

External Components

External buffer block have two main purposes. First to buffer cathodes of displays and load shift registers. Schematic of each block is very simple. Each driver block consist from shift register 74XX595, Darlington buffer ULN 2803, 8 Load resistors and 2 connectors. Blocks in each LINE are connected serially via 10-pin ribbon cable (note **Figure 1**). All necessary signals for control of blocks are produced from LED Controller. Cables between neighbour blocks must be not longer than 1 m. To void a different light intensity in different Blocks, Ground must be assured to provide enough current for Darlington buffers. Each driver block occupied 10 bytes in controllers LED Buffer. Via writing of byte (bytes) in appropriate address in LED Buffer, LED Controller drives defined segments of selected indicator. After power up two LED LINES is filled with 00h (display is blanc). Each external block can drive up to 10 seven-segment displays. All 16 external blocks can drive up to 160 seven-segment displays for each LINE. All tree control signals are connected in parallel except, SDATA signal that must be connected serially between each block. Refer to **Figure 2**.

JP5 on LED Controller is used for different schematics applicable to drive LED displays. In this schematic **JP5** on LED Controller must be in open position, because ULN2803 invert data comes from shift register 74XX595. This schematic provide maximal Load current of 500 mA for each segment and is suitable for building of very large LED displays, where segments are constructed from multiple LED's.

