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Demo Kit Manual

AS1130

Standard Board

AS1130-WL_DK_ST

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1 Introduction

This document describes the AS1130 Demo Kit.

The AS1130 is a compact LED driver for 132 single LEDs. The AS1130 offers a 12x11 LED-Matrix with 1/12 cycle rate. The required lines to drive all 132 LEDs are reduced to 12 by using the cross-plexing feature optimizing space on the PCB. The whole LED-Matrix can be analog dimmed from 0 to 30mA in 256 steps.

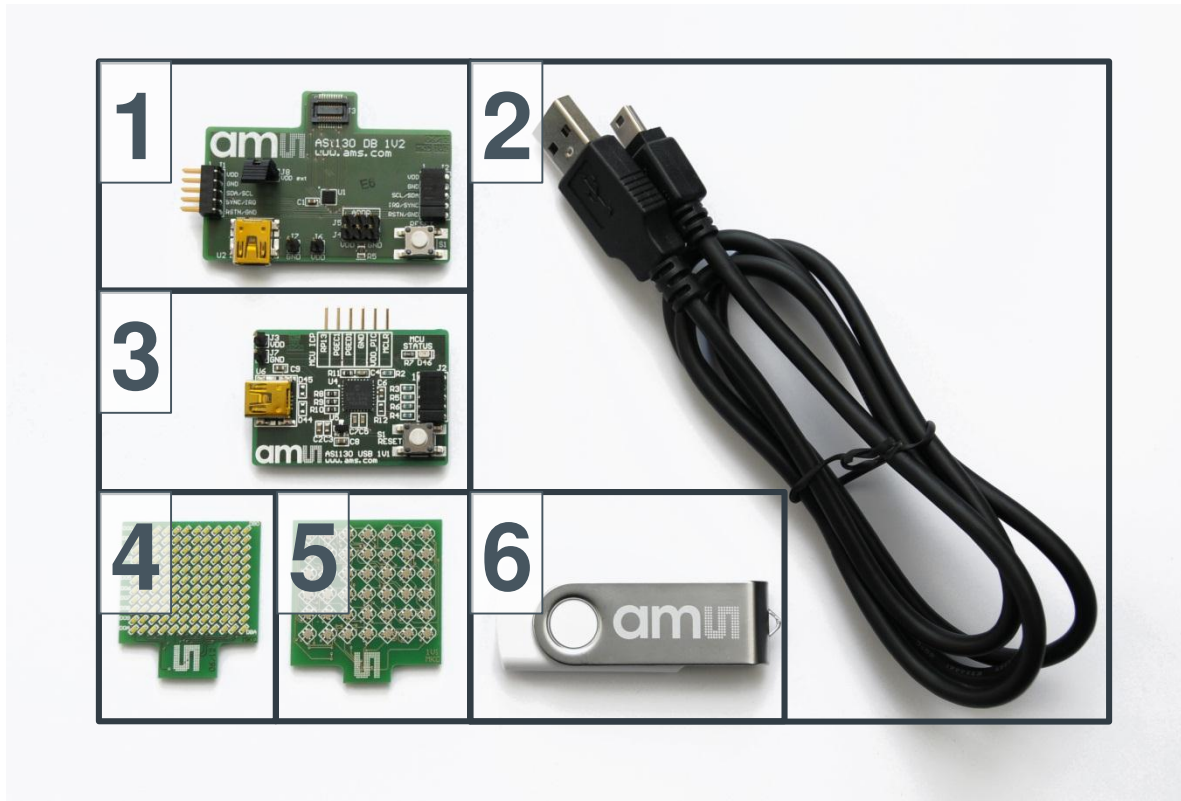
The Demo Kit allows too supply all components by the PC USB Port. No external supply or battery is needed. Except the USB cable (included), no wiring is needed which allows a fast and comfortable evaluation of the AS1130.

The graphical user interface (GUI) runs on PC running Windows 7 and allows the user to control the AS1130.

1.1 Kit Content

The AS1130 Demo Kit includes all items listed in Figure 1: Kit Content.

Figure 1: Kit Content



Label	Item	Comment
1	AS1130 Demo Board	
2	USB Cable	Data & Supply
3	AS1130 USB Interface Board	
4	Standard LED Board	Snap on board
5	RGB LED Board	Snap on board

Label	Item	Comment
6	USB Data Stick	Documents and Software

2 Getting Started

Drive the AS1130 only with the recommended settings and values as described in the datasheet. Please check www.ams.com for the latest version.

For a detailed description of the Kit please read sections 3-5 of this document.

- Connect the LED board to connector J3 and make sure Jumper J8 is placed on the AS1130 Demo Board.
- Connect USB Interface Board J2 to connector J1 of AS1130 Demo Board
- Start the GUI and connect the USB Interface Board to PC USB Port via mini USB cable (U6).
- Enable “Direct Drawing Mode” in the GUI and select LEDs to be enabled in the LED matrix the dot correction (DC current) for each channel.

If there are questions do not hesitate to contact us.

