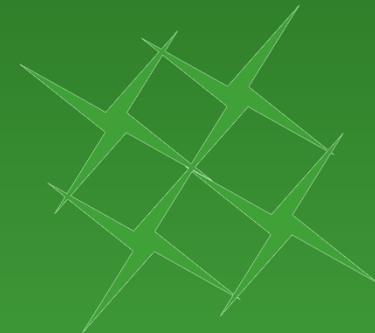




Design Exercise: Large Scale 1080p Video distribution

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SVFIG Forth Day
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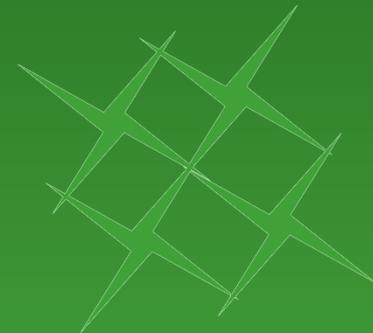
Problem Statement

- In Summer of 2015, Sunrise Systems, Inc. funded GreenArrays to design a simple, practical video distribution system that would enable Sunrise to build very large LED signs, running full 1080p video from an HDMI source, from its existing LED sign modules. Each module had an array of LED pixels with pitches typically 7.62mm; each module was controlled by an ARM processor receiving commands on an RS485 compatible serial interface running 4.5 Megabit asynchronous communications. A full sign might have on the order of 2,000 modules.



Our Design

- Rip video apart column-wise to minimize buffering and reduce pixel rate by factor of the number of columns
- ADV7611 HDMI to 24 bit pixel bus
- FPGAs to parse video, transmit pixels down columns as parallel 3 data + $\frac{1}{2}$ frequency clock
- GA144 at each module, daisy chained vertically



Controlling the ADV7611 HDMI Receiver

The Analog Devices® ADV7611 is a chip designed to interface an audiovisual sink with an HDMI source. This paper describes controlling this chip (on an EVAL-ADV7611eb2z BOARD) to initialize the HDMI link, negotiate video format and produce a parallel RGB data stream for 1080p video. Does not support audio, HDCP decryption, repeater functions, Infoframes or CEC packets. The implementation complies with the mandatory parts of the standards below, which are adequate for 1080p video sinks at 60 Hz refresh. Reference documentation other than that of GreenArrays is as follows:

HDMI Specification Version 1.3a (276 pp)

VESA Extended Display Identification Data Standard, Release A, Revision 1 (32 pp)

EIA/CEA Standard 861-B (A DTV Profile for Uncompressed High Speed Digital Interfaces) (134 pp)

Analog Devices ADV7611 Low Power 165 MHz HDMI Receiver Data Sheet Rev D (16 pp)

ADV7611 Eval Note Rev A (42 pp)

ADV7611 Register Settings Recommendations Rev 1.5 (11 pp)

ADV7611 Reference Manual UG-180 Rev C (184 pp)

ADV7611 Software Manual (Documentation of Register Maps) Rev A (129 pp)

I²C bus specification and user manual (NXP UM10204) (64 pp)

This work was funded by Sunrise Systems, Inc., manufacturer of custom LED signage.

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Design Exercise: Distributing 1080p Video in Large Scale Sunrise Systems LED Signs

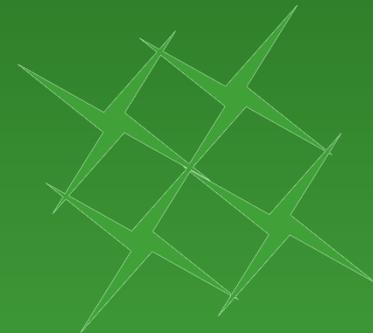
System architecture and design for upper level video flow control to enable rapid manufacture of high resolution (1080p) LED video signs from existing Sunrise modules.

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For More Information on GreenArrays and These Modules

- Primary Website
 - <http://www.greenarraychips.com>
 - Get all documents here
- Announcement Blog
 - Technical <http://www.greenarraychips.com/blog2>
- Tech Support on e-mail, Skype, Phone





Thank You!

For more information, please visit

<http://www.greenarraychips.com>

