



SD4-012

SD Card Controller
for Addressable LED strips and Pixels
(Single Output)

User Manual

Version 1.1

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1. Power Supply

The SD Card controller operates at any voltage between 5 and 30 volts DC. The power supply voltage is dependent upon the type of LED lights that you are controlling. If purchased from us as a complete pack with lights, we will have provided you with the correct voltage power supply for the lights.

The controller is powered from the DC socket at the rear of the unit. Alternatively you can power the unit from the V (+) and GND (-) connection for the LED Lights.

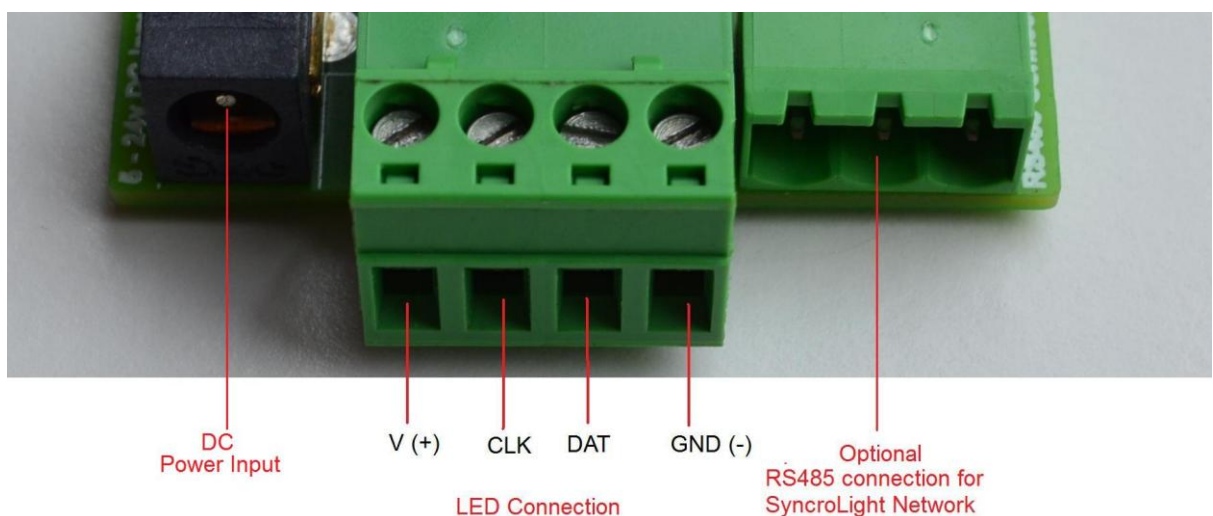
If using a large ampere power supply to power several strings/length of LED lights, we recommend you also inject power at the start of each additional LED string or strip.

2. Light Connections

The rear of the unit contains a 4-way pluggable terminal block for connection to your LED lights. It is important to ensure that the lights are correctly wired to prevent damage to the lights and controller. Ensure that the V(+),GND(-),CLK (Clock) and DAT (Data) wires are correctly connected.

The wire colours vary between lights, please consult the information provided with your lights to correctly identify the wires.

Some lights, such as our ball lights (1803) only have 3 wires; in this case the CLK terminal is not used.



3. Configuration

The SD Card contains a configuration utility for the controller's internal settings. This utility can be run on a Windows PC (requires Microsoft .NET 4.0 to be installed).

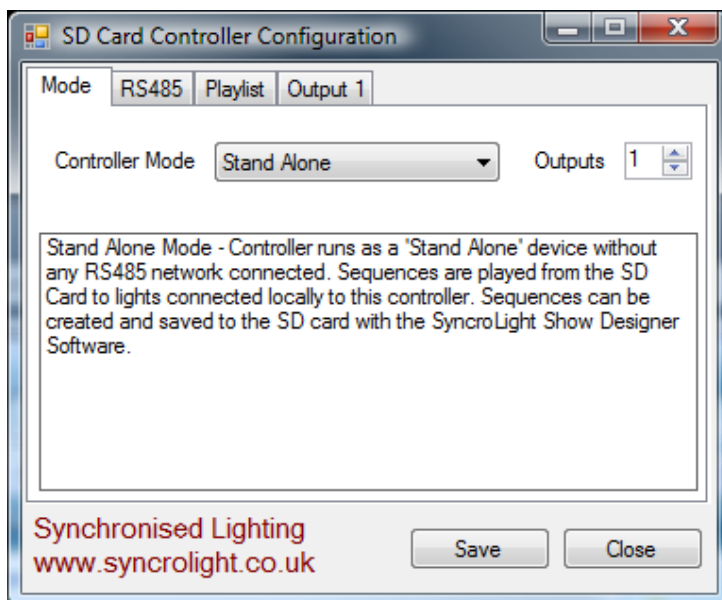
If you purchased the SD card controller with a set of light, the controller will come preconfigured with appropriate settings for the LED lights.