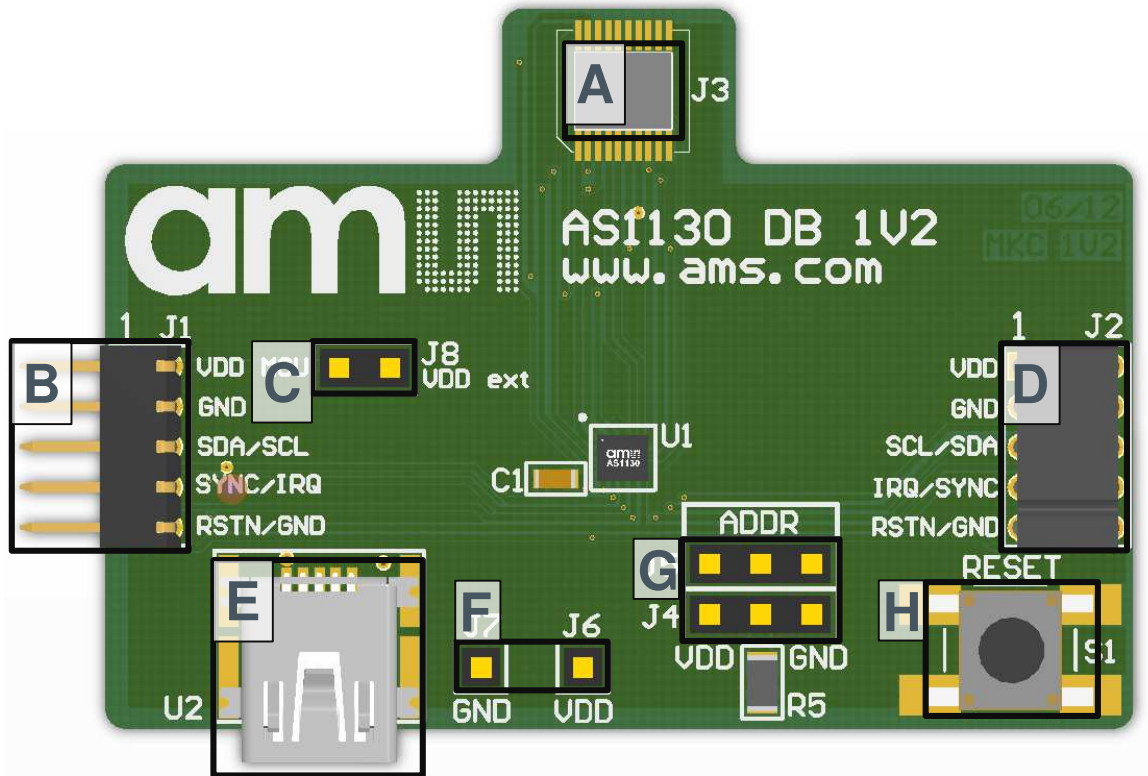
3 Hardware Description



3.1 Demo Board Description




The AS1130 Demo Board can be powered from the AS1130 USB Interface board via J1 if J8 is placed or via an additional USB cable plugged in U2 or any other supply via J6 and J7 (J8 has to be removed if powered from U2 or J6/J7!). The AS1130 can be controlled with the USB Interface board or any other controller board via 10 pole connector which enables fast code debugging.

It supports connection of various LED test boards via 20 pole connector.

Figure 2: Demo Board Connectors



Label	Name	Designator	Description	Info
A	LEDs	J3	LED Connector	Connect LED board to this connector. The kit comes with RGB and standard LED board.
B	IN	J1	Line In Connector	Can be connected to AS1130 USB Interface Board, general purpose controller board or OUT "D" of the previous AS1130 Demo Board.
C	VDD ext	J8	Supply Voltage	 Jumper placed: Vdd from IN "B"  Jumper released: Vdd from "E" of "F"

Label	Name	Designator	Description	Info
D	OUT	J2	Line Out Connector	Can be connected to IN "B" of next AS1130 Demo Board.
E	USB	U2	USB Power Supply	Connect Mini USB cable. This Connector is not used for data transfer. Release Jumper "C" if cable is connected.
F	VDD, GND	VDD, GND	Supply Voltage	Supply Voltage Range: 2.7V to 5.5V. Make sure no USB cable is connected on "E" and release Jumper "C".
G	ADDR	J4, J5	Device Address Selection	 Address is set to 0110111  Address depends on R5 (default is 10kΩ - 0110110)  GND: Address is set to 0110000
H	RESET	S1	Reset Button	Push to reset the AS1130

Notes:

- Use only the Connectors VDD and GND "F" or USB Connector "E". Never use both supply possibilities at the same time!
- If the *AS1130 Demo Board* is connected to the *USB Interface Board* and jumper "C" is set, no extra Supply is needed.

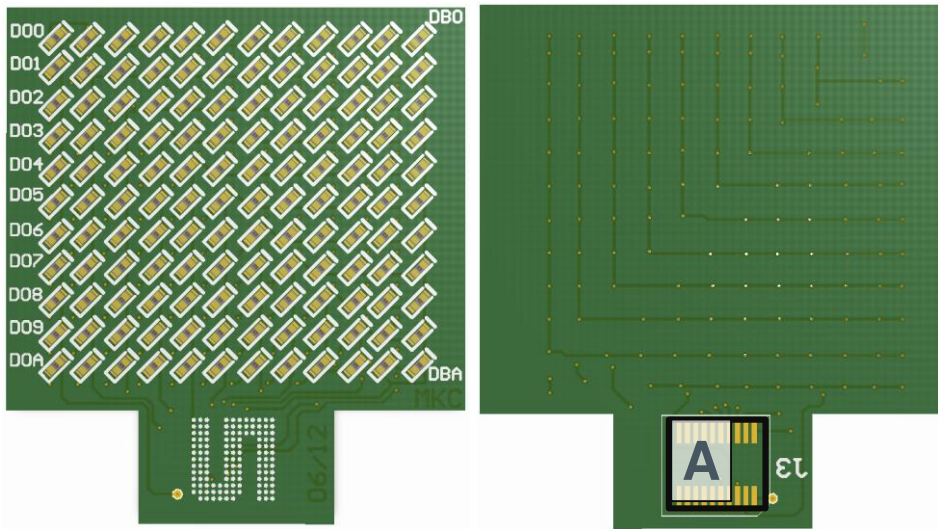
Figure 3: Demo Board Pinout



3.2 Single Color LED Board Description

The Single Color LED Board has mounted 132 white LEDs. It can be attached to the AS1130 Demo Board by the 20-pin connector. The attachable LED board enables easy testing of various LEDs with minimum effort and costs.

Figure 4: Single Color LED Board

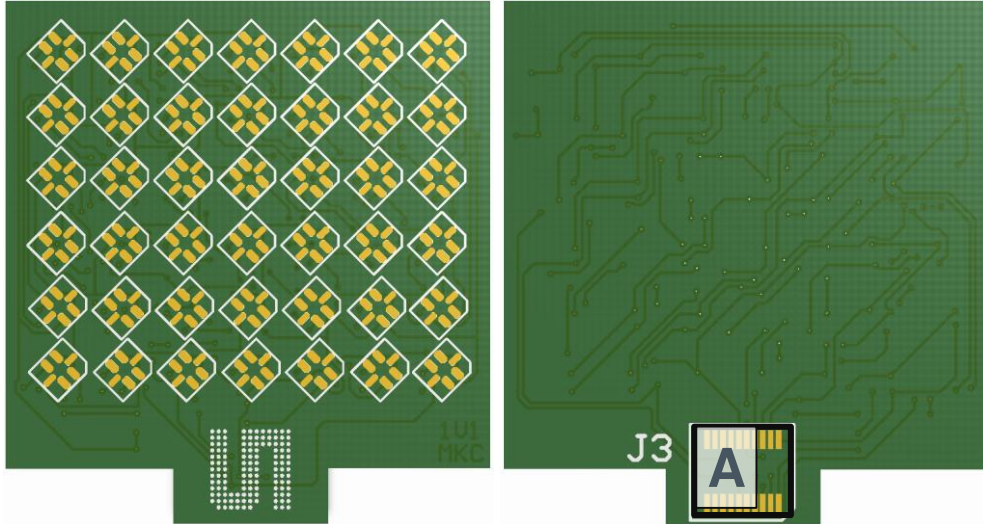


Label	Name	Designator	Description	Info
A	LEDs	J3	LED Board Connector	Connect to connector “A” of AS1130 Demo Board.

