

“Modern Instructional/Event Presentation Technologies for Immersive/Planetarium Theaters”

A Workshop for IPS 2012

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Abstract: The modern design for a domed theater should include extensive audio-video-control capabilities for instruction, special events, and other multimedia uses. This package is one of the most overlooked parts of theater upgrade or new construction design.





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Why add such capabilities:

To all-dome video:

HDCP Compliancy!!!!
Brighter lumens per square foot.
Lose image and text legibility using all dome warping/blends.
Ease of use. Don't turn on all-dome system.
Most do not provide hi-res external inputs
Wear and tear on projectors
Wear on matched lamps.
Fallback presentation system.




To optical projectors:
To add BluRay videos, PowerPoint, NASA select, educational programming.
To extract 5.1 surround sound from these.
To add compatibility with new digital computer outputs.
Equipment stays put and is ready for use.



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Special Considerations

VGA Obsolescence

Intel and AMD have come to an agreement to phase out computer VGA connections beginning in 2013 and expect the technology to be off all their product lines by 2015.

It will be replaced by HDMI and DisplayPort.




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Special Considerations

Analog Sunset

All BlueRay players have utilities burned into their chipset that will automatically turn off (or downscale to super low res) the component, composite, VGA and S-video outputs on December 31, 2013.

This is a Federal law that all manufacturers must adhere to.

That means they will only output HDMI or another digital format.




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Special Considerations

High-bandwidth Digital Content Protection (HDCP) Compliancy
Commonly though incorrectly referred to as High-Definition Copyright Protection, is a form of digital copy protection developed to prevent copying of digital audio and video content as it travels across connections.



Digital Rights Management (DRM)
Digital rights management (DRM) is a class of access control technologies that are used by hardware manufacturers, publishers, copyright holders and individuals with the intent to limit the use of digital content and devices.

Extended Display Identification Data (EDID)
Provided by a digital monitor or projector to describe its capabilities to a video source. It is what enables a modern computer, HDTV or Blu-ray to know what kinds of monitors are connected to it



Why not use your all-dome system for nuts & bolts instruction?

1. Lower resolution: 25 times the resolution is typical. See next slide
2. Wear and tear on expensive projectors and lamps.
3. HDCP, DRM and EDID Compliancy
4. Analog Sunset



Why not use your all-dome system for nuts & bolts instruction

1. Resolution: Pixels on the Dome 10' wide image

All-dome HD Projector = 0.1M pixels on a 12' wide image in 40 foot dome = 1.1 K pixels per ft²

Dedicated HD Projector = 2.3M pixels on a 12' wide image in 40 foot dome = 25.5K pixels per ft²

20-25x resolution plus impact of light level

1920 x 1200 = 2,304,000 pixels per projector

1,450,000 pixels visible per projector on dome for all-dome system

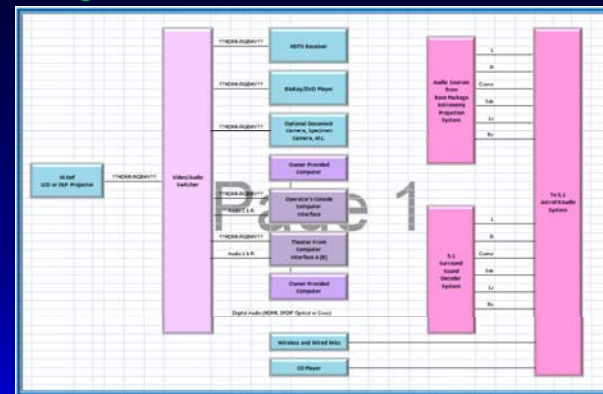
40 x 40 x 3.14/2 = 2512 ft² dome surface area or 1256 per 1/2 dome
1154 pixels per ft² pixels with all-dome projector

12' w x 7.5' h image = 90 ft² dome = 2.3M pixels or 25.5K pixels per ft² dome with one dedicated projector.
12' w x 7.5' h image = 90 ft² dome = 0.10M or 1.1K pixels per ft² dome with all dome projector

20-25 x resolution plus impact of light level



Basic Signal Path



Future of Obsoleting RGBHV (VGA) and Futureproofing Video

RGBHV (VGA)

DVI

DisplayPort

HDMI -M

HDMI -F

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Where to locate computer and video inputs.

Computer/video/audio connection in floorbox under podium

Computer/video/audio connection in floorbox under podium

Computer/video/audio connection in pop up box at console.

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Where to locate computer and video inputs.

4 FL-G4

Floor Box

T3U Rim Mounting

Console Pop-Up

Wall Box

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Connections

No DVI? Why?

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BluRay and HDTV tuners.

SPDIF digital audio out. Coax/foslink optical.

HDMI Out

Serial/Ethernet Control

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Distance Limitations

15m

30'

30'

Digital deterioration due to distance

Corrected digital signal

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Distance Limitations: UTP-CAT5/6 Extenders (Unshielded Twisted Pair)

Extender CAT5

RGBHV (VGA)

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Routing and Legacy RGBHV

4x1 HDMI Audio???

RGBHV to HDMI Converter w Audio

Switcher/Scaler HDMI, RGBHV, CV, YC (S), Audio???

4x1 HDMI w 7.1 Audio

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Distance Limitations: Extenders

Uses Single or 2x Cat 5/6

- Various units available for
 - Audio only
 - Video only
 - HDMI w audio
 - RGBHV w audio
 - Above with serial 232

Must be EDID and HDCP capable






Distance Limitations: HDBaseT

Uses Single Cat 5/6 for 5Play™ feature set...


- Full, uncompressed HD video to 4K and 3D
- Audio
- Ethernet
- Power (100W)
- And control (232, IR, other)

...over a single 100m cable.

EDID and HDCP capable





Projection Resolutions



4:3 Aspect Ratio
1440 x 1050
1.5M Pixels

16:9 Aspect Ratio
1920 x 1080
2.1M Pixels



Projection



| | |
|---|--|
| <p>1-Chip DLP Advantages</p> <ul style="list-style-type: none"> No organic filters Smooother video Pixels less visible More "filmlike" on DVD and Bluray Generate "blacker" blacks Higher contrast | <p>1-Chip DLP Dis-advantages</p> <ul style="list-style-type: none"> Rainbow effect bothers some due to color wheel More moving parts (color wheel) Color wheel sometimes produces soft whine |
| <p>LCD Advantages</p> <ul style="list-style-type: none"> No color wheel = No "rainbow effect" Slightly quieter = No color wheel | <p>LCD Dis-advantages</p> <ul style="list-style-type: none"> More visible pixels Some screen door effect on certain video images Poorer contrast Blacks come out lighter gray than DLP projectors |

| | |
|---|---|
| <p>LED Advantages</p> <ul style="list-style-type: none"> No color wheel = No "rainbow effect" Slightly quieter = No color wheel Terrific color Excellent contrast No lamps!!!! Lower heat. | <p>LED Dis-advantages</p> <ul style="list-style-type: none"> Cost Brightness at this time... 700-1100 ANSI |
|---|---|



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