To run this utility:

1. Remove the SD card from the controller and insert into a suitable SD card reader connected to your PC.
2. Start a Windows Explorer and navigate to the SD card drive.
3. Run the "SDControllerConfig.exe" application from the SD card.
4. The configuration screen should now appear.

Note: The configuration utility must reside on the SD card and be run directly from the SD card. An additional copy of this utility is also installed as part of the SyncroLight software package, this can be copied to the SD card should the original version become lost or damaged.

3.1. Mode Configuration



Mode

The controller contains the following modes:

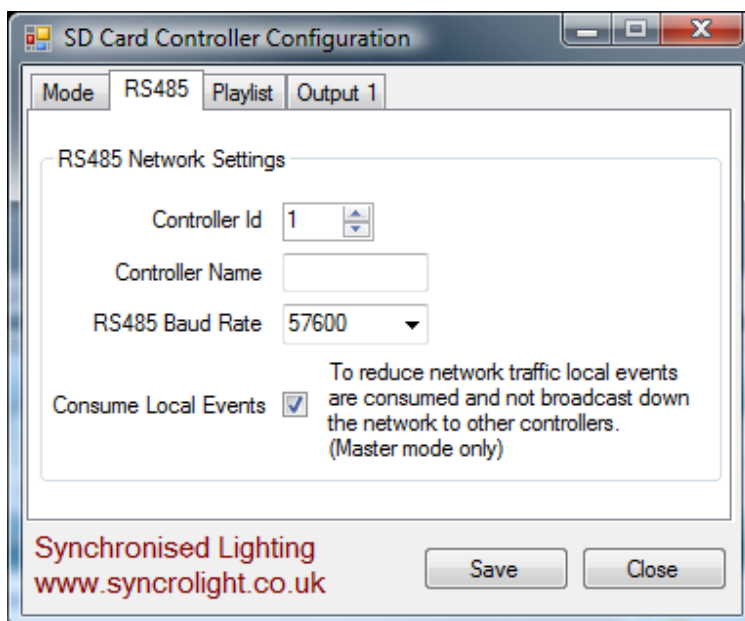
Mode	Description
Stand Alone	For Standalone use. Sequences run from SD card only.
RS485 Slave	For use with SyncroLight software package. Sequences are run from a computer or a network master.
RS485 Master	Sequences run from SD card and are also transmitted over the RS485 network to other devices. Only ONE network master must be active on the network at any time.
Auto Detect	If no master is detected on the RS485 network the controller itself acts as the master. If another master is detected on the network it runs as a RS485 Slave device.

Outputs

The standard version of the controller has one external output for use with 8806, 2801 or 1803 based lights.

3.2. RS485 Configuration

This controller can also be used on a SyncroLight network along with other SyncroLight Controllers to run as part of a synchronised light display. In this setup controllers are directed either by the computer using one of the SyncroLight software packages, or by another controller acting as the network master. See section 5 for details on how to connect the controller to your computer.



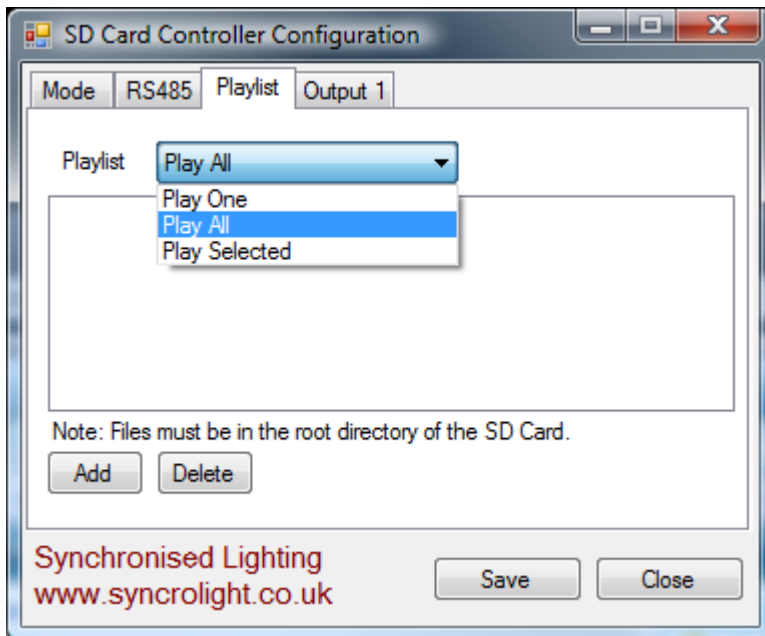
The RS485 tab on the configuration application contains the following settings:

Setting	Description
Controller Id	ID of controller on SyncroLight RS485 network.
Controller Name	Optional name for this controller.
RS485 Baud Rate	Network speed. All devices must use the same speed. 57600 is recommended (default).
Consume Local Events	To reduce RS485 traffic keep this selected, unless running identical sequences across multiple controllers (see below).