3.3 RGB LED Board Description

The RGB LED Board has mounted 42 6-pin RGB LEDs. It can be attached to the AS1130 Demo Board by the 20-pin connector. The attachable LED board enables easy testing of various LEDs with minimum effort and costs.

Figure 5: RGB LED Board

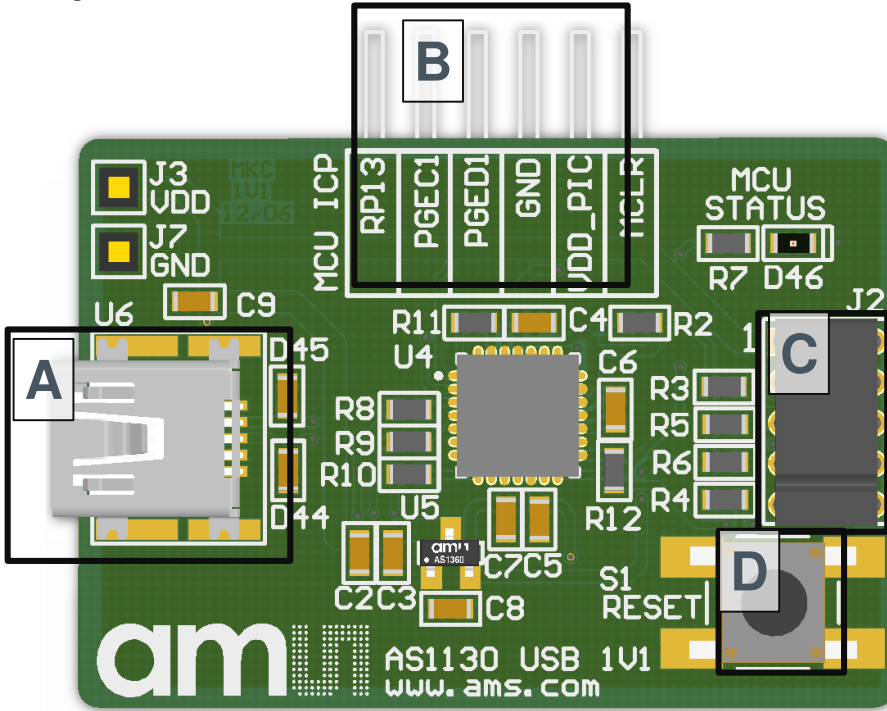


Label	Name	Designator	Description	Info
A	LEDs	J3	LED Board Connector	Connect to connector "A" of AS1130 Demo Board.

3.4 USB Interface Board Description

The USB Interface Board allows control of the AS1130 with the delivered graphical user interface (GUI). It allows too supply the AS1130 Demo Board with the PC USB Port without need of an additional supply or battery. Except the USB cable no wiring is needed for a fast evaluation of the AS1130.

Figure 6: USB Interface Board



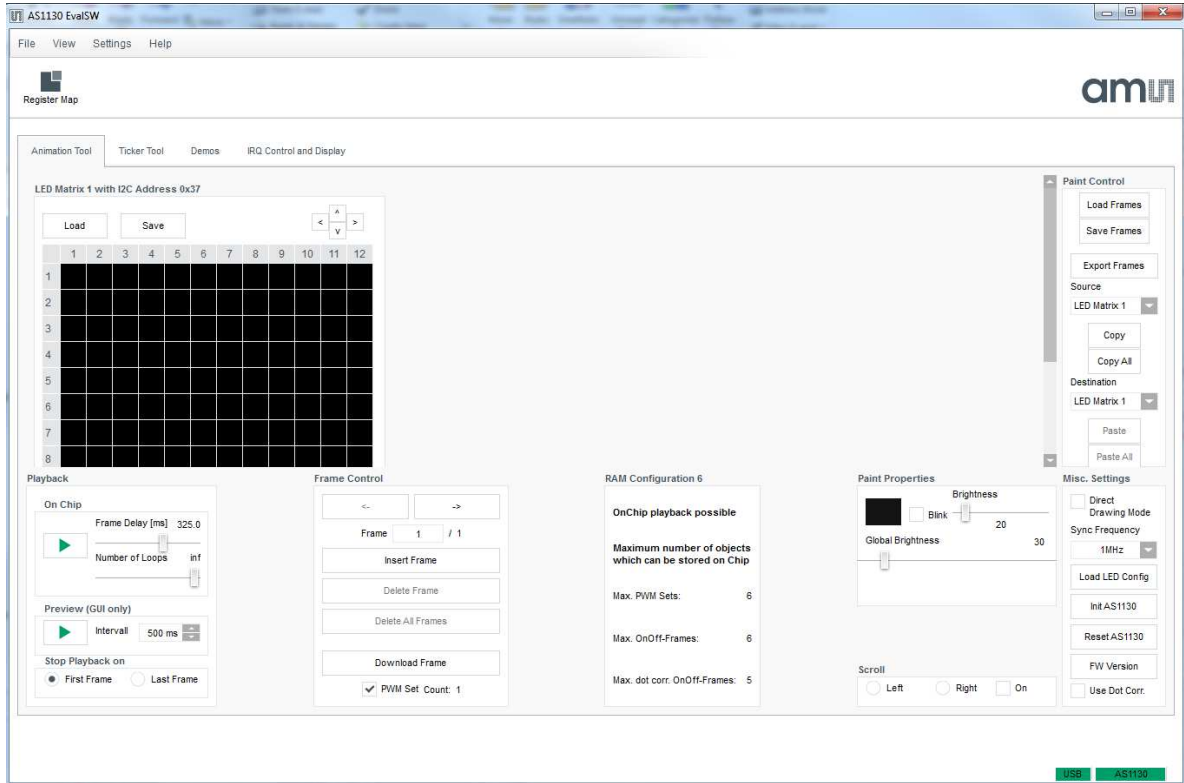
Label	Name	Designator	Description	Info
A	USB	U6	Mini USB Interface	Data interface and board supply
B		J1	ICP Interface	For details see PIC24FJ64GB datasheet
C		J2	Line Out Connector	Can be connected to AS1130 Demo Board
D	RESET	S1	Reset	Resets the AS1130 (if connected)

4 Software Description

Plug the device to your Computer and install it. Afterwards restart your computer to finish installation. Now you can start AS1130 Evaluation SW either from the desktop icon or from the start menu.

