels from the left side of the screen
        ii. `p4p.sh ch4 hpos:1280`
            o Sets Channel 4 horizontal starting position to 1280 pixels from the left side of the screen
        iii. `p4p.sh ch1 hpos:320 ch4 hpos:1280`
            o Sets Channel 1 horizontal starting position to 200 pixels from the left side of the screen and Channel 4 horizontal starting position to 1280 pixels from the left side of the screen in one command
4. `vpos:`**VPOS**
    - Set the vertical pixel position of the top-left corner of the Channel
    - Custom layouts output at 1920x1080
        i. Top of the screen is pixel 0
        ii. Bottom of the screen is pixel 1080
    - Examples:
        i. `p4p.sh ch1 vpos:0`
            o Sets Channel 1 vertical starting position to the top of the screen
        ii. `p4p.sh ch4 vpos:720`
            o Sets Channel 4 vertical starting position to 720 pixels from the top of the screen
        iii. `p4p.sh ch1 vpos:0 ch4 vpos:720`
            o Sets Channel 1 vertical starting position to the top of the screen and Channel 4 vertical starting position to 720 pixels from the top of the screen in one command
5. `width:`**WIDTH**
    - Set the horizontal pixel width of the Channel
    - Custom layouts output at 1920x1080
    - Examples:
        i. `p4p.sh ch1 width:1280`
            o Sets Channel 1 horizontal width to 1280 pixels
        ii. `p4p.sh ch4 width:640`
            o Sets Channel 4 horizontal width to 640 pixels
6. `height:`**HEIGHT**
    - Set the vertical pixel height of the Channel
    - Custom layouts output at 1920x1080
    - Examples:
        i. `p4p.sh ch2 height:720`
            o Sets Channel 2 vertical height to 720 pixels
        ii. `p4p.sh ch3 height:360`
            o Sets Channel 3 vertical height to 360 pixels
        iii. `p4p.sh ch2 height:720 ch3 height:360`
            o Sets Channel 2 vertical height to 720 pixels and Channel 3 vertical height to 360 pixels in one command

Examples

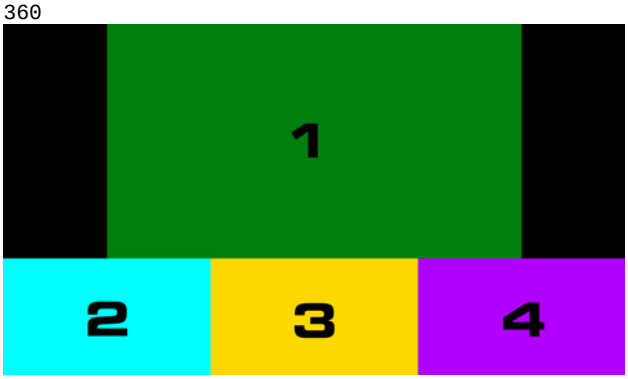
1. Three on the right with proper aspect ratio

```
p4p.sh ch1 hpos:0 vpos:180 width:1280 height:720 ch2 hpos:1280 vpos:0 width:640
height:360 ch3 hpos:1280 vpos:360 width:640 height:360 ch4 hpos:1280 vpos:720
width:640 height:360
```



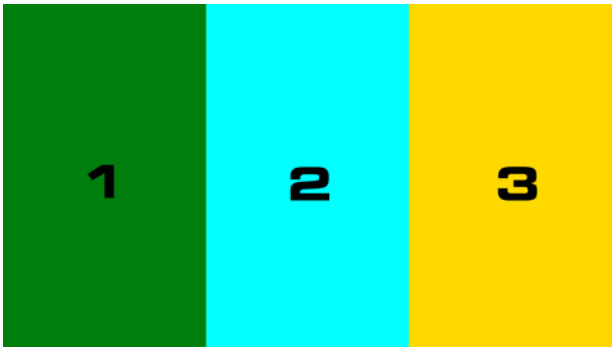
2. Three on bottom with proper aspect ratio