If you want multiple controllers to run identical sequences, with full synchronisation then:

- a. Configure one controller as a RS485 Master and one as a RS485 slave.
- b. Connect a cable between controllers for the RS485 network (Simply connect A,B, GND from one controller to A,B,GND on the other controller).
- c. Configure BOTH controllers to have identical Controller ID's.
- d. Ensure 'Consume Local Events' is NOT ticked.
- e. Load Sequences onto the SD card of Master.
- f. Insert SD cards and Power up
- g. Master Device will play sequences and will also transmit messages to control the Slave Device.

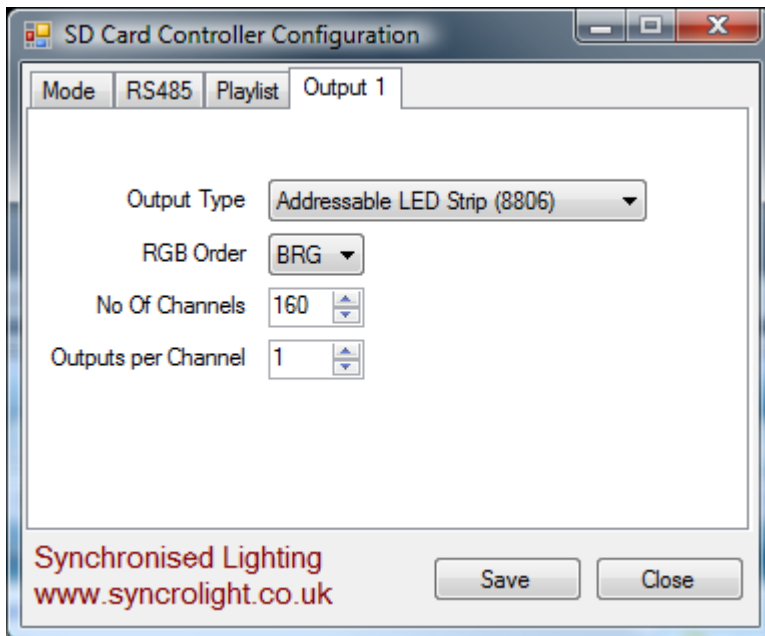
3.3. Play List Configuration



When in 'Stand Alone' or 'RS485 Master' mode, sequences are played from the SD card. You can specify the sequences to be played using the Playlist configuration Tab.

Playlist Setting	Description
Play One	Repeats a single sequence. Pressing the button on the front of the controller will advance to the next sequence on the SD card. The current playing sequence is remembered after power off/on.
Play All	Plays each sequence in turn. Playing all sequences on the SD card.
Play Selected	Plays the specified sequences in turn. Use the Add/Delete buttons to specify the sequences to be played. Files must be located on the root directory of the SD card.

3.4. Output Configuration



The output configuration is set via the output tab.

Setting	Description
Output Type	Type of LED's connected to this output port
RGB Order	When the output type is changed the RGB order will change to the default setting for our LEDs. If another brand of LEDs are used the colours may be the wrong order and display incorrectly (i.e. Red appears a Blue). In this case the RGB order can be changed accordingly.
No of Channels	Number of channels for the connected LED string. If 'Outputs per Channel' below is 1, then 'No of channels' should match the number of addressable LEDs on the connected string/strip.
Outputs per Channel	Rather than control individual LEDS, it is possible to control groups of LEDs by setting this value accordingly.

4. Creating Sequences

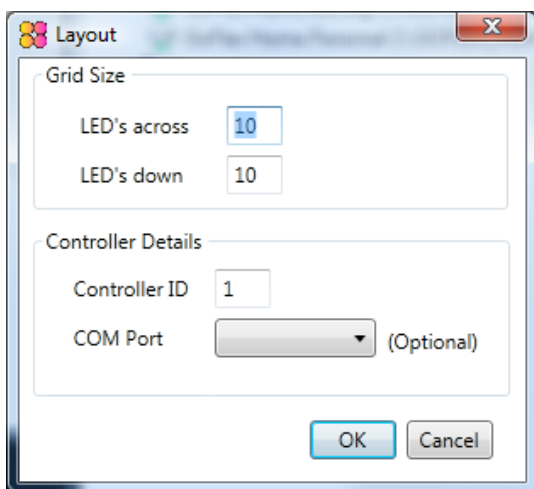
The SD card comes with a few pre-loaded sample sequences. You can also create custom light sequences using our SyncroLight software package. This software is available on CD or can be downloaded at www.syncrolight.co.uk.

The software contains several software tools for creating sequences. The software can be used to create comprehensive light shows set to music as well as basic stand alone sequences.

4.1. LED Sequence Editor

The easiest way to create custom colour effects is by using our LED Sequence Editor. Once you have installed the SyncroLight software suite, start the LED Sequence editor and select 'File/New'. A screen will then be displayed prompting for a grid size. The software works by arranging the LEDs into grid. You can use different grid sizes for different effects. Example grid sizes are shown in the table below.