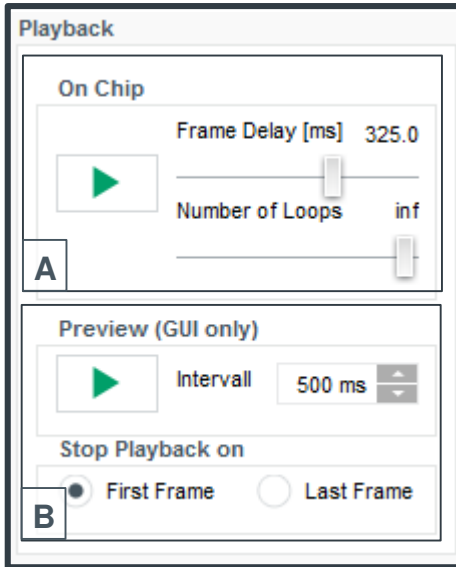
If the device is connected correctly in the right bottom corner it says “**USB AS1130**” otherwise “**USB Not connected**”

Figure 7: Startup Screen



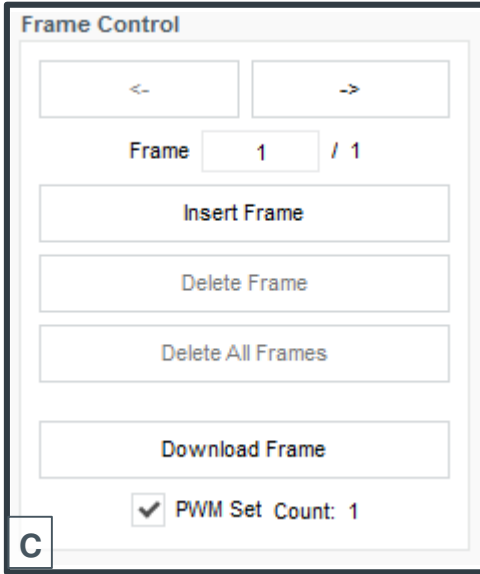
4.1 Animation Tool

Figure 8: Playback Features



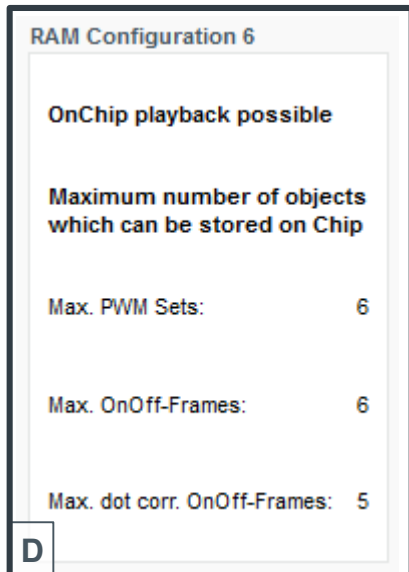
Label	Name	Comment
A	On Chip	Data is stored on the AS1130. You can modify both the Frame Delay and the Number of Loops. On Chip Playback means that if the storage of the device is big enough then the data is programmed on the device otherwise the data is streamed. If the box “Streaming Mode only” which is explained later in letter J is checked the data is anyway streamed to the device.
B	Preview (GUI only)	With this option you can only have an output on the GUI. A time delay can be adjusted with the buttons up and down. Another feature is to stop Playback either on first or last Frame.

Figure 9: Frame Control Feature



Label	Name	Comment
C	Frame Control	<p>On Frame Control Mode you can navigate through your existing Frames. You can either skip with the arrow buttons to the left or to the right. Under the arrows to the right of Frame the number shows your current position and how many Frames you have.</p> <p>Insert Frame: inserts a new Frame after your current Frame position</p> <p>Delete Frame: deletes the selected Frame</p> <p>Delete all Frames: all Frames are deleted</p> <p>Download Frame: is for moving the code from the Computer to the chip on the board.</p> <p>The Box in the bottom has to be checked if you want to have the selected Frame to be set as PWM. If marked it defines just the PWM Setting – not what should be displayed! Also how many PWM's exist is displayed next to count.</p>

Figure 10: Ram Configuration Feature



Label	Name	Comment
D	RAM Configuration	This Feature gives you information about how many PWM Sets or how many ONOFF-Frames or how many dot corr. OnOff-Frames are possible for OnChip playback. If number of Sets exceeds the maximum streaming mode will be activated.

One Frame consists of 2 datasets, the On/Off dataset and the Blink & PWM dataset. Where more On/Off Frames can be linked to one PWM set. Depending on the used PWM sets more or less On/Off frames can be stored inside the AS1130 (see figure 5).

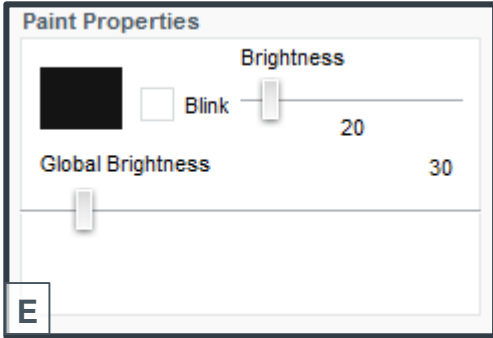
Each On/Off Frame needs to define the used Blink & PWM datasheet.

Figure 11: Ram Configuration

RAM Configuration	Blink & PWM Sets	On/Off Frames	On/Off Frames with Dot Correction
1	1	36	35
2	2	30	29
3	3	24	23
4	4	18	17
5	5	12	11
6	6	6	5

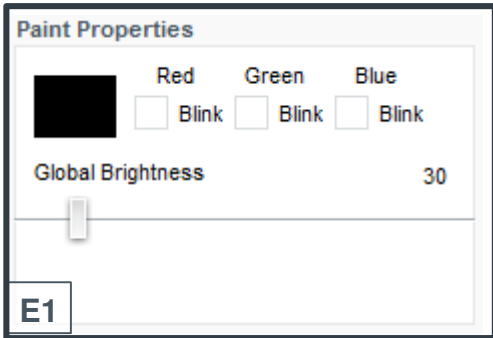
Note: After a first write of data to the frames, the configuration is locked in the AS1130 config register and can be changed only after a reset of the device. A change of the RAM configuration requires to re-write the frame datasets!

Figure 12: Paint Properties Feature



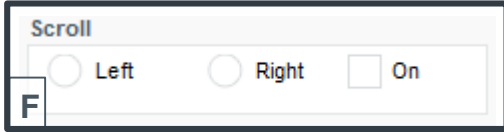
Label	Name	Comment
E	Paint Properties	In this Tool you can vary the brightness of a single LED "Brightness" and of all LED's "Global Brightness". Checking the box "Blink" enables blinking of the LED's. In this case color can not be changed.

