

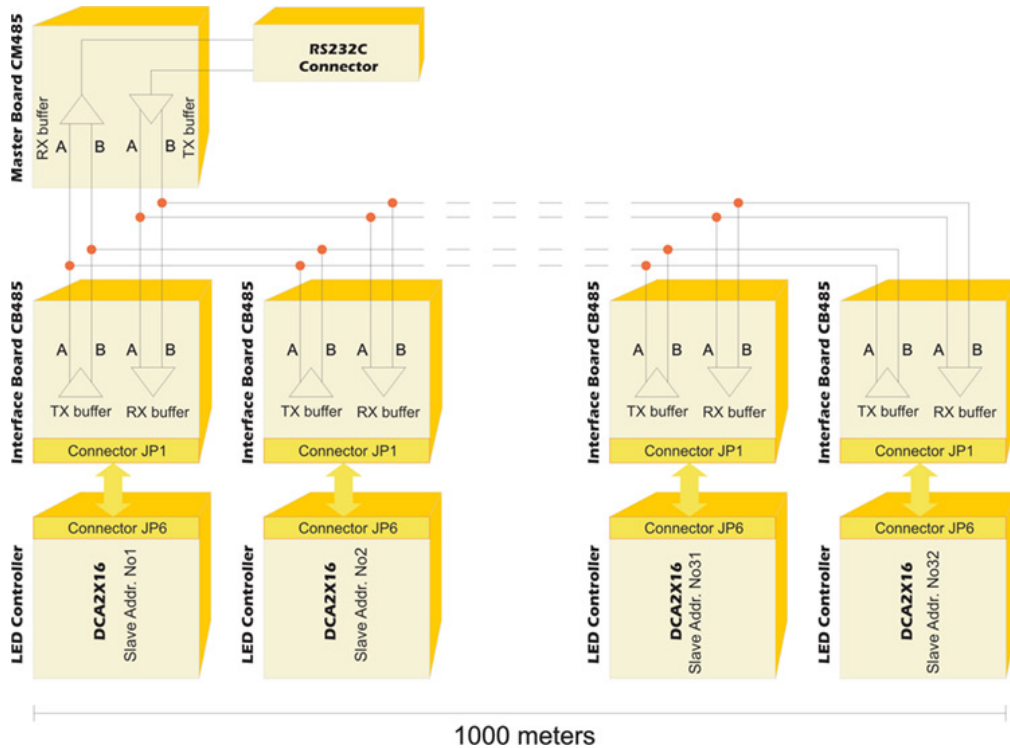
**v.3.21**

**THIS MANUAL DESCRIBES MASTER – SLAVE CONFIGURATIONS AND FUNCTIONS OF MCA2X16 LED DISPLAY CONTROLLERS SUPPORTING RS485 NETWORK**

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**1. [General description](#)**

In **Picture 1** bellow is illustrate CB485 four wire interface board for MCA2X16 LED display controller connected to one Master board CM485. Cable can be longer up to 1000 meters. Used cable is 6 wire telephone cables, crimped straight. Devices configured for four wire communications bring out A and B connections for both transmit and the receive pairs. If the cable is not attached to CB485 interface board LED D1 may blinks with frequency of about 1 Hz.



**Picture 1**

Note that the signal ground line should also be connected in the system (this ties are visible in schematics below). This connection is necessary to keep the VCC common mode voltage at the receiver within a safe range. The interface circuit may operate without the signal ground connection, but may sacrifice reliability and noise immunity.