Lights	Addressable LEDs	Grid Size
5m Addressable led Strip	160 (32 per meter)	16 x 10
Pixel lights	50 LEDs	10 x 5
Ball Lights	20 LEDs	20 x 1

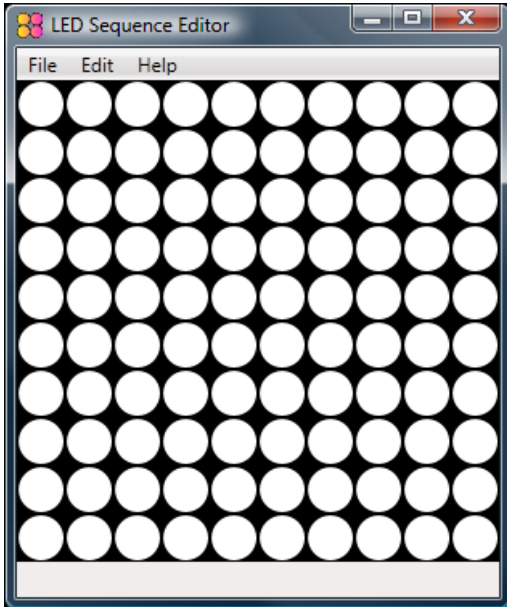


The controller ID must match the ID of the controller you are using. Controllers have a default id of 1, so unless you have changed the controller's id, leave this value as 1.

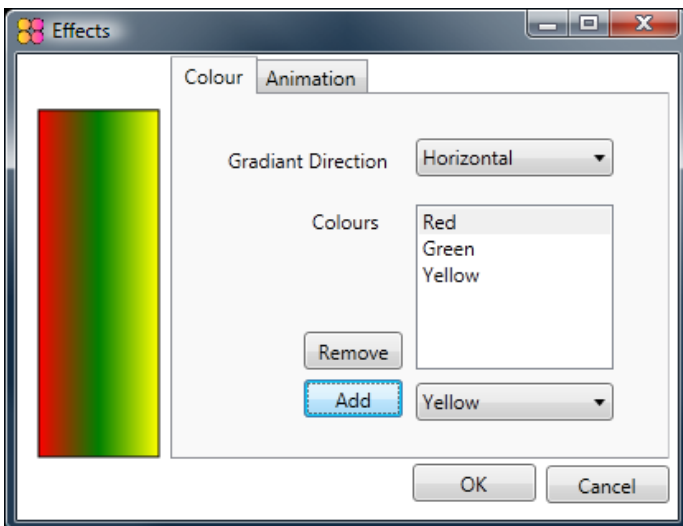
If you have setup a RS485 SyncroLight network and have the SD card controller connected directly to the computer (via a RS485 network - see section 5) you can see the effect on the lights immediately in real-time. In this case select the COM port and Id of the controller.

Selecting 'LED Control (RS485)' from the Edit menu will then display the effect on the lights immediately.

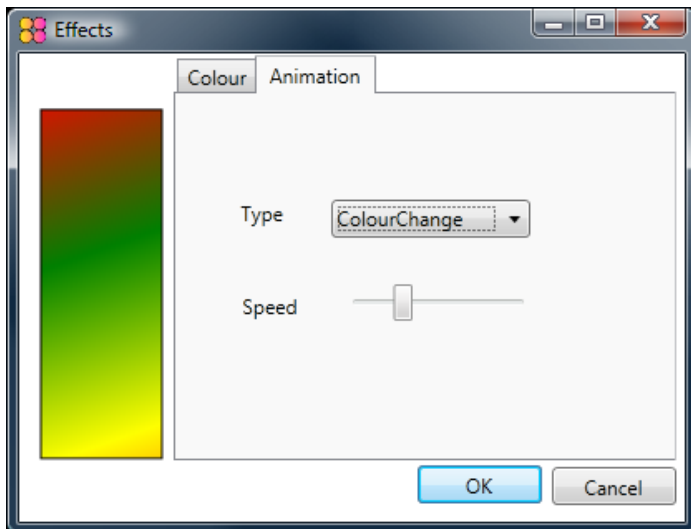
When you OK the layout window a grid will then be displayed as shown below.