Figure 13: Paint Properties RGB



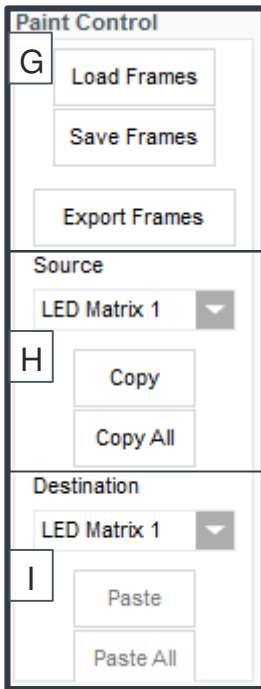
Label	Name	Comment
E1	Paint Properties RGB	Clicking on the color opens a new window in which the wanted color can be chosen. Checking the box "Blink" enables blinking of the LED' which can be set for each color individually. In this Tool the globale brightness of the LED's can be adjusted.

Figure 14: Scroll Feature



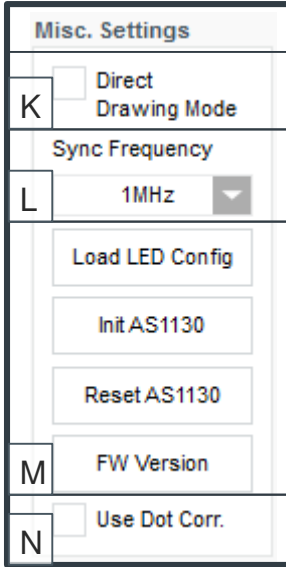
Label	Name	Comment
F	Scroll	To enable scroll function check box “On” then choose moving direction either to the left or to the right.

Figure 15: Paint Control Feature



Label	Name	Comment
G	Paint Control	Load Frames: select an existing file and it will be opened to be edited Save Frames: saves your data in a xml File Export Frames: saves your data in an .inc file Info: Exports your data as a c-include file
H	Source	The option Source with its dropdown Menu is for selecting a Matrix Copy: Copies a Frame of a Matrix. Copy all: all Frames of selected Matrix are copied.
I	Destination	Destination option with its dropdown Menu is for selecting Matrix Paste: the copied content to another Frame. Paste all: all Frames of copied Matrix are pasted.

Figure 16: Misc. Settings Feature



Label	Name	Comment
K	Direct Drawing Mode	The Direct Drawing Mode gives you the opportunity to see your changes you are currently doing on the Matrix directly on your device.
L	Sync Frequency	In the dropdown Menu you can choose your favored synchronization frequency between your computer and your device.
M	Button	Load LED Config: import an existing LED Config file to your Project. Init AS1130: the device will be initialized. Reset Button: resets your device. FW Version: information which Firmware is installed.
N	Use Dot Corr.	Dot Corr. Box: separate modification of the dots.

4.2 Ticker Tool

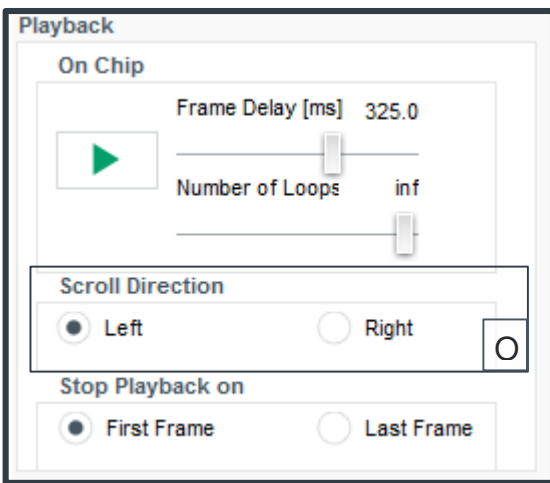
This Tool is supposed to be used for 24x5 matrices.

The Ram Configuration Feature and the Paint Properties Feature are the same as in the Animation Tool.

The Paint Control Feature is pretty the same but in the Ticker Tool there are no Copy all and Paste all buttons available.

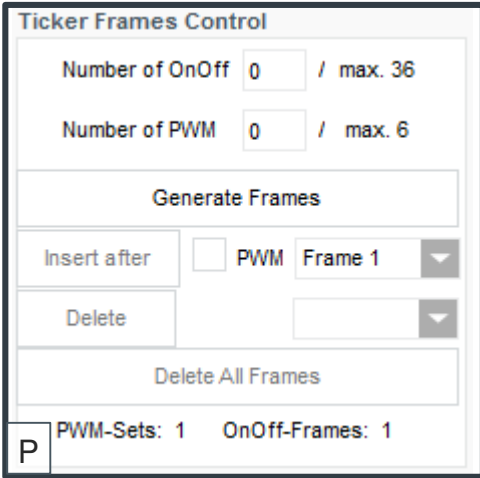
The Misc. Settings Features in the Ticker Tool are mostly the same as they are in the Animation Tool except the Direct Drawing option.

Figure 17: Playback Feature



Label	Name	Comment
O	Scroll Direction	In comparison to the Playback Feature in the Animation Tool there is an additional Feature “Scroll direction” which has to be set otherwise “Stop Playback on” is disabled.

Figure 18: Ticker Frames Control Feature



Label	Name	Comment
P	Ticker Frames Control	<p>Ticker Frames Control Feature gives you information about your Status how many OnOff and PWM Frames exist and how many Frames you are allowed to have.</p> <p>Generate Frames: creates an entered number of Frames.</p> <p>Insert after: creates a new Frame at the end.</p> <p>Delete: a single Frame can be deleted</p> <p>PWM: the selected Frame from the dropdown Menu to the right of the PWM checkbox can be set as PWM or not.</p> <p>Delete all Frames: a button for deleting all Frames.</p>

4.3 Working with XML

XML files can be edited with lots of tools. The hwPos can be taken from the Single LED 2x5 config.