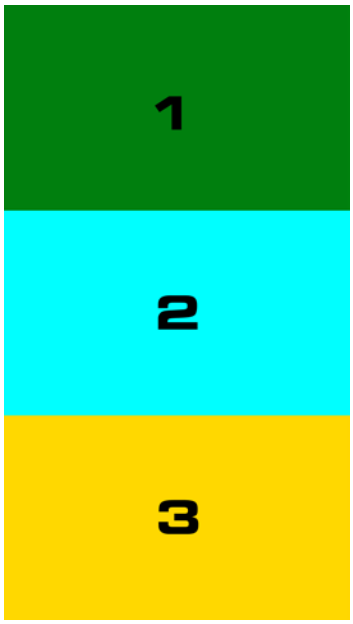
```
p4p.sh ch1 hpos:320 vpos:0 width:1280 height:720 ch2 hpos:0 vpos:720 width:640
height:360 ch3 hpos:640 vpos:720 width:640 height:360 ch4 hpos:1280 vpos:720
width:640 height:360
```



3. Three Columns

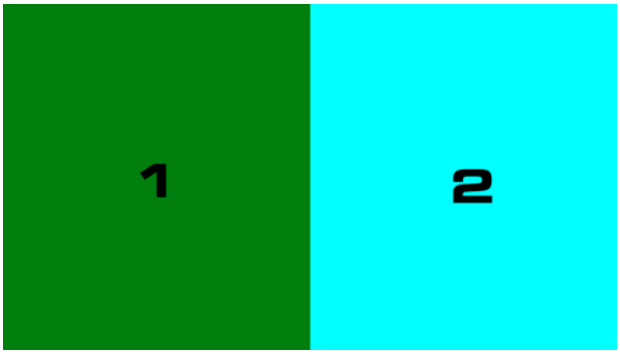
```
p4p.sh ch1 hpos:0 vpos:0 width:640 height:1080 ch2 hpos:640 vpos:0 width:640
height:1080 ch3 hpos:1280 vpos:0 width:640 height:1080 ch4 hpos:0 vpos:0 width:0
height:0
```

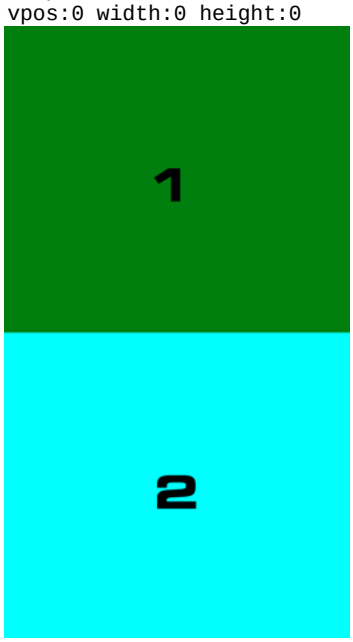




4. Left and Right

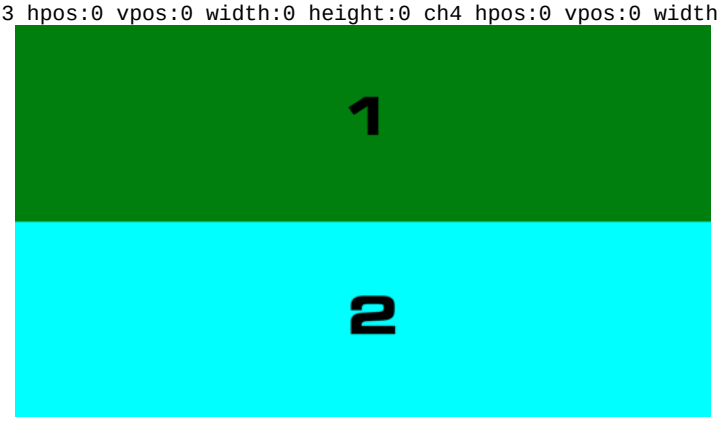
```
p4p.sh ch1 hpos:0 vpos:0 width:960 height:1080 ch2 hpos:960 vpos:0 width:960
height:1080 ch3 hpos:0 vpos:0 width:0 height:0 ch4 hpos:0 vpos:0 width:0 height:0
```