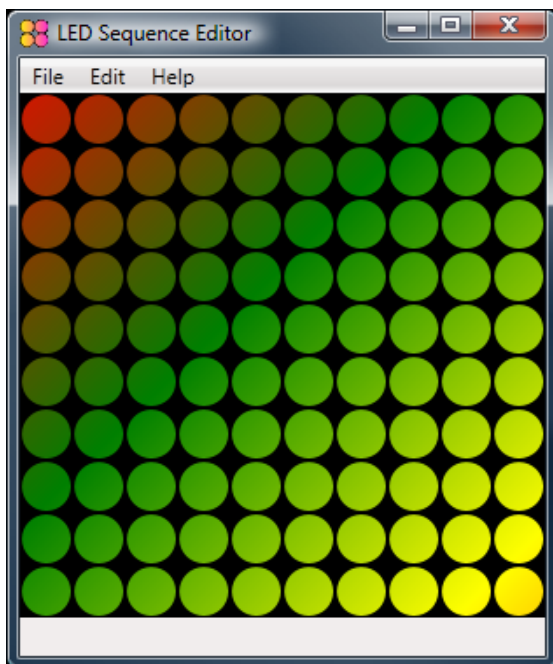
Next select the 'Edit/Effects' menu. The effects dialog will be displayed allowing you set the effect and animation. First select the Colours you require and any gradient direction.



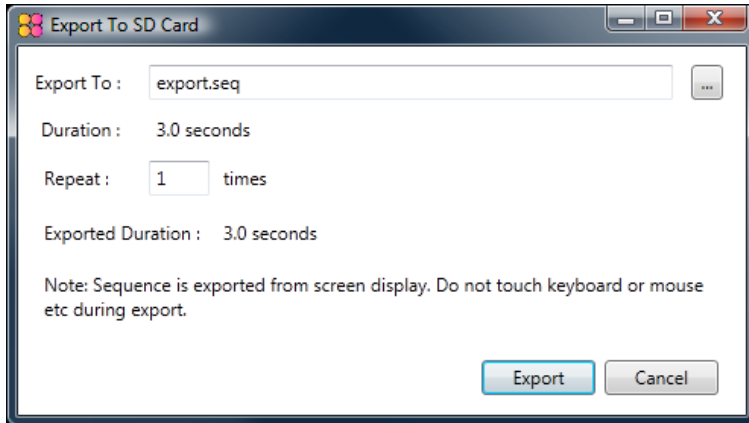
Next select the Animation tab and select the type and speed of colour movement. Colour Change is a good one to use.



When you OK this window the effect will start playing on the main grid.



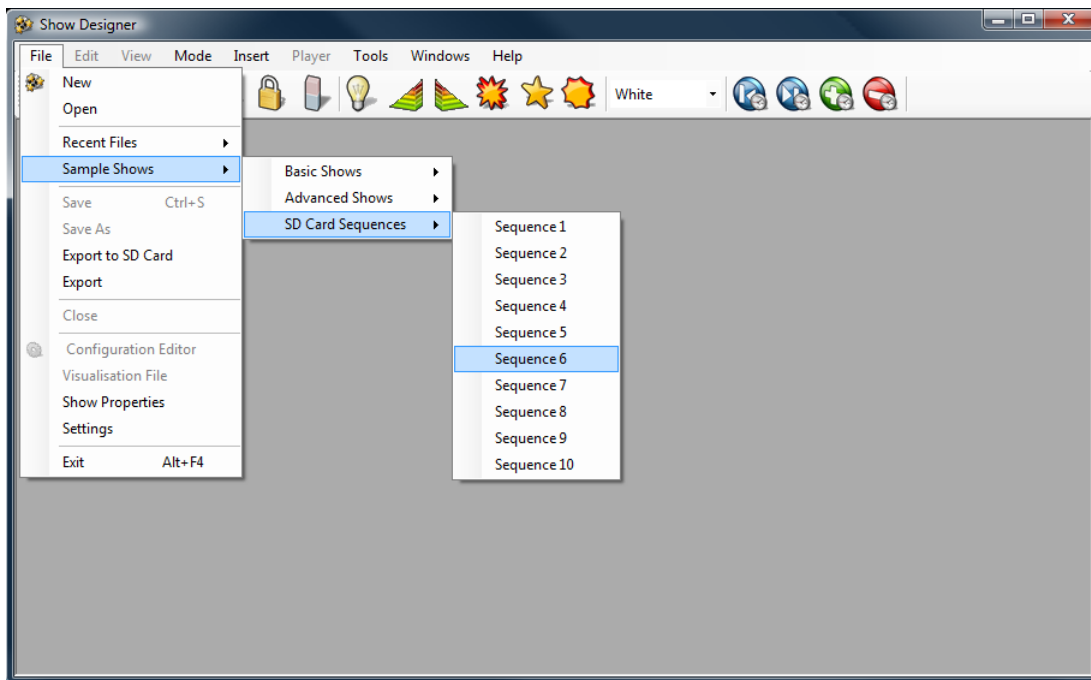
Once you have an effect you are happy with you can save the sequence to the SD card by using the 'File/Export to SD card' menu item. Remove the SD card from the controller and insert into a suitable SD Card Reader connected to your computer. After exporting the sequence to your SD card, reinsert the SD card into the controller and power up the controller. Your new sequence will now be played along with other sequences, depending on the current play list mode you have configured (See Section 3.3).