Example (description of the code added in blue):

```
-<ledConfig> //opens ledConfig
  -<chip i2cAddress="0x30"> //opens chip and sets address "0x30"
    // if you want to drive more displays you have to copy the whole example code and substitute instead of 0x30
    the proper i2c Address of the other display
    -<matrix nrOfRows="2" nrOfColumns="5"> //enter the maximum number of rows and columns between " "
```

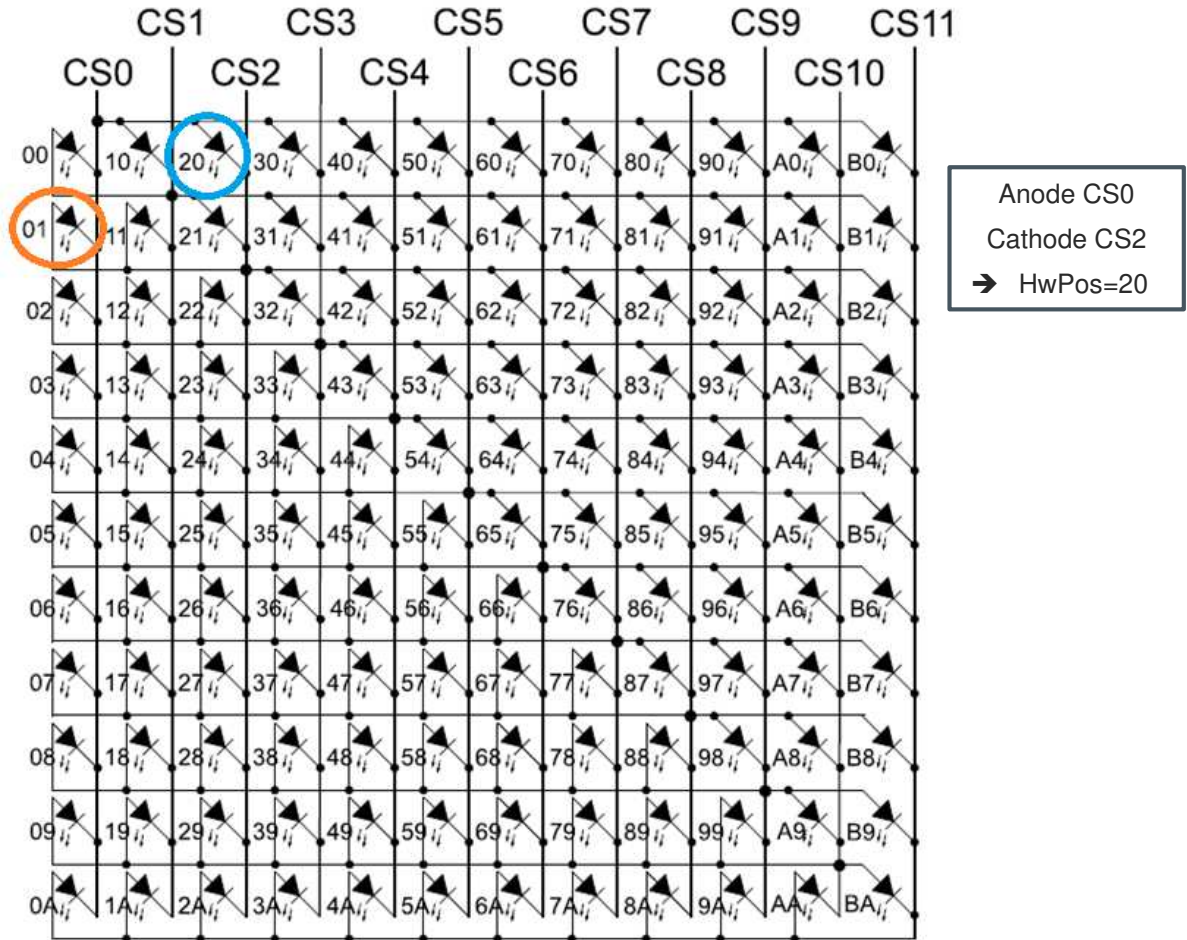
A	B	C	D	E	F	G	H
<led row="0" col="0" enable="1" is RGB="0" hwPos="0x20" />							
<led row="1" col="0" enable="1" is RGB="1" hwPosGreen="0x21" hwPosRed="0x01" hwPosBlue="0x11" />							
<led row="0" col="1" enable="1" is RGB="0" hwPos="0x22" />							
<led row="1" col="1" enable="1" is RGB="1" hwPosGreen="0x23" hwPosRed="0x03" hwPosBlue="0x13" />							
<led row="0" col="2" enable="1" is RGB="0" hwPos="0x24" />							
<led row="1" col="2" enable="1" is RGB="1" hwPosGreen="0x25" hwPosRed="0x05" hwPosBlue="0x15" />							
<led row="0" col="3" enable="1" is RGB="0" hwPos="0x26" />							
<led row="1" col="3" enable="1" is RGB="1" hwPosGreen="0x27" hwPosRed="0x07" hwPosBlue="0x17" />							
<led row="0" col="4" enable="1" is RGB="0" hwPos="0x28" />							
<led row="1" col="4" enable="1" is RGB="1" hwPosGreen="0x29" hwPosRed="0x09" hwPosBlue="0x19" />							

```
</matrix> // close Matrix
</chip> //close chip
</ledConfig> //close ledConfig
```

Label	Name	Comment
A	Row	Enter the number of the row of the LED
B	Col	Enter the number of the column of the LED
C	Enable	Enable = 1 = LED ON , Disable = 0 = LED OFF
D	RGB	Enable = 1, Disable = 0 RGB... RedGreenBlue
E	hwPos	Position of the white LED (no RGB)
F	hwPosGreen	Position of the green LED
G	hwPosRed	Position of the red LED
H	hwPosBlue	Position of the blue LED

Figure 19: hwPos

The AS1130 is configured to control on big LED matrix.



5 Board Schematics, Layout and BOM

5.1 Schematics, Layout and BOM AS1130 Demo Board

The AS1130 Demo Board is a 4-layer FR4 board. The main component is the AS1130 with some passive components and connectors.

