

RGB Realization

2012 PacNW Regional CLAP

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AGENDA

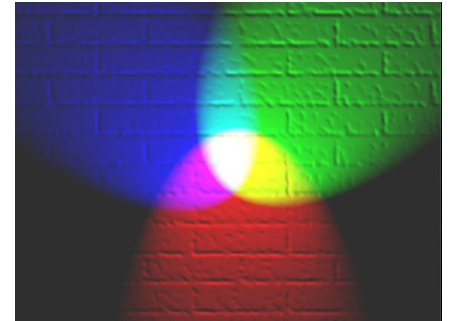
- **RGB** "Basics" (Review)
- Controlling **RGB** Elements
- Difference in **RGB** Elements
- **RGB** SPI Details
- **RGB** SPI Pixel Controllers
- **RGB** Execution
- **RGB** / DMX "Dedicated" Sites
- **RGB** Summary
- **RGB** Realization Demo





RGB "Basics" (Review)

- 3 color - Red-Green-Blue - LED "elements"
 - Individual colors, or by mixing, "up" to 16 Million
- Sizes/types of LEDs
 - T1 / 5mm = Traditional Single color LEDs
 - 8mm RGB/Superflux/Piranha = 4 pin RGB
 - 5050 = surface mount device (5.0mm x 5.0mm)
- Many types of implementations
 - Strings - Strip - Modules - Floods/Spots - Matrix - Tubes - Rope - Etc.....
 - Each can be "Dumb" or "Smart"



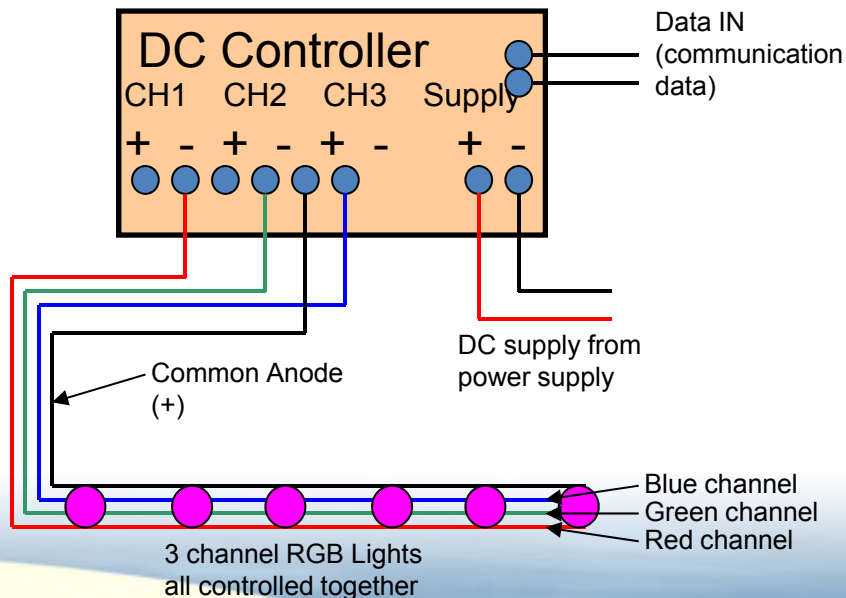


Controlling RGB Elements

There are 2 main types of control for RGB lighting used

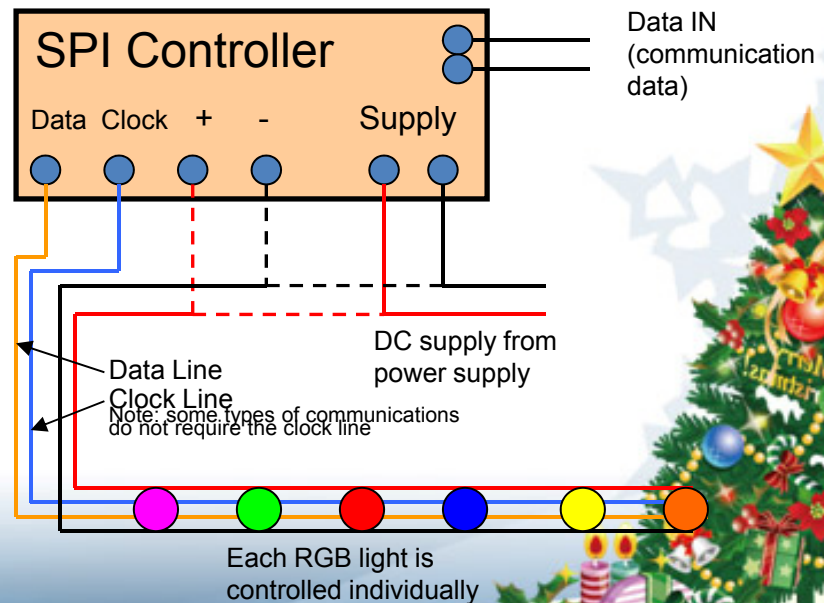
3 Channel DC control - "Dumb"