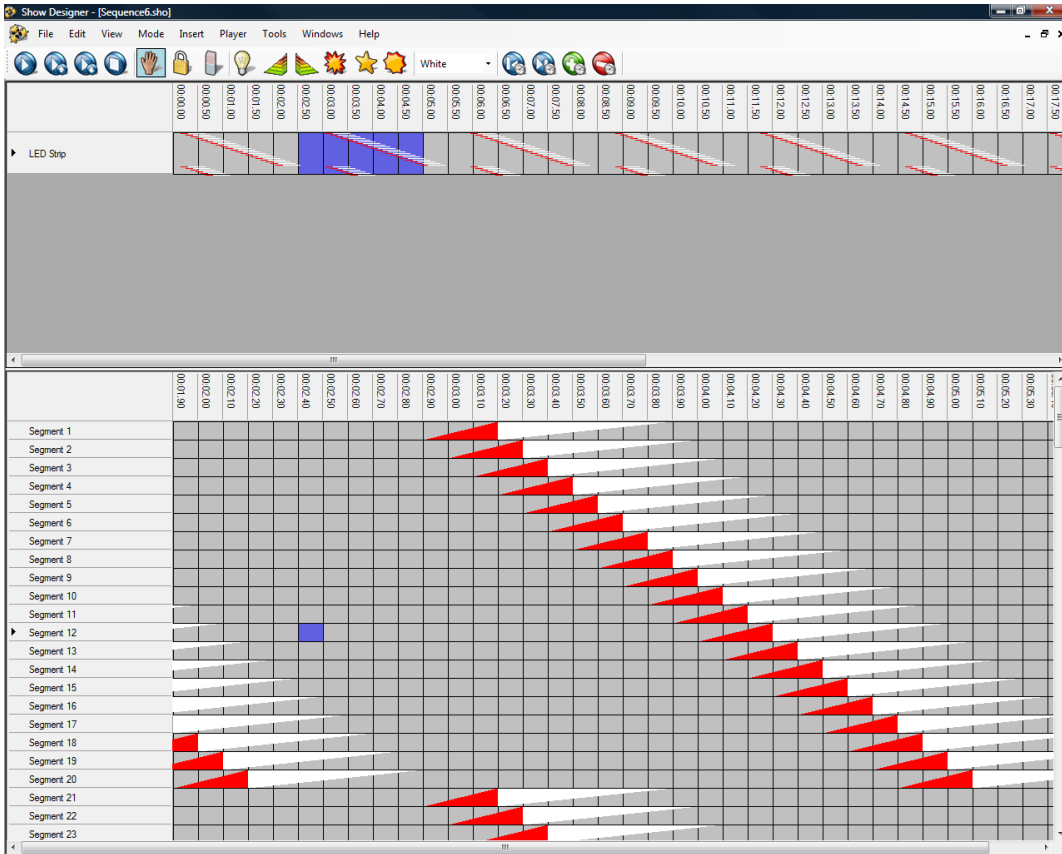
4.2 Show Designer

For specific control of individual LEDs, our Show Designer software can be used.

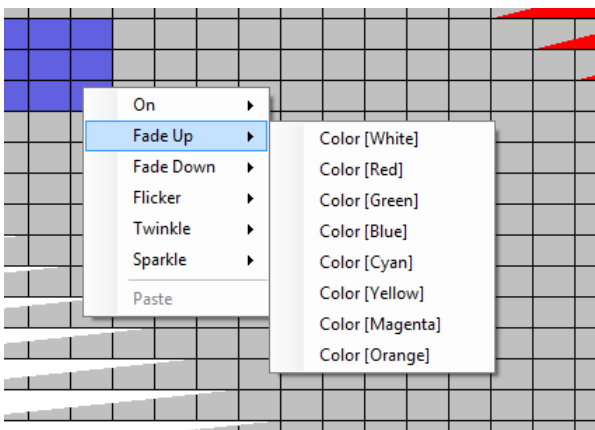
Once opening the Show Designer we suggest you look at one of the Sample SD Card sequences. You can access these via the 'File/Sample Shows' menu.



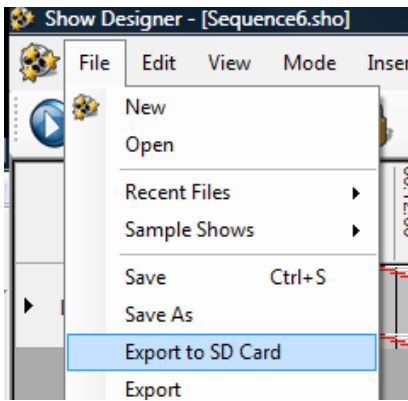
Once you open the sequence you will notice the screen is divided into two parts; an overview at the top and a zoomed in area at the bottom. Selecting an area in the top grid will display that section on the bottom grid. Time is displayed across the top of the grid with the individual segments (LEDs) down the side.



