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Application Note:
4 pin RGBs in a Cross-Plexing Matrix

AS1130

132 LED, I²C Interfaced, Cross-Plexing Driver with scrolling Function

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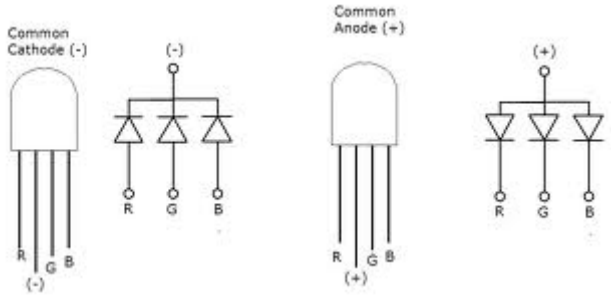
General Description

This document describes how to build up a large 4-pin RGB LED Matrix with the AS1130. The device is using cross-plexing to control 132 LEDs with only 12 pins.

4 pin RGB LEDs

In order to safe space it's common to use 4 pin RGBs instead of 6 pin RGBs. The 4 pin RGBs are assembled as common anode or common cathode RGBs.



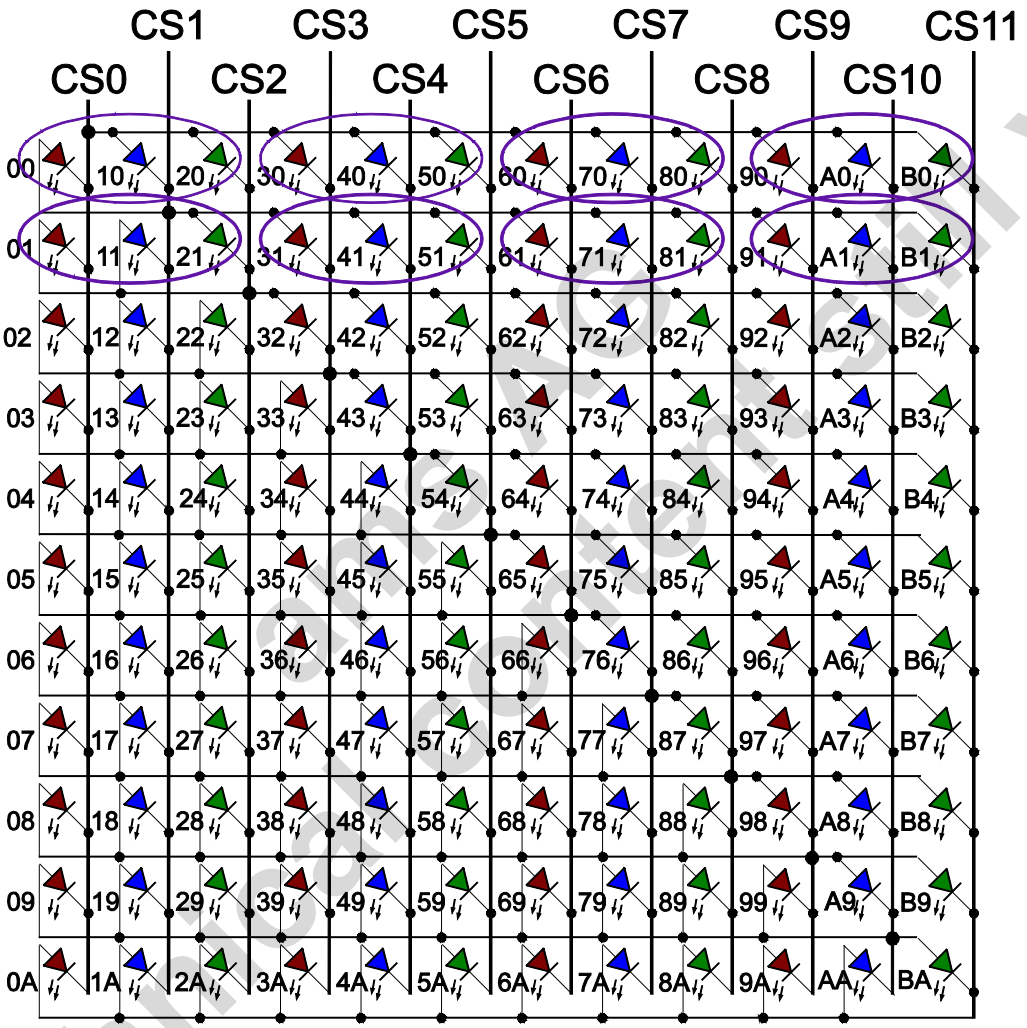
Whereas 6 pin RGB can be treated like single LEDs, the 4 pin RGB are limited in positioning inside the cross-plexed Matrix. Due to the connection of the three anodes or cathodes together these RGBs can cause some unwanted effects, e.g. shorts when turning on one of the channels and influencing the other two trough the shared connection.
In the following it's described where the common anode/cathode RGB are allowed.