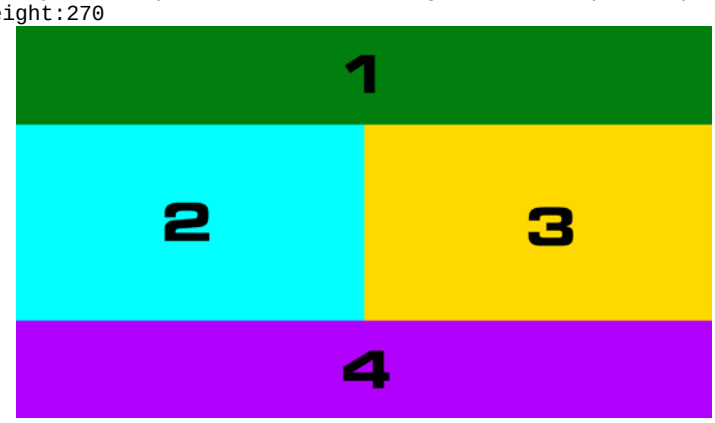
5. Top and Bottom

```
p4p.sh ch1 hpos:0 vpos:0 width:1920 height:540 ch2 hpos:0 vpos:540 width:1920
height:540 ch3 hpos:0 vpos:0 width:0 height:0 ch4 hpos:0 vpos:0 width:0 height:0
```



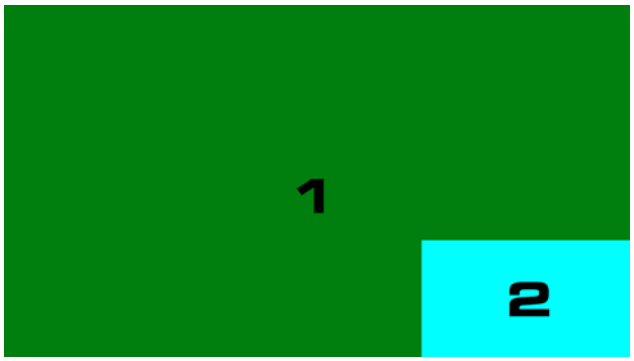
6. Sandwich

```
p4p.sh ch1 hpos:0 vpos:0 width:1920 height:270 ch2 hpos:0 vpos:270 width:960
height:540 ch3 hpos:960 vpos:270 width:960 height:540 ch4 hpos:0 vpos:810
width:1920 height:270
```

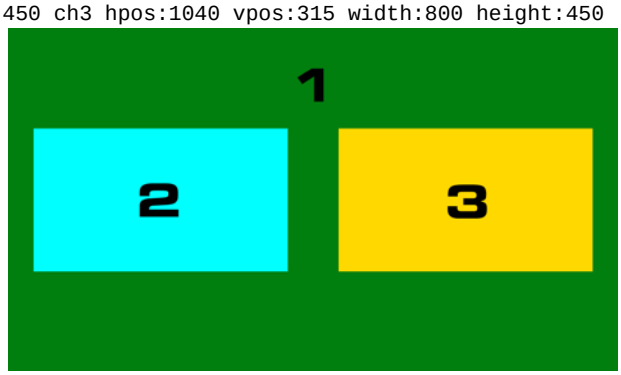


7. Picture-In-Picture

```
p4p.sh layer:2134 ch2 hpos:1280 vpos:720 width:640 height:360 ch1 hpos:0 vpos:0
width:1920 height:1080
```

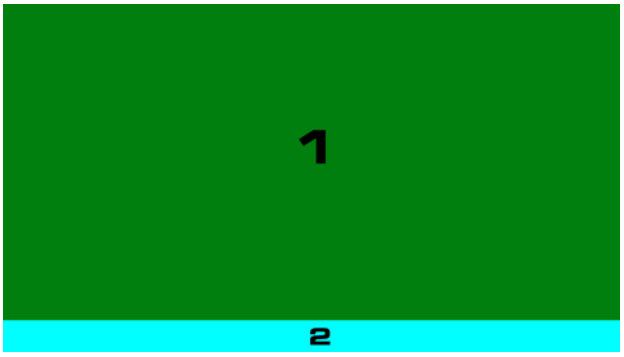



```
p4p.sh layer:2314 ch1 hpos:0 vpos:0 width:1920 height:1080 ch2 hpos:80 vpos:315
width:800 height:450 ch3 hpos:1040 vpos:315 width:800 height:450
```