Right clicking in the bottom grid allows you to insert events to control individual LED's. You can also insert events for all LED's by right clicking in the top grid.



Sequences can be exported for use on the SD card controller by the 'File/Export to SD card' menu option.



More details about the Show Designer can be found in the 'Getting Started' help. The show designer is written for creating large shows set to music, but can be used for creating stand-alone sequences for the SD Card Controller.

5. Computer Connection

5.1. Computer Interface

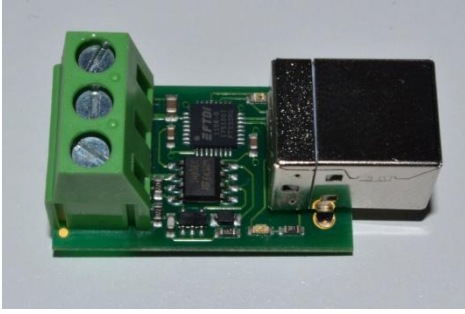
With our SD Card Controller you can create sequences on the computer and simply copy them onto the SD Card. However, you can also connect the controller to a SyncroLight RS-485 network and have real-time control of the lights from our software. This is great for creating sequences as you can immediately see the results.

In order for the computer to be able to control the lights, the controllers and computer need to be on a RS-485 based network. This is a serial network, capable of reliable transmission of data over a distance.

The network starts at the computer, but since computers do not have an RS-485 port, hence a converter is required. These can take the form of either:

- RS-242 to RS-485 converter (for older computers with serial COM ports).
- USB to RS-485 converter.

The recommended USB-RS485 converter, shown below, has been tested with the SyncroLight controllers and software. The converter is available for separately, with full installation instructions, on the SyncroLight website (www.syncrolight.co.uk).



The network is a 2-wire network, which connects to each controller in a linear multi-drop arrangement, connecting to each controller in turn. The network should not contain any spurs or loops.

To ensure reliable data transmission it is often recommended that RS-485 networks are terminated with a resistor between the two wires. This is optional as in most cases the network will work fine without any terminating resistor. If you find messages on the network are being lost (i.e. lights not coming on/ going off as expected), then it may be worth adding a resistor. The SD card controller contains an internal jumper to allow correct termination of the network. Remove the PCB from the case and add a PCB pin jumper on PL6 'Termination Jumper'.

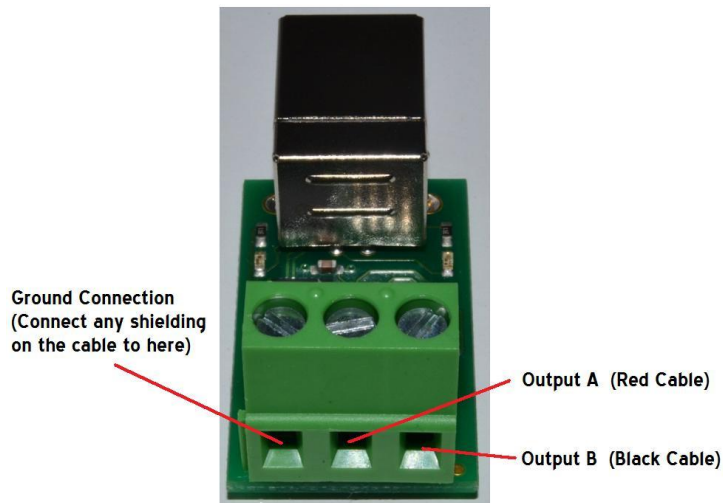
We strongly recommend the use of shielded network cable (available on the SyncroLight website) to minimise interference from electrical cables and equipment. When running network and power cables around your light display to controllers and lights, try and run the network cable away from power cables to minimise any risk of electrical interference. Don't worry if you have to run the network cables alongside power cables, you'll probably be ok. Just remember where you have done so and revisit this area should you have any communication problems on the network.

The shielding of each cable should be joined at each controller and connected to the ground connection provided on the USB-RS485 converter.

Each controller on the network is given a unique numeric address, often called either, controller address, controller id or device id. This controller address, which has a value between 1 and 255, is used by the software to identify and address each output on the network (i.e. Controller Id 3 Channel 1).