## 2. Termination

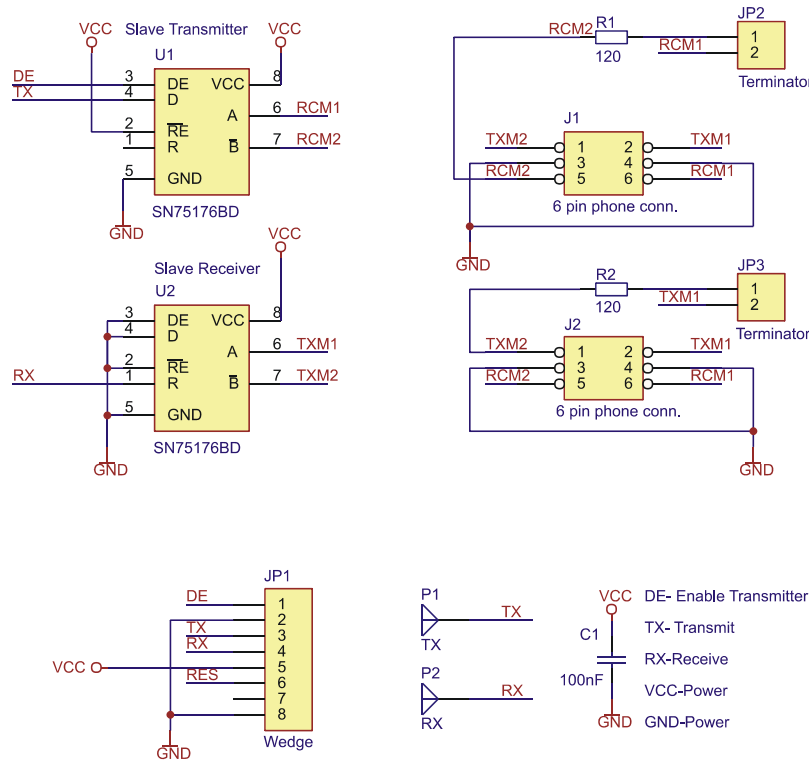
Termination is used to match impedance of a node to the impedance of the transmission line being used. When impedance is mismatched, the transmitted signal is not completely absorbed by the load and a portion is reflected back into the transmission line. If the source, transmission line and load impedance are equal these reflections are eliminated. There are disadvantages of termination as well. Termination increases load on the drivers, increases installation complexity, changes biasing requirements and makes system modification more difficult. The decision whether or not to use termination should be based on the cable length and data rate used by the system. A terminating resistor of less than 90 ohms should not be used. Termination resistors should be placed only at the extreme ends of the data line, and no more than two terminations should be placed in any system that does not use repeaters.

## 3. Biasing an RS485 Network

When an RS485 network is in an idle state, all nodes are in listen (receive) mode. Under this condition there are no active drivers on the network. All drivers are in tristate condition. Without anything driving the network, the state of the line is unknown. In master board MB485 lines A and B in receiver buffer are connected through pull up and pull down resistors.

## 4. Slave schematic description

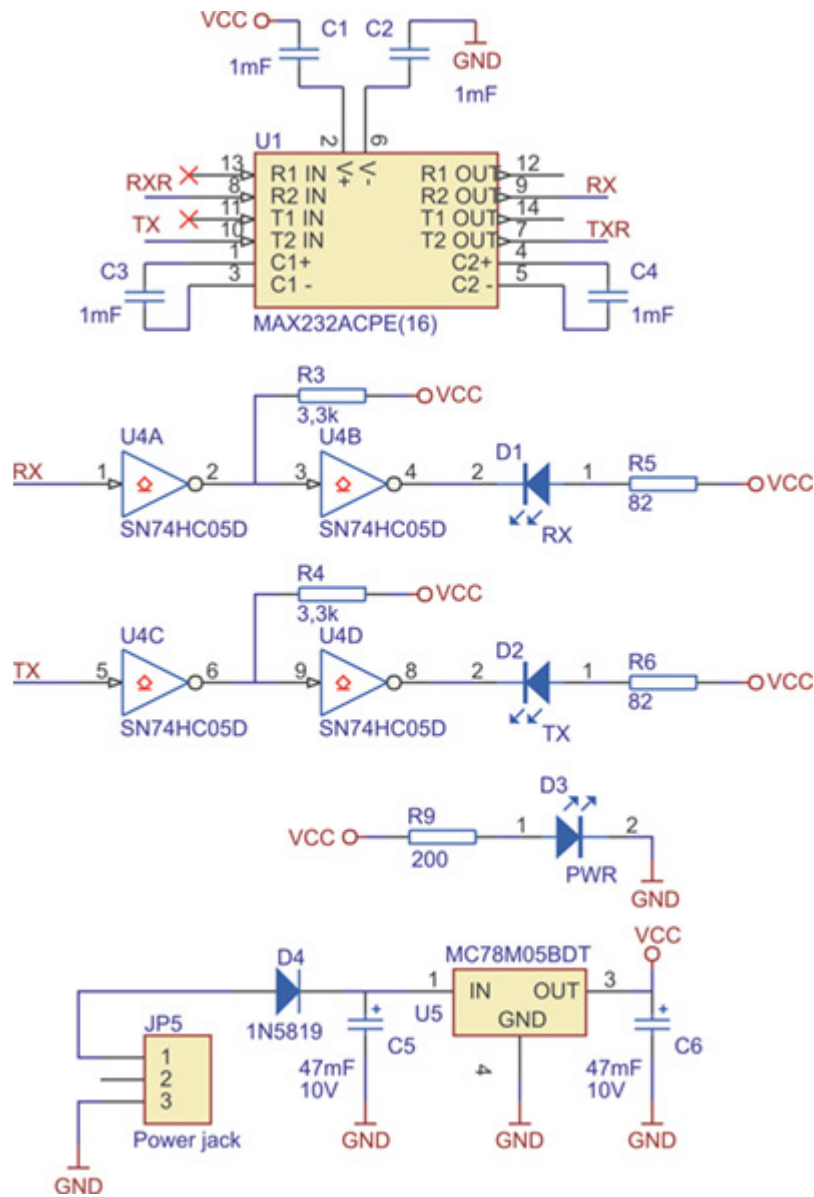
In **Picture 2** below is illustrate CB485 four wire interface board schematic for MCA2X16 LED display controller. J1 and J2 are **TS6P6C** PCB phone jack connector, that are doubled for convenience of Slave interconnection. JP2 and JP3 are line terminator jumpers, described above. JP 1 is single row wedge male connector for interconnection between CB485 and MCA2X16. DE signal of U1 is controlled from MCA2X16 LED controller firmware (refer to command set manual).