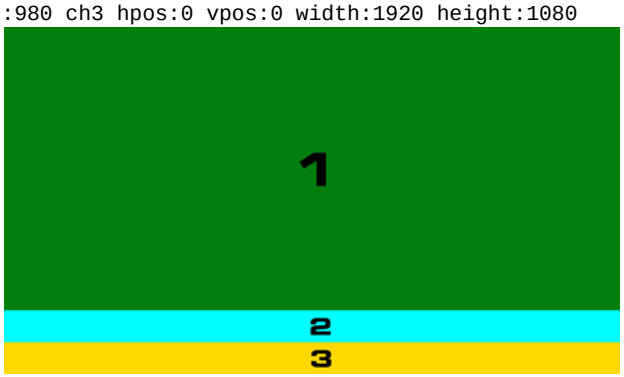


8. Ticker Overlay (ticker is 100 pixels at the bottom of the video)

```
p4p.sh layer:1234 ch1 hpos:0 vpos:0 width:1920 height:980 ch2 hpos:0 vpos:0
width:1920 height:1080
```



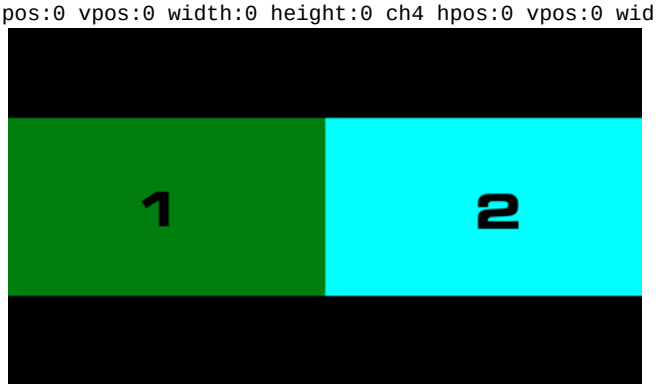

```
p4p.sh layer:1234 ch1 hpos:0 vpos:0 width:1920 height:880 ch2 hpos:0 vpos:0
width:1920 height:980 ch3 hpos:0 vpos:0 width:1920 height:1080
```



9. Centered Layouts

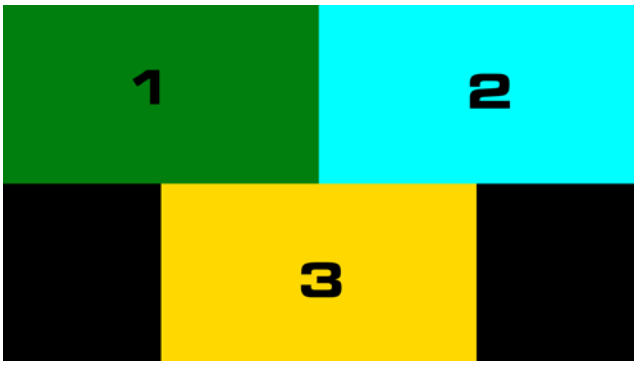
i. 2 videos, centered, maximum size, maintain aspect ratio

```
p4p.sh ch1 hpos:0 vpos:270 width:960 height:540 ch2 hpos:960 vpos:270 width:960
height:540 ch3 hpos:0 vpos:0 width:0 height:0 ch4 hpos:0 vpos:0 width:0 height:0
```



ii. 3 videos, centered, maximum size, maintain aspect ratio

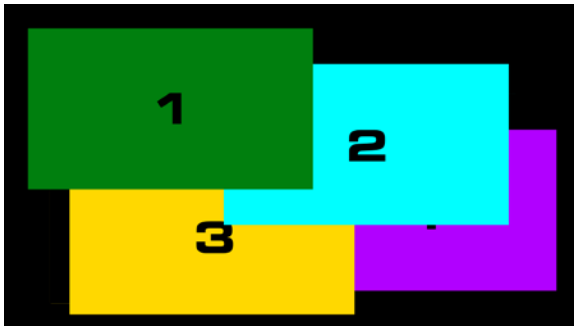
```
p4p.sh ch1 hpos:0 vpos:0 width:960 height:540 ch2 hpos:960 vpos:0 width:960
height:540 ch3 hpos:480 vpos:540 width:960 height:540 ch4 hpos:0 vpos:0 width:0
height:0
```