Figure 20: AS1130 Demo Board Schematic

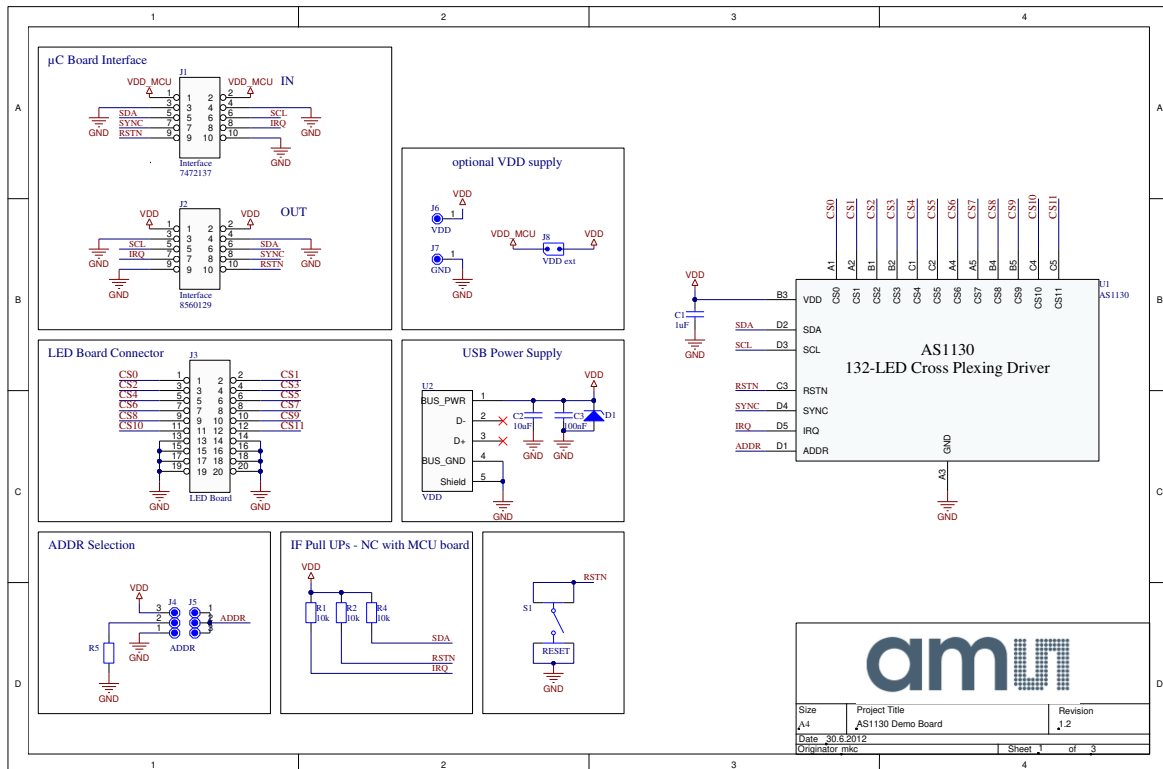


Figure 21: Top Layer and Silk Screen AS1112 Evaluation Board

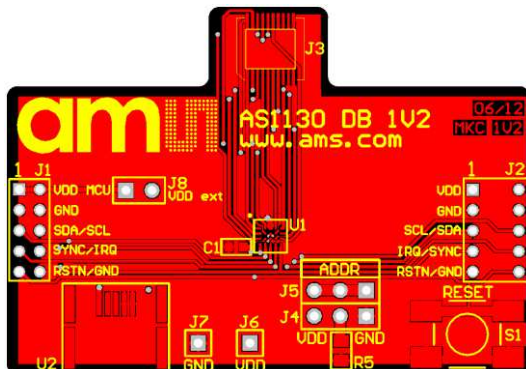


Figure 22: Inner Layer1 AS1130 Demo Board

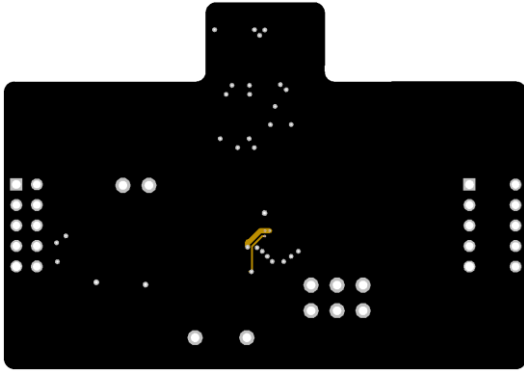


Figure 23: Inner Layer2 AS1130 Demo Board

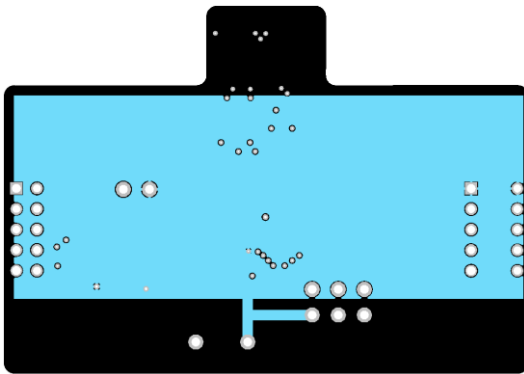


Figure 24: Bottom Layer AS1130 Demo Board (bottom view)

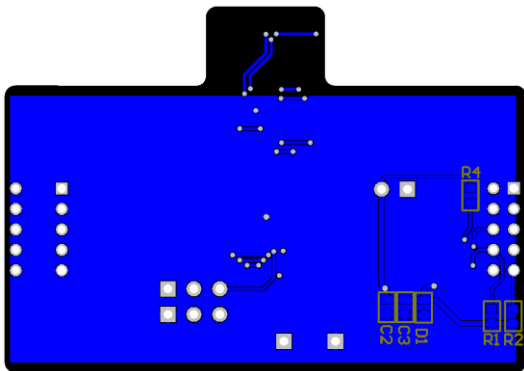


Figure 25: Bill of Materials AS1130 Demo Board

Bill of Materials			AS1130 Demo Board			
Company:			ams AG			
Originator:			mkc			
PCB Name:			AS1130 Demo Board			
PCB Version:			1.2			
Report Date:			30.6.2012			
#	Designator	Comment	Component Description	Manufacturer	Manufacturer Part Number	Quantity
1	C1	1uF	CAP CER 1UF 25V 10%	Murata Electronics North	GRM219R71E105KA88D	1
2	C2	10uF	Multilayer Ceramic	Murata Electronics	GRM219R61A106ME44D	1
3	C3	100nF	CAP CER 0.1UF 50V 10%	Murata Electronics North	GRM21BR71H104KA01L	1
4	J1	Interface	MOLEX - 877601016 -	MOLEX	877601016	1
5	J2	Interface	MOLEX - 87264-1052 -	MOLEX	87264-1052	1
6	J3	LED Board	MOLEX - 54722-0204 -	MOLEX	54722-0204	1
7	J4, J5, J8	[NoValue], ADDR, VDD ext	FISCHER ELEKTRONIK -	FISCHER ELEKTRONIK	SL11 124 36G	3
8	J6	VDD	VERO - 20-313137 -	VERO	20-313137	1
9	J7	GND	VERO - 20-2137 -	VERO	20-2137	1
10	R5		MULTICOMP -	MULTICOMP	MCO.1W08051%10KFR	1
11	S1	RESET	OMRON ELECTRONIC	OMRON ELECTRONIC	B3S-1000	1
12	U1	AS1130	IC LED DVR DOT MATRIX	ams	AS1130-BWLT	1
13	U2	VDD	MOLEX - 54819-0572 -	MOLEX	54819-0572	1
Approved			Notes			15

5.2 Schematics and Layout AS1130 Single Color LED Board

The AS1130 Single Color LED Board is a 2-layer FR4 board. Color of mounted LEDs is white.