Picture 2

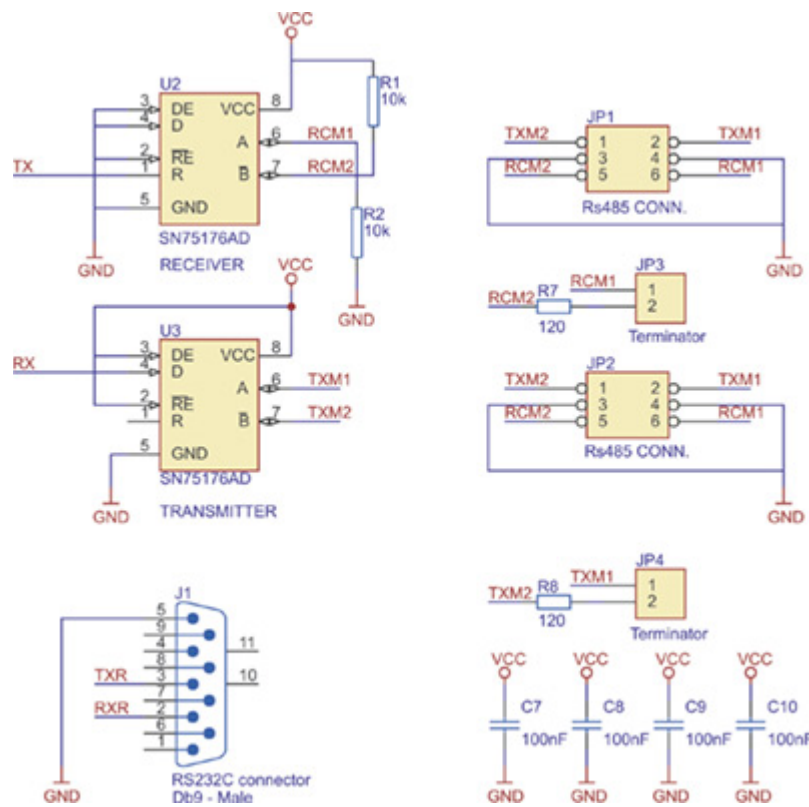
### 5. Master schematic description

In **Picture 3** and **Picture 4** below is illustrate CM485 four wire Master board. LED D3 is power on indication. D1 and D2 are communication activity LED's, that blinks when data is exchanged



**Picture 3**

between Master and selected Slave. Power supply is provided from external DC source 9 – 15V. Can be used AC/DC power adaptor 9V/500 mA. D4 provide correct DC polarity protection. If power jack is connected properly, D3 must light on. JP3 and JP4 are jumpers for terminator resistors. JP1 and JP2 are modular phone connectors for Ground and RS485 network lines A and B. J1 is DB9 male connector for RS232C channel.



Picture 4

## 6. Cables and wiring

Cables for RS485 network is flat 6 wire telephone cable. Cable must be crimped straight on both cable ends via TPL6P phone connectors. Cable length must be least 0.5 m. For RS232C channel is used standard 3 wire crossed cable with DB9 female connectors on both cable sides.

If you have any questions or find some mistakes in this document, do not hesitate to contact us on the next E-mails: [its@itsdisplays.com](mailto:its@itsdisplays.com) or [support@itsdisplays.com](mailto:support@itsdisplays.com), and we try to answer you as soon as possible. For more detailed information, documentation and free source schematics, please refer to our Web site : <http://www.itsdisplays.com/products.htm>