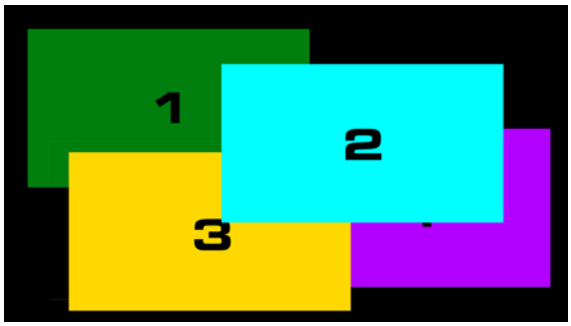
10. Layer Demo

```
p4p.sh ch1 hpos:80 vpos:80 width:960 height:540 ch2 hpos:740 vpos:200 width:960
height:540 ch3 hpos:220 vpos:500 width:960 height:540 ch4 hpos:900 vpos:420
width:960 height:540
```

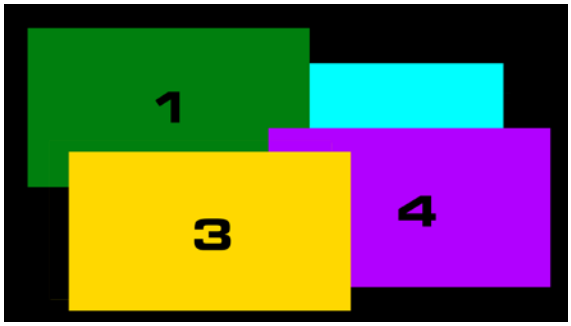
```
p4p.sh layer:1234
```



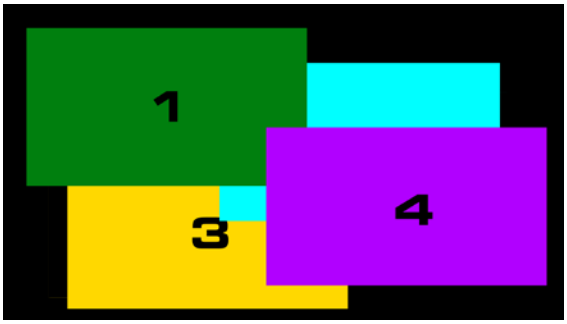

```
p4p.sh layer:2341
```




```
p4p.sh layer:3412
```



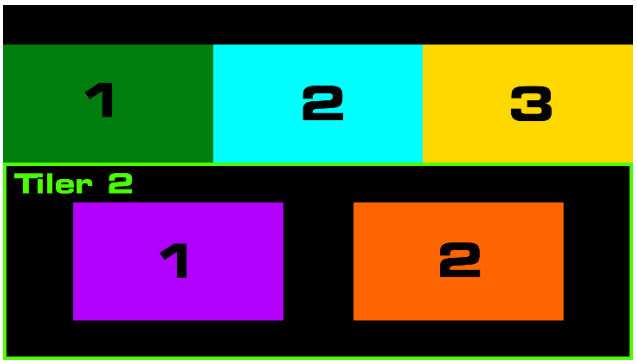

```
p4p.sh layer:4123
```



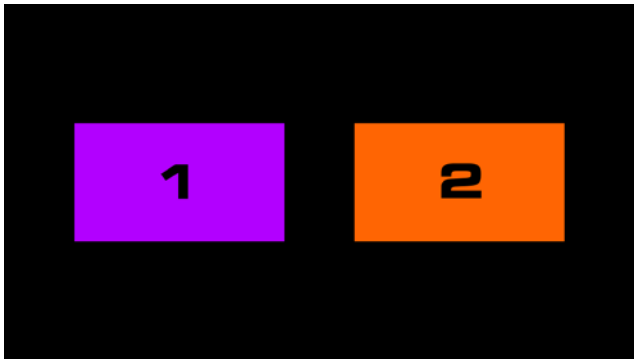
Multi-Tiler Examples

These layouts require more than one Tiling Transmitter. The end result is achieved by setting a Tiling Receiver to watch a different Tiling Transmitter.

1. 5 sources, centered, maximum size, maintain aspect ratio. Requires 2 Tiling Transmitters.
   On Tiler 1: set RX1-3 to watch three of the sources. Set RX4 to watch Tiler 2.
   On Tiler 2: set RX1-2 to watch two of the sources. RX3-4 will be invisible.