Figure 26: AS1130 Single Color LED Board Schematic

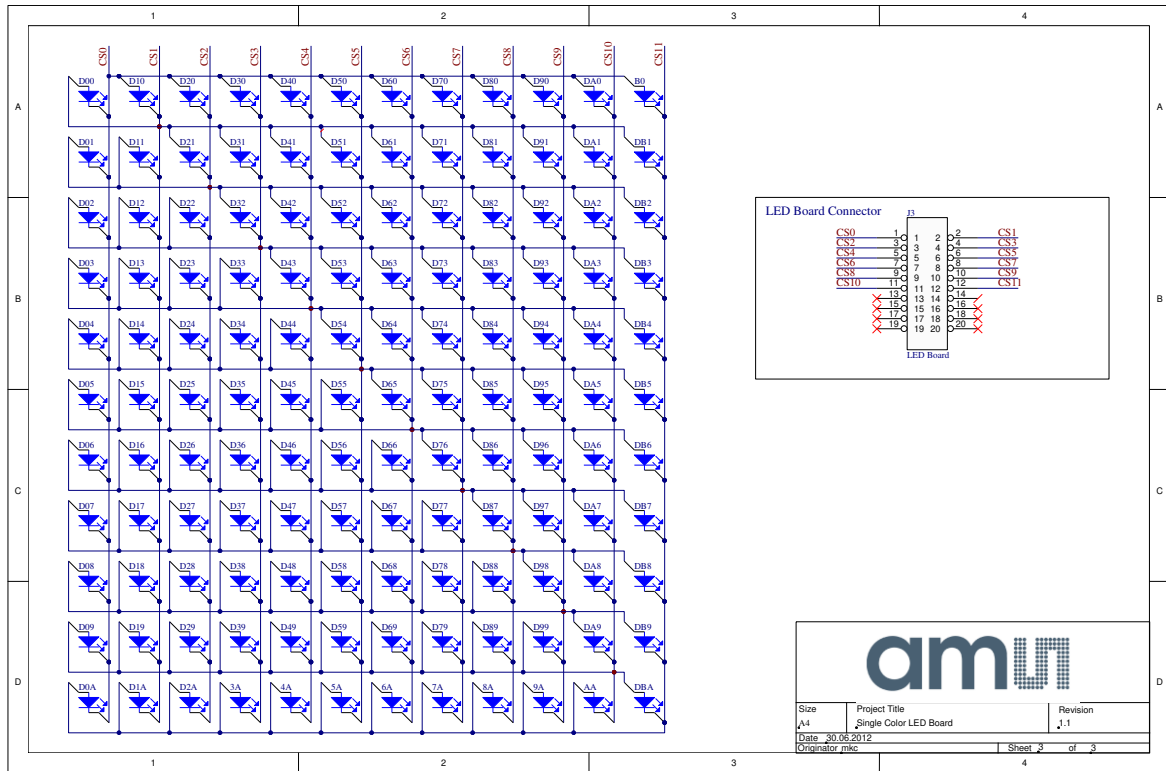


Figure 27: Top Layer and Silk Screen AS1130 Single Color LED Board

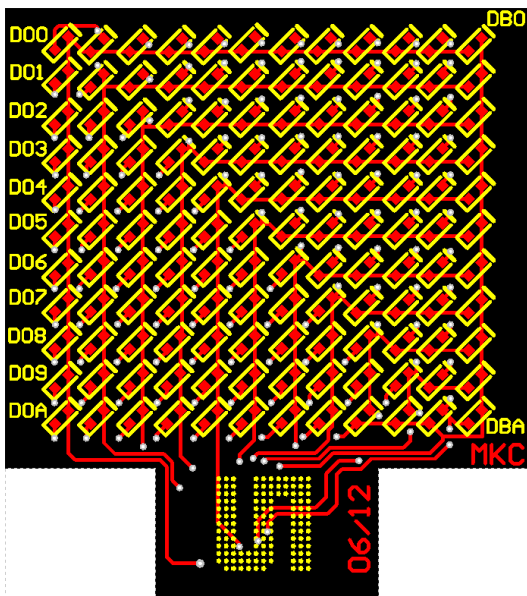


Figure 28: Bottom Layer AS1130 Single Color LED Board (top through view)

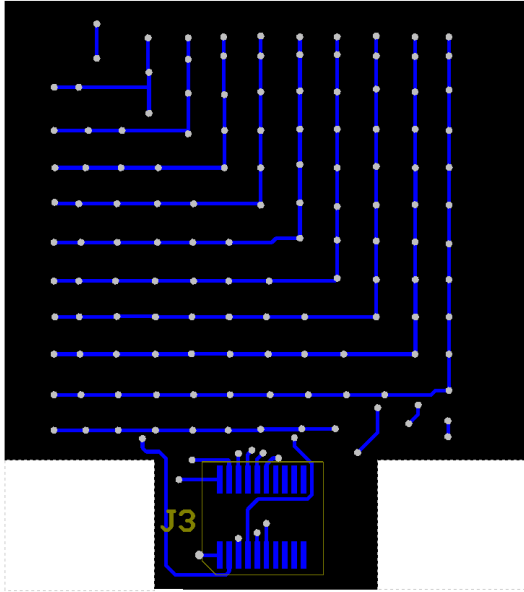


Figure 29: Bill of Materials AS1130 Single Color LED Board

Bill of Materials		Single Color LED Board				
Company:		ams AG				
Originator:		mkc				
PCB Name:		Single Color LED Board				
PCB Version:		1.1				
Report Date:		30.06.2012				
#	Designator	Comment	Component Description	Manufacturer	Manufacturer Part Number	Quantity
1	3A, 4A, 5A, 6A, 7A, 8A, 9A, AA, B0, D00, D0A, D01, D1A, D02, D2A, D03, D04, D05, D06, D07, D08, D09, D10, D11, D12, D13, D14, D15, D16, D17, D18, D19, D20, D21, D22, D23, D24, D25, D26, D27, D28, D29, D30, D31, D32, D33, D34, D35, D36, D37, D38, D39, D40, D41, D42, D43, D44, D45, D46, D47, D48, D49, D50, D51, D52, D53, D54, D55, D56, D57, D58, D59, D60, D61, D62, D63, D64, D65, D66, D67, D68, D69, D70, D71, D72, D73, D74, D75, D76, D77, D78, D79, D80, D81, D82, D83, D84, D85, D86, D87, D88, D89, D90, D91, D92, D93, D94, D95, D96, D97, D98, D99, DA0, DA1, DA2, DA3, DA4, DA5, DA6, DA7, DA8, DA9, DB1, DB2, DB3, DB4, DB5, DB6, DB7, DB8, DB9, DBA	LED	LED white 0402	Citizen Electronics	CL-287S-WQ-SD	132
2	J3	LED Board	MOLEX - 55560-0207 - PLUG, 0.5MM, 1.5MM HEIGHT, 20WAY	MOLEX	55560-0207	1
3	Approved					Notes
						133