Standard RGB Matrix (6 pin)

Number of RGB LEDs: max 44 RGBs (6 pin RGB);

Design Rule: Connect cathodes of only one type (same forward voltage, color) of LED per CSx pin.
If single color and RGB LEDs are mixed within one matrix take care that only LEDs with the same forward voltage are connected to one CSx pin.

In the following figure an AS1130 matrix with 6 pin RGBs is shown. With the Dot Correction Register the brightness differences between the three channels of one RGB can be adjusted.



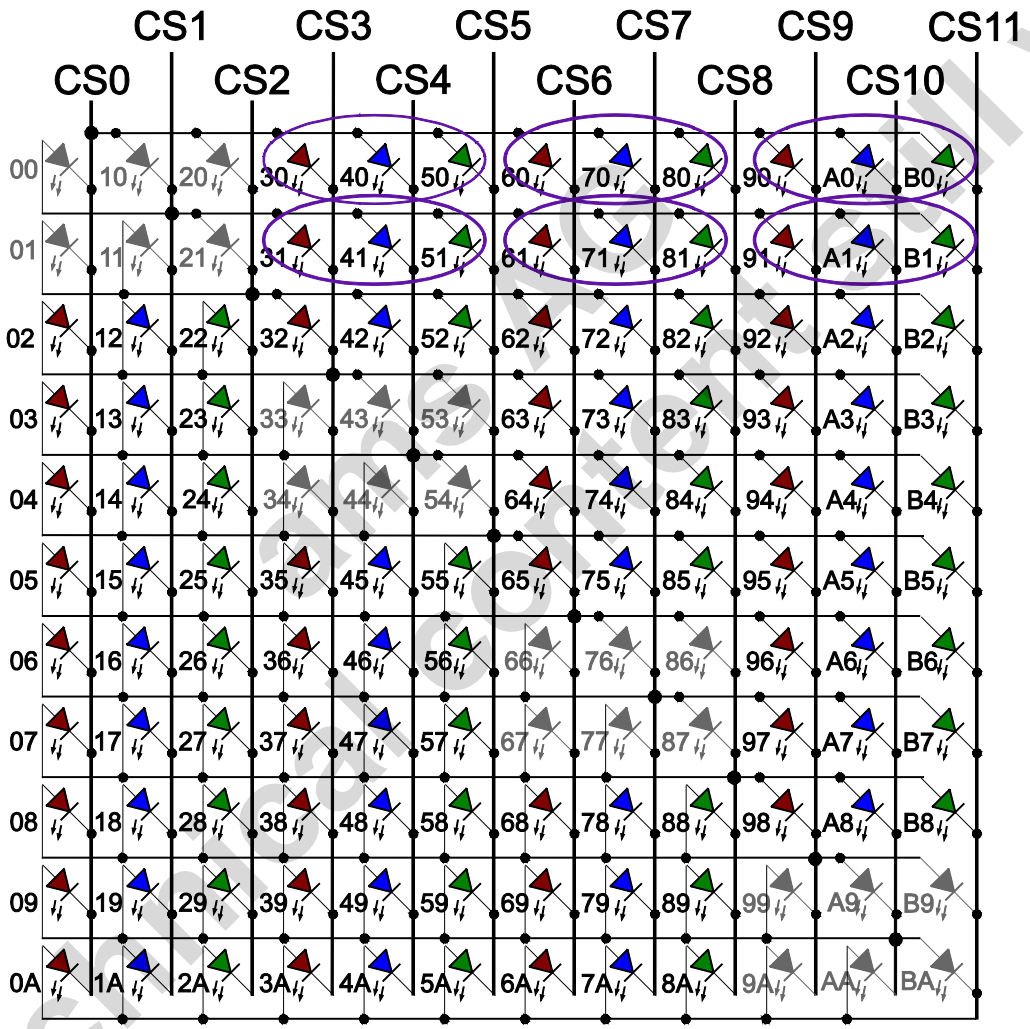
Common Anode RGB Matrix

Number of LEDs: max 36 common anode RGBs;

Design Rule: Connect cathodes of only one type (same forward voltage, color) of LED per CSx pin.