Tiler 1 View



Tiler 2 View

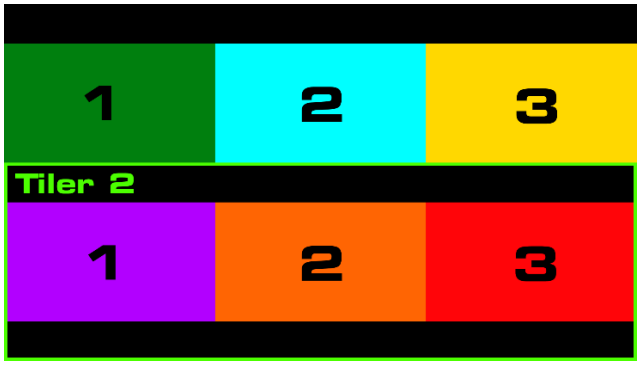
Tiler 1 Command

```
p4p.sh layer:1234 ch1 hpos:0 vpos:120 width:640 height:360 ch2 hpos:640 vpos:120
width:640 height:360 ch3 hpos:1280 vpos:120 width:640 height:360 ch4 hpos:0
vpos:240 width:1920 height:1080
```

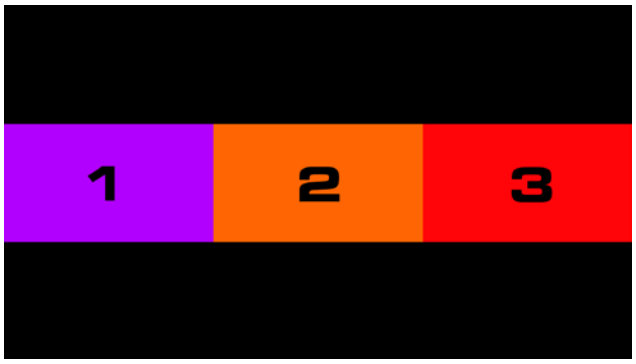
Tiler 2 Command

```
p4p.sh layer:1234 ch1 hpos:213 vpos:360 width:640 height:360 ch2 hpos:1067
vpos:360 width:640 height:360 ch3 hpos:0 vpos:0 width:0 height:0 ch4 hpos:0 vpos:0
width:0 height:0
```

2. 6 sources, centered, maximum size, maintain aspect ratio. Requires 2 Tiling Transmitters.
   On Tiler 1: set RX1-3 to watch three of the sources. Set RX4 to watch Tiler 2.
   On Tiler 2: set RX1-3 to watch three of the sources. RX4 will be invisible.



Tiler 1 View



Tiler 2 View

Tiler 1 Command

```
p4p.sh layer:1234 ch1 hpos:0 vpos:120 width:640 height:360 ch2 hpos:640 vpos:120
width:640 height:360 ch3 hpos:1280 vpos:120 width:640 height:360 ch4 hpos:0
vpos:240 width:1920 height:1080
```

Tiler 2 Command

```
p4p.sh layer:1234 ch1 hpos:0 vpos:360 width:640 height:360 ch2 hpos:640 vpos:360
width:640 height:360 ch3 hpos:1280 vpos:360 width:640 height:360 ch4 hpos:0 vpos:0
width:0 height:0
```

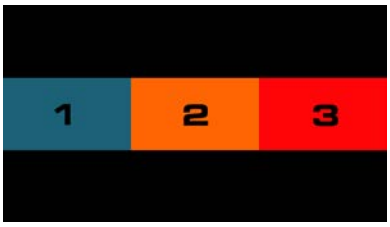
3. 9 sources in a 3x3 grid. Requires 3 Tiling Transmitters.

   On Tiler 1: set Quad layout and set RX1-4 to watch four of the sources.

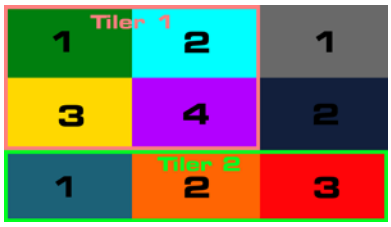
   On Tiler 2: set RX1-3 to watch three of the sources. RX4 will be invisible.

   On Tiler 3: set RX1-2 to watch two of the sources. Set RX3 to watch Tiler 1. Set RX4 to watch Tiler 2.

