Projection Decorating

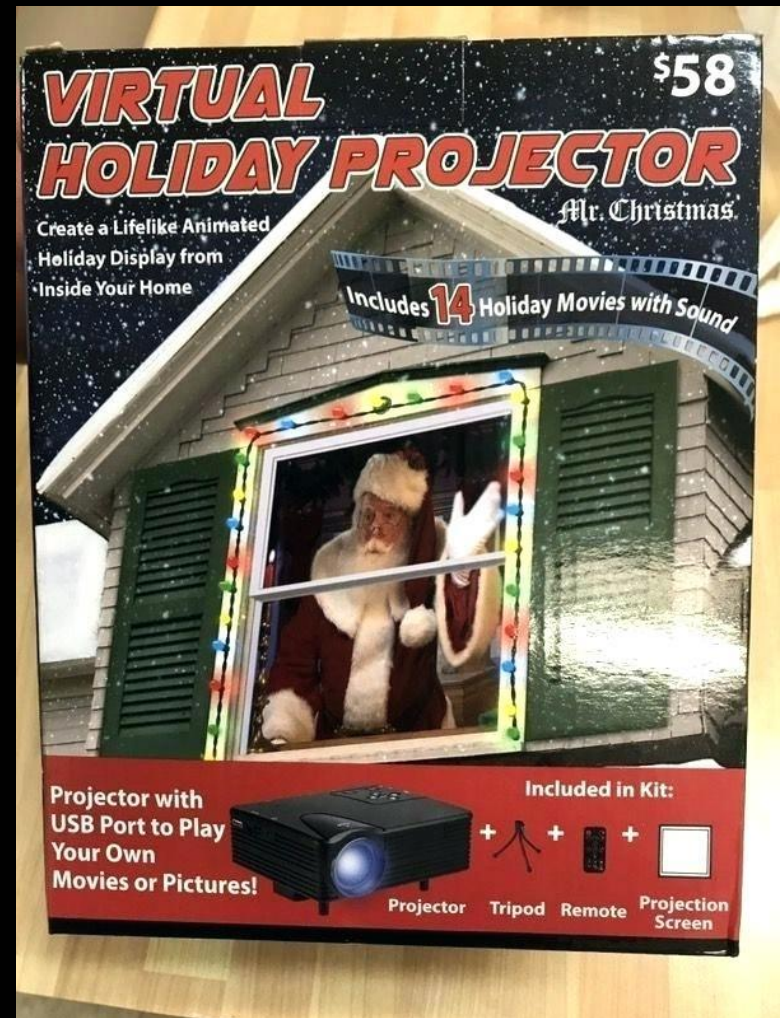by Tom Hammond
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Topics

- What is it?
- Choosing a projector
- Choosing a screen
- Projector placement
- Video sources & editors
- Integrating with Falcon Player
- Playing videos in Falcon Player
- Virtual Pixels in xLights

What is it?

- Playback of videos and still images onto windows, glass doors, and garage doors

- Projector inside house (usually)

- Virtual pixels with xLights

What Can It Be Used For?

- Christmas images, from Santas, wreathes, reindeer, ornaments, Christmas trees, angels, snowmen, etc.).
- Christmas cartoons/videos
- Custom videos for each sequence/song
- Virtual pixels/matrix with xLights

What Do I Need?

- Projector with serial port

- Serial cable

- USB to serial adapter

- Raspberry Pi running Falcon Player

- Videos in MP4 format

- Window with open room space

- Projection screen material

Choosing a Projector

Brightness and Resolution

- Lumens is important
  - 1,700 - 2,000 good for windows
  - Cheap brands lie about lumens!

- Resolution not as important
  - Visitors will see house from the road
  - 800x600 is sufficient
  - WXGA is best (1,280 x 800 for wide windows)
  - Cheap brands lie about resolution!
    - HD "compatible"

A Million Lumens
Something
Looks Fishy

Throw Distance and Brands

- Throw distance
  - How far from window to project a large image
  - Short-throw projectors are best
  - Good website: www.projectorcentral.com

- Good brands
  - Sony, Optoma, Viewsonic, Eiki, Pro FX, Hitachi, Boxlight

New or Used?