This method of control uses 3 channels to light a length/section of RGB lighting



Serial Peripheral Interface (SPI) Data control - "Smart"

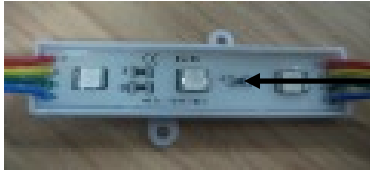
This method of control uses a data stream to communicate to each individual 3 channel RGB light



Pictures courtesy of Fasteddy



Difference in RGB Elements



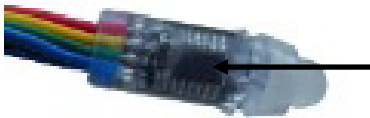
Non digital 3 channel



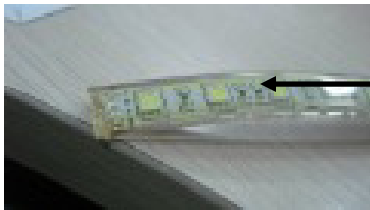
Digital SPI control



Non digital 3 channel



Digital SPI control



Non digital 3 channel



Digital SPI Control

The difference between a non digital 3 channel light and a digital SPI controlled light is that there is a little black IC (integrated circuit) on each SPI controlled light as shown.

This allows **RGB** control of each light without having additional wires going to each light.

The digital SPI light is turned on by receiving the appropriate data that then controls the level of red, green and blue light

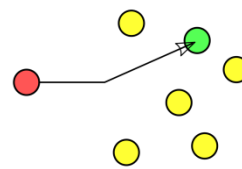




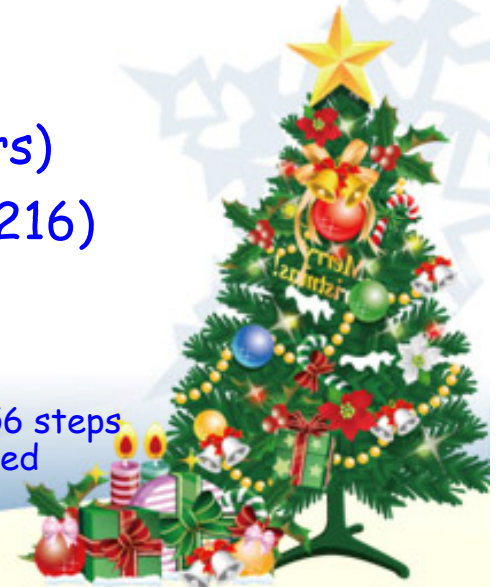
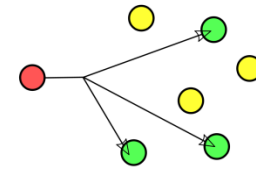
RGB SPI Details

- **Protocols**
 - DMX512A (E1.11)
 - E1.31 (Streaming ACN, DMX over ethernet)
 - Art-Net (DMX w/ RDM over ethernet)
- **Broadcast (Networking)**
 - Unicast
 - Multicast
 - Controller Dependant
- **Bit Level - Impact is to color / fades**
 - 5 bit - 32 steps per color ($32 \times 32 \times 32 = 32768$ colors)
 - 8 bit - 256 steps per color ($256 \times 256 \times 256 = 16777216$)
 - 12 bit - 4096 steps per color ($4096 \times 4096 \times 4096 = 68719476736$)
 - Note: DMX only supports 8 bit output so a 12 bit chip will only run 256 steps per color but a 12bit chip will allow for dimming curves to give improved dimming
 - 16 bit ICs are not too far off

Unicast



Multicast





RGB SPI Details

- **Output Control**

- Constant Current: Ensures correct current maintained. LEDs are current devices and are better controlled with constant current
- Constant Voltage: Ensures correct voltage is maintained
- Common Anode
 - Sinking vs Sourcing within the LEDs and cost of devices (FETs)

- **IC Examples**

- 6803 - 2801 - 1804 - 3001 "et al"
- Available in different package(s), style(s) and voltages

- **Power Requirements - 12VDC, 5VDC**

- The lower the voltage the higher the possibility of voltage drop affecting the lights. 1 volt drop is a much higher percentage of 5 VDC than it is with 12VDC. Also current requirement are less with higher voltages.