Tiler 1 View



Tiler 2 View



Tiler 3 View

Tiler 1 Command

```
_4in1_layout.sh 4
```

Tiler 2 Command

```
p4p.sh layer:1234 ch1 hpos:0 vpos:360 width:640 height:360 ch2 hpos:640 vpos:360
width:640 height:360 ch3 hpos:1280 vpos:360 width:640 height:360 ch4 hpos:0 vpos:0
width:0 height:0
```

Tiler 3 Command

```
p4p.sh layer:1234 ch1 hpos:1280 vpos:0 width:640 height:360 ch2 hpos:1280 vpos:360
width:640 height:360 ch3 hpos:0 vpos:0 width:1280 height:720 ch4 hpos:0 vpos:360
width:1920 height:1080
```

Video Transparency/Opacity

Description

Transparency/opacity will overlay a picture-in-picture video over a background video and make the overlay video partially see-through.
Channel 1 is always the background video and Channel 2 is always the picture-in-picture video
Channels are not the same as Receivers. Channels reference the relation of a specific video input to the primary video input, where the Primary Video is always Channel 1. See the table below for matching:

When primary video is… →	…Receiver 1…	…Receiver 2…	…Receiver 3…	…Receiver 4…
…Channel 1 is →	Receiver 1	Receiver 2	Receiver 3	Receiver 4
…Channel 2 is →	Receiver 2	Receiver 3	Receiver 4	Receiver 1

Note: The command to set Primary Audio follows Channel numbers in the same way.

Command

```
_4in1_pop.sh hpos:HPOS vpos:VPOS width:WIDTH height:HEIGHT [opacity:O || transparency:T]
```

Variables

Note: Custom layouts output at 1920x1080

1. `hpos:`**HPOS**
    - Set the left starting pixel of the picture-in-picture Channel
    - 0 - 1920
2. `vpos:`**VPOS**
    - Set the top starting pixel of the picture-in-picture Channel
    - 0 - 1080
3. `width:`**WIDTH**
    - Set the pixel width of the picture-in-picture Channel
    - 0 - 1920
4. `height:`**HEIGHT**
    - Set the pixel height of the picture-in-picture Channel
    - 0 - 1080
5. `opacity:`**O**
    - Set the Opacity of the picture-in-picture Channel
    - Use either Opacity or Transparency; never both
    - 0 – 100
        - 0 is completely transparent
        - 100 is completely opaque
6. `transparency:`**T**
    - Set the Transparency of the picture-in-picture Channel
    - Use either Opacity or Transparency; never both
    - 0 – 100
        - 0 is completely opaque
        - 100 is completely transparent

Examples

1. Top left picture-in-picture at 75% Opacity

```
_4in1_pop.sh hpos:100 vpos:100 width:640 height:320 opacity:75
```

2. Full overlay picture-in-picture at 75% Transparency

```
_4in1_pop.sh hpos:0 vpos:0 width:1920 height:1080 transparency:75
```

Video Fade

Description

The `p4p.sh` command can fade between video signals – referred to here as Channels – where all four signals overlap. Channels are not the same as Receivers. Channels reference the relation of a specific video input to the primary video input, where the Primary Video is always Channel 1. See the table below for matching:

When primary video is… →	…Receiver 1…	…Receiver 2…	…Receiver 3…	…Receiver 4…
…Channel 1 is →	Receiver 1	Receiver 2	Receiver 3	Receiver 4
…Channel 2 is →	Receiver 2	Receiver 3	Receiver 4	Receiver 1
…Channel 3 is →	Receiver 3	Receiver 4	Receiver 1	Receiver 2
…Channel 4 is →	Receiver 4	Receiver 1	Receiver 2	Receiver 3

Note: The command to set Primary Audio follows Channel numbers in the same way.

Commands

1. `_4in1_layout.sh 1`
   - In order for fading to work, all Channels must completely overlap with each other
   - This command sets all channels to completely overlap with layering order of 1, 2, 3, 4
2. `p4p.sh fade:`**AB**#**X**
   - **A** & **B** are Channels. **A** is the Channel that begins the fade and **B** is the Channel that is being faded to.
   - **X** determines the number of fifths of a sec (0.2s) that the fade takes to complete

Examples

- `p4p.sh fade:12#10`
  - Transition from Channel 1 to Channel 2 with a 2-second fade time
- `p4p.sh fade:42#5`
  - Transition from Channel 4 to Channel 2 with a 1-second fade time