- New projectors can be $500 - $1,500 & up
- Used is the way to go!
  - Good projectors for $70-$200
  - Ebay (ipl-reno is an excellent seller)
  - Schools sell used projectors on eBay
  - Make sure remaining lamp remaining life is low
  - Used projector can last 5-8 years with a fairly new lamp

Video Inputs and Control

- Video inputs
  - HDMI, DVI*, and DisplayPort* best for Falcon Player
    * *with adapter*

- Automatic on/off control
  - Serial port (RS232) best
  - USB port on projector not good
  - Ethernet/RJ45 port not as good
  - Do not use a timer! (will damage lamp)

Choosing a Screen

Choosing a Screen

- Material ideas (commercial)
  - Atmosfx premium projection material (www.foxandgrapes.com)
  - Trapeze
    - 10% spandex / 90% polyester
    - Best picture quality for rear projection
  - Spandex
    - Four-way stretch, not two-way

Choosing a Screen

- Material ideas (DIY)
  - Shower curtain!
    - <u>Frosted</u>, thin, not white?
    - Remove wrinkles with hair dryer, add grommets
  - Plastic tablecloth
  - Translucent industrial plastic
  - Window privacy film
  - Plastic garbage bag
  - Durable white polyvinyl
  - Vellum (from art stores)
  - Rubber bed sheet

Projector Placement

Projector Placement

- Sit projector near window bottom
  - Avoids "hotspot" from lens causing a bright area in the video

- Locations
  - Window
  - Storm door
  - Garage door

Video Sources
& Editors

Video Sources & Editors

- www.totalhomefx.com

- www.atmosfx.com

- www.holidayprojectors.com

- www.thechristmaslightemporium.com

- Anything by Jon Hyers
  - www.virtualfxvideo.com/shop-c1yk

- Good, free video editor
  - Davinci Resolve 16 (free version)

Integrating with Falcon Player

Detailed instructions at:
www.itwinkle.org > Build It > Projector Control

How It Works

- Free projector plugin
- Serial cable between Raspberry Pi and projector
- Load MP4 video files into Falcon Player
- Events in playlist to turn on/off projector, change video source, etc.
- Play videos in playlist

Connections

- Connections
  - HDMI out on Raspberry Pi to HDMI / DVI input on projector
  - USB (RPi) to serial (projector) adapter
  - Null modem or straight-through serial cable

Projector Control Codes

- What are they?
- Hex codes for your projector model
- Good source for projector manuals & hex codes:
  - Google "(brand) (model) projector Clary Business Machines"

-Command List

TYPE1 Command (HEX+CR) P65	Function
C00(43 30 30 0D)	POWER ON
C01(43 30 31 0D)	POWER OFF

0892D0

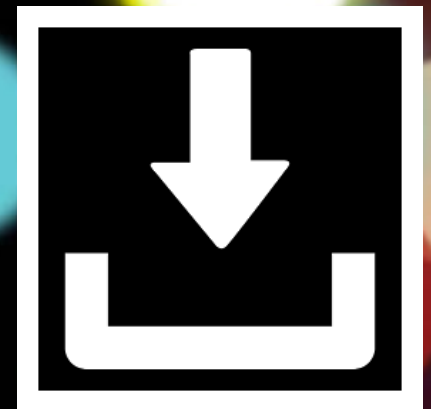| 8 | 146 | 208 |

Projector Control Plugin

- Install via Content Setup > Plugins
  - List of supported projectors in Input/Output Setup > Projector Control menu
  - Choosing a similar brand/model may work

Connection type: SERIAL ▾

SERIAL DEVICE: ttyUSB0 ▾

Projector: BOXLIGHT-WX25NU ▾

Get help at www.falconchristmas.com/ forum/index.php/topic,2182.html

Projector Not Listed? Add Your Own!

- Help > SSH Shell
- sudo nano media/plugins/FPP-Plugin-Projector-Control/projectorCommands.inc
- Remove comments, add hex codes for ON, OFF, VIDEO, and baud rate settings.
- Ctrl-O to save, Ctrl-X to exit editor

```
// To add another projector fill out the below and remove the //
    Array("NAME" => "BOXLIGHT-WX25NU",

            "ON"  => "\x43\x30\x30\x0D",
            "OFF" => "\x43\x30\x31\x0D",
            "VIDEO" => "\x43\x30\x35\x0D",
            "BLANK" => "\x43\x39\x37\x0D",
            "AUTO" => "\x43\x39\x32\x0D",

            "BAUD_RATE" => "9600",
            "CHAR_BITS" => "8",
            "STOP_BITS" => "1",
            "PARITY" => "none"
    ),
```
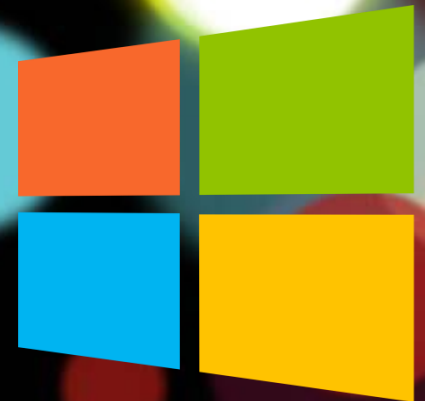
Not Using Falcon Player?