Grey LED positions: At this positions common anode RGBs are not allowed. Single LEDs with same forward voltage as the other LEDs on this CSx pin may be placed at this positions.
If single color and RGB LEDs are mixed within one matrix take care that only cathodes of LEDs with the same forward voltage are connected to the CSx pin.

In the following figure an AS1130 matrix with common anode RGBs is shown. With the Dot Correction Register the brightness differences between the three channels of one RGB can be adjusted.



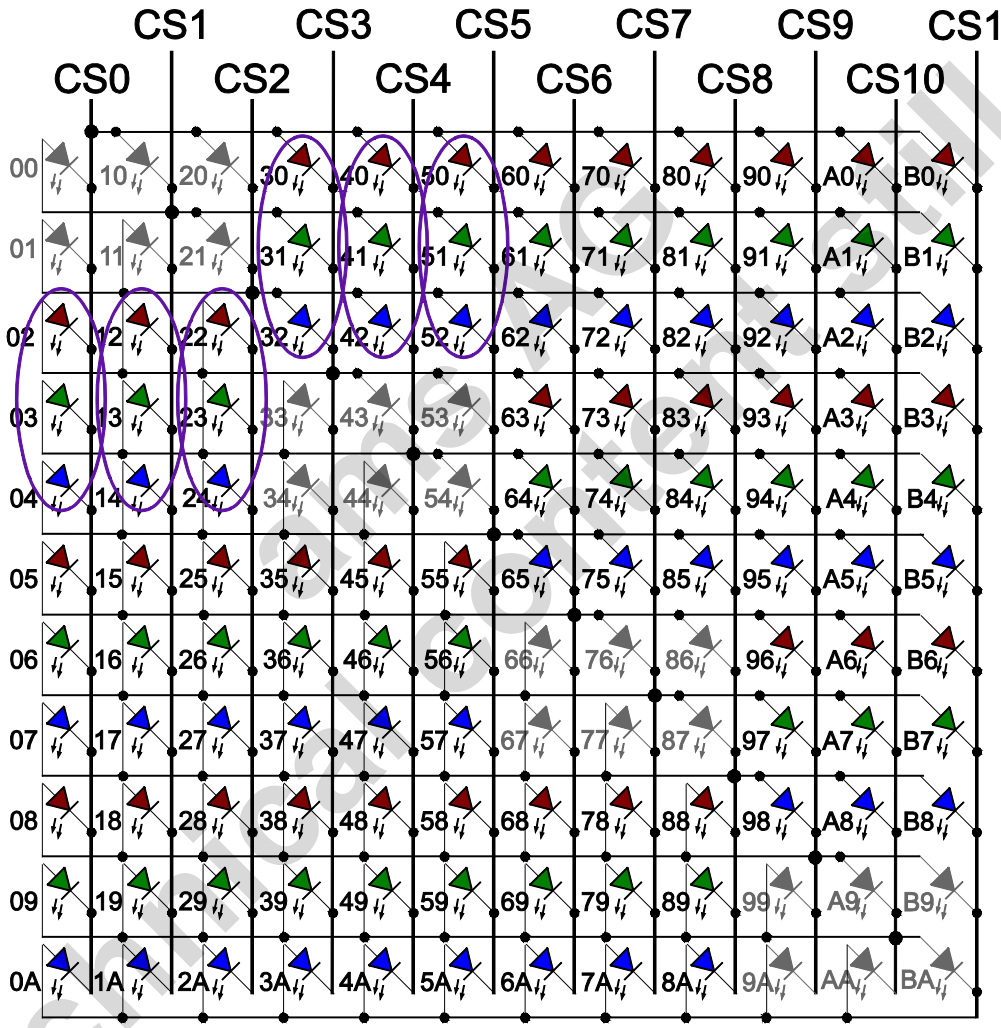
Common Cathode RGB Matrix

Number of LEDs: max 36 common cathode RGBs;

Design Rule: Connect anodes of only one type (same forward voltage, color) of LED per CSx pin.

Grey LED positions: At this positions common cathode RGBs are not allowed. Single LEDs with same forward voltage as the other LEDs on this CSx pin may be placed at this positions.
If single color and RGB LEDs are mixed within one matrix take care that only anodes of LEDs with the same forward voltage are connected to the CSx pin.

In the following figure an AS1130 matrix with common cathode RGBs is shown. Within this setting the brightness differences between the three channels of the RGB can be adjusted via the PWM of the single LEDs.



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