5.2 Network Connections

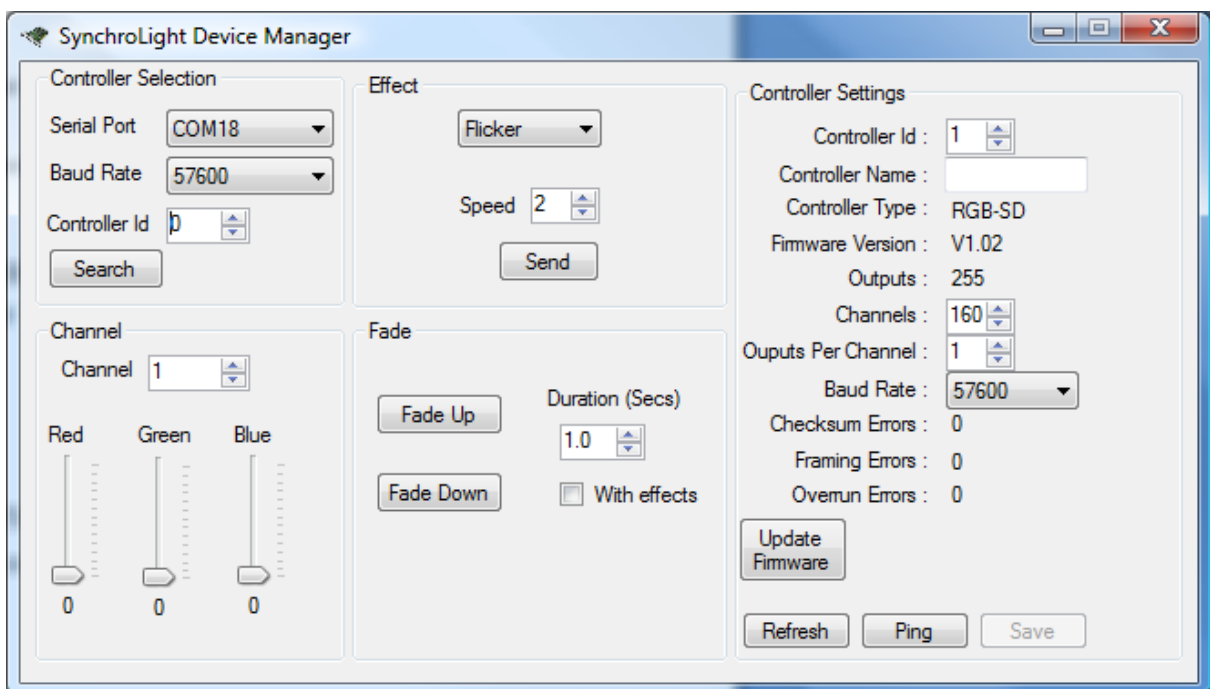
We recommend the use of 2-core shielded cable for the network connections. Terminal connection on the controllers are labelled A and B, outputs of the USB-RS485 converter are as shown below.



Where the wire colours are red and black, we suggest using the red wire to connect to the 'A' terminals and black wire to connect to the 'B' terminals. Adopt your own colour code if you have different colour wire.

5.2 Device Manager

With the computer connected to a SyncroLight RS485 network, you can use the Device Manager utility to search and access controllers on the network.

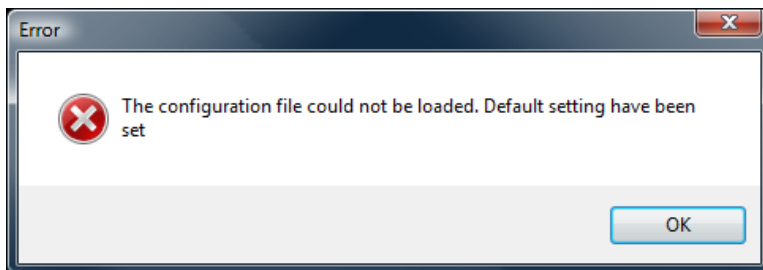
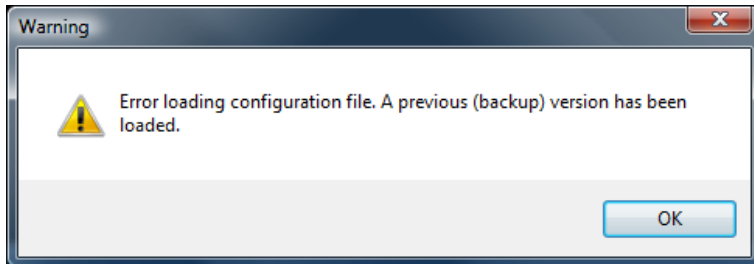


You can also change some basic settings such as controller ID from the Device Manager.

5.3 Device Reset / Working without an SD Card

The controller settings are stored on the SD Card, making it easy to run the controller in different configuration by using multiple SD Cards.

Should the configuration on the SD card become corrupted you can use the Configuration Utility will use either the backup version of the settings or create new default settings for you as shown below.



Additionally, if the device is powered up without an SD card, it will default to a Network Slave with a Controller ID of 1 and a baud rate of 57600. This allows the device manager to be used to check the device and reset any settings.

6. Additional Information

6.1 Ball Lights (1803)

Our 1803 based ball lights can be connected to the external LED connection only.

Additionally a jumper must be installed on the PCB across the centre two pins of PL5 on the PCB. If you purchased a controller with a set of the Ball lights, this will be done for you. You will need to remove this jumper if you wish to change between Ball Lights (1803) and Pixel Lights (2801) and LED strip (8806).

Our ball lights (1803) only have 3 wires; in this case the CLK terminal is not used and should be left unconnected.