RGB SPI Pixel Controllers

- **Commercial (Plug & Play)**
 - Stellascapes - www.stellascapes.com/
 - Andrew Fraser (mrapackthead)
 - John Chapman (jec)
 - response-box.com/rgb/
- **DIY**
 - Ethcongateway - www.joshua1systems.com
 - Ed Bryson (j1sys) - Joshua 1
 - E68x - <http://sandevices.com/>
 - Jim St Johnz (jstjohnz)
 - Smart String Controller - <http://diylightanimation.com/index.php?board=35.0>
 - Robert Jordan (rj)
 - Controllers by various vendors
 - Ex. Ray Wu - <http://www.aliexpress.com/fm-store/701799>





RGB Execution

- **Software**
 - **Sequencing**
 - Light O Rama (LOR) S3 (\$\$)
 - Light Show Pro (LSP) V2 (\$\$)
 - Vixen (Free)
 - **RGB Add-on Pattern Generation**
 - Madrix (\$\$\$)
 - Superstar (LOR) (\$\$)
 - Nutcracker (Free)
 - Light Factory (\$\$\$)
 - HLS (Free)
 - Vegomatic - (Free) Itsmebobo
 - <http://itsmebob.com/Christmas/2012/Vegomatic.exe>
 - http://forums.lightorama.com/view_topic.php?id=32778&forum_id=81
- **Show Integration Mgmt**
 - **Xlights (Free)**
 - Intermixing of controllers
 - Show execution
 - Generic Sequence Player





RGB / DMX "Dedicated" Sites

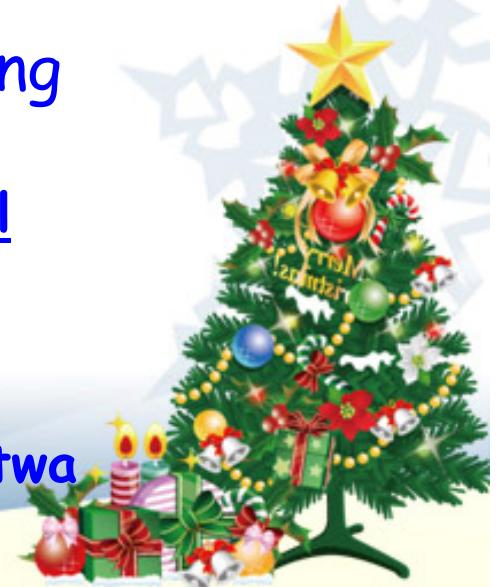
- *Disclaimer - There are a lot of Christmas forums, the following have specific topics dedicated to this subject matter*
- **AusChristmasLighting**
 - <http://auschristmaslighting.com/forums/index.php>
- **Do It Yourself Christmas**
 - <http://doityourselfchristmas.com/forums/forumdisplay.php?94-Pixels-and-Pixel-controllers>
- **DIY Light Animation**
 - <http://diylightanimation.com/index.php?board=35.0>
- **John Chapman**
 - <http://response-box.com/rgb/>
- **Joshua 1 Systems**
 - <http://forum.joshua1systems.com/index.php>
- **Planet Christmas**
 - <http://forums.planetchristmas.com/index.php?forum/175-dmx-based-lighting/>





Pixel Resources

- **Pixel String Power Calculator**
 - <http://blinkyflashy.info/calcs/pixpower.php>
 - Thread Discussion:
 - <http://doityourselfchristmas.com/forums/showthread.php?20242-New-tools-for-estimating-pixels-string-voltage-drops>
- **sACN Info/View**
 - Windows utility for viewing and controlling Streaming ACN levels on a network
 - <http://sacnview.sourceforge.net/index.html>
- **Audio Visual Devices - da_E1.31**
 - E1.31 checking freeware
 - https://www.audiovisualdevices.com.au/software/da_e131/index.php





RGB Summary

- **RGB SPI** is an **ADVANCED** Display Methodology
- You will be required to have a good understanding of:
 - DMX Universe structure and setup
 - Electrical Components & Controllers
 - Networking
 - Power / Electrical
 - Advanced Sequencing
 - Troubleshooting
- There is a lot of data and resources available for reference and help





RGB Realization Demo

- Show Laptop
- Madrix
- LOR
- 2 Enttec Pro Dongles
- Trendnet Network Switch
- iDMX
- Lynx DMX Splitter
- E681 Sandevices Pixel Controller
- 2801 Strip (8 bit)
- 6803 Pixel (5 bit)
- 2801 Pixel (8 bit)
- 3001 Pixel (12 bit)
- iDMX
- RGB Balls
- Chauvet 200B



Thank You!
Have a successful
2012!