- On Raspberry Pi (Linux) or Mac OSX...
  - Find name of USB to Serial adapter
    - dmesg | grep tty
  - Create executable script with these commands
    - sudo chmod 666 /dev/ttys0
    - echo -en '\x43\x30\x30\x0D' > /dev/ttyUSB0
  - Create cron job to run script on a schedule

OS X

Not Using Falcon Player?

- In Windows...
  - Get COM port number in Device Manager
  - Put hex codes in binary file with UltraEdit, Notepad++ (with Hex Editor plugin), not Notepad!
  - Add to batch file:
    - mode com3 baud=9600 parity=n data=8 stop=1
    - copy /b on.bin com3
  - Use Windows Task Scheduler to run batch file on a schedule

Playing a Video

- Upload MP4 video via Content Setup > File Manager

- Create playlist with these entries:

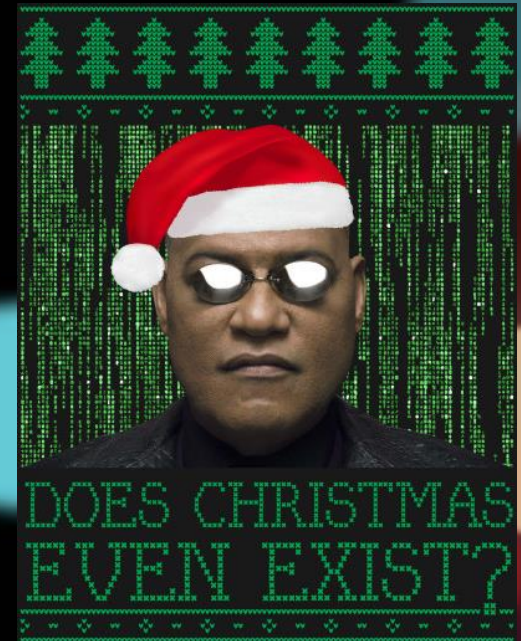| #	Type	Media File / Script / Event / Pause
1.	Event	01_01 - PROJECTOR-ON
2.	Pause	PAUSE - 45
3.	Event	01_03 - PROJECTOR-VIDEO
4.	Media	Brave - Trailer.mp4
5.	Event	01_02 - PROJECTOR-OFF

- Connect FM transmitter to Pi audio jack

Use Your Projector as a Matrix!

- Virtual Matrix feature
  - Create sequences on xLights matrix model
  - Can display text and any effects in xLights
  - Falcon player outputs sequence to HDMI port
  - Matrix FP plugins: Matrix Tools, BetaBrite Sign Control, Twitter-Tweet Download, Message Queue to Matrix Overlay, RDS Data to Message Queue/Matrix, Sports Ticker, Mail Control, Stock Ticker, Score Board, Event Date, Weather Information to Message Queue

Setting up Matrix in xLights

- Resolution
  - Lower is better! Even 176x96 is 50K channels, large FSEQ files, longer rendering time
- Create xLights controller universes
  - IP address of Falcon Player
  - 100 universes
- Create xLights matrix model
  - 96 strings, 176 nodes/string, top-left Starting Location

Name	VirtualMatrix
Matrix	
Direction	Horizontal
# Strings	96
Nodes/String	176
Strands/String	1
Starting Location	Top Left
Indiv Start Chans	☐
Start Channel	13621

Setting up Matrix in Falcon Player

- Input/Output Setup > Channel Outputs > Other

  – Virtual Matrix "type", start channel from xLights model, 176 width, 96 height

- FPP Settings > Force HDMI display

  – Bug with "Blank screen on startup"

- Need help?

  – https://falcon-player.gitbooks.io/falcon-player-manual/content/chapter_nine_miscellaneous_items/virtual_matrix.html

Questions?

Projection
Decorating

Thank you!

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