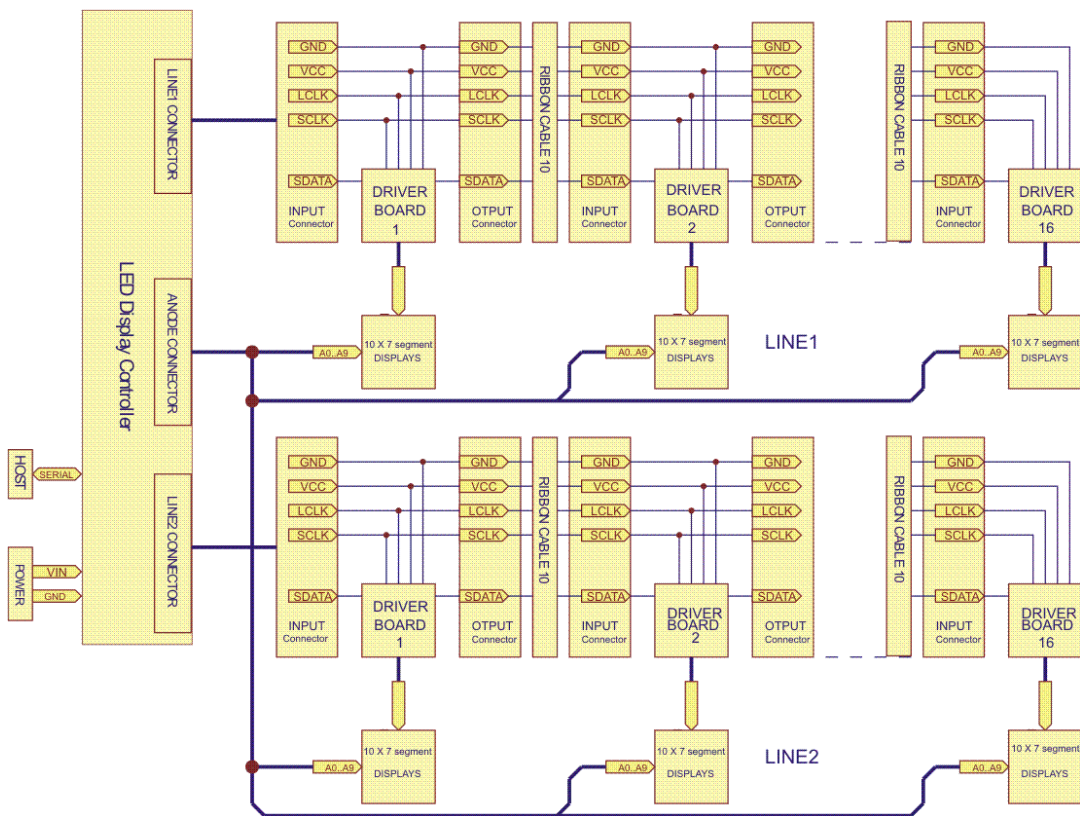


Figure 1

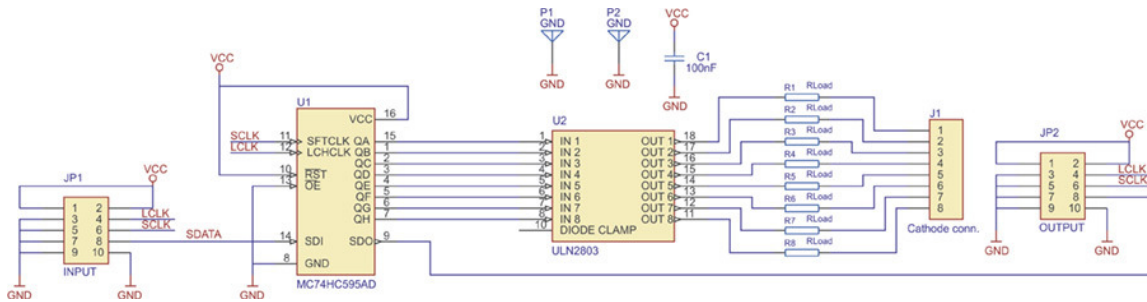


Figure 2

DRA1 LED driver board takes ability to produce end product for very short time, simplicity of PCB boards routing and save space and flexibility of the end product. Often when indicator displays are very small, is a difficult to route all components in one PCB board. Using of separate external LED driver board is good practice. Each LED driver board DRA1 can drive up to 10 seven segment LED indicators, or 80 single diodes. **Note:** Boards is shipped without Load resistors. **Figure 3** shows PCB board from schematic shown on **Figure 2**. In one line can be connected 16 **DRA1** boards as shown in **Figure 1**. **Figure 3** shown topside of board.

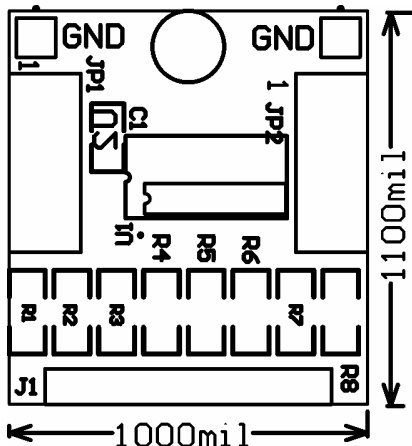


Figure 3 Top view

J1 – Segment buss connector pin 1 – D0...pin 8 – D7

pin1	pin2	pin3	pin4	pin5	pin6	pin7	pin8
DA0	DA1	DA2	DA3	DA4	DA5	DA6	DA7

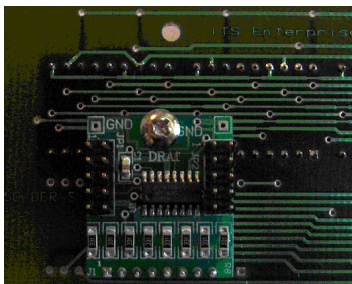
JP1 – Input connector

pin1	pin3	pin5	pin7	pin9
+5V	GND	GND	GND	GND
pin2	pin4	pin6	pin8	pin10
+5V	LCLK	SCLK	SDATA	GND

Note: **SDATA** input comes from LED Controllers LINE connector or from output connector from previous driver board.

pin1	pin3	pin5	pin7	pin9
+5V	GND	GND	GND	GND
pin2	pin4	pin6	pin8	pin10
+5V	LCLK	SCLK	SDOUT	GND

JP2 – Output connector
Note: **SDOUT** output goes to the **SDATA** input of the next driver board. In the last 16th board this signal is not connected.



This picture shown rear side of the LED indicator board. LED Indicator board contains only LED indicators, cathode and Anode connectors.

NOTES

If you have any questions or find some errors or misunderstandings in this documentation, do not hesitate to contact us on the next E-mails: support@itsdisplays.com or its@itsdisplays.com , and we try to answer you as soon as possible. Refer to <http://www.itsdisplays.com/> site to download Schematics and PCB source files.