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SL-845 booster for iButton/TK readers

Technical reference

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General description

The SL-845 module is used to extend the maximum cable length between a TK iButton reader module and an SL-8x controller. This length is around 20m for UTP/STP cables and good quality phone cables but may be less for other types of cables which have a higher capacity per metre.

With the SL-845 the maximum cable length is as follows:
- between the TK reader and the SL-845:   10m
- between the SL-845 and the SL-8x: 60m

These lengths also only apply to UTP/STP and good phone cables. Higher capacitance cables will have shorter maximum lengths.
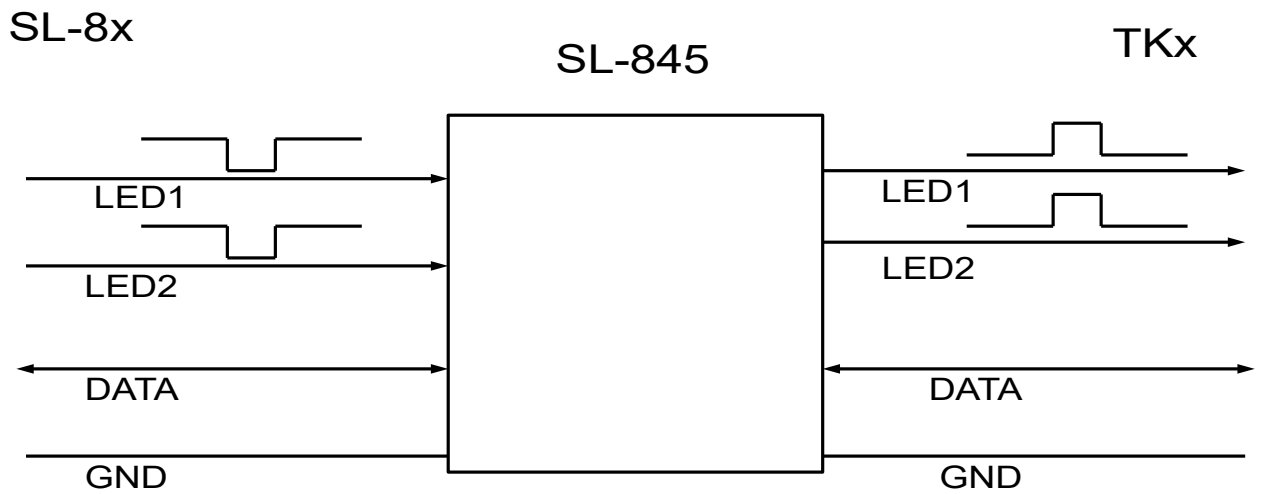
Note: STP cables have a capacitance of around 45pF/m. UTP cables with grounded shields have a capacitance of around 75pF/m.

The SL-845 simulates an iButton for the attached controller and a controller for the TK reader. Since the SL-845 needs a 5V voltage to function, the LED lines from the controller are used for the power supply. This requires the LED polarity of the channel to be configured to default HIGH with a short LOW pulse.

The SL-845 reads the iButton that is touched to the attached TK reader and sends it to the controller on a different port pin, simulating an iButton. The polarity of both LEDs must be default high with a low pulse on the controller side. This is inverted by the SL-845 so the TK LEDs are default LOW with a short HIGH pulse.

Since the SL-845 loses its power source when both LEDs on the controller side are LOW, large capacitors are used to power the unit for that one second when both LEDs are low.

Block diagram

SL-8x

SL-845

TKx

LED1

LED2

DATA

GND

LED1

LED2

DATA

GND

Functions

As was explained in the description and shown in the block diagram above, the functions of the SL-845 are the following:

- use the incoming (from the SL-8x controller) LED signals to derive the power supply (when they are HIGH)
- invert the incoming LED signals to drive the outgoing (to the TK reader) LED lines. Thus the TK LEDs are on when the incoming LED lines are LOW.
- Read any iButton touched to the TK reader via the TK side DATA line
- Wait for a presence detect pulse on the SL-8x side DATA line, simulate an iButton with a Presence pulse and transmit the iButton ROM code to the SL-8x
- If the SL-8x side LED1 line (yellow) goes LOW, clear the buffer and start reading new iButtons on the TK side DATA line.
- If the LED1 line doesn't go low for approx 1 second, wait for the next presence detect pulse from the SL-8x and resend the iButton code in the buffer.

Configuring the SL-8x LEDs

The SL-83 and SL-8x controllers have extensive configurability. Most of this configuration is kept in a serial EEPROM so it can be changed via the CommConsole configure option. The behaviour of the TK LED outputs is one such option. Both LEDs (yellow and red) can be individually configured to 4 states:

1. default LOW, 1 second HIGH
2. default LOW, 2 seconds HIGH
3. default HIGH, 1 second LOW   (USE THIS FOR SL-845)
4. default HIGH, 2 seconds LOW

The first or second options are the usual for TK readers. The 3rd option is necessary for using the SL-845.

Connectors

There are only two connectors: an RJ-11 telephone socket for the SL-8x side and an RJ-11 socket for the TK side. Care should be taken not to mix them up.

As can be seen from the picture below, the box cover has a guide, but if you rotate it it can be very misleading. Note that the silkscreen (white letters on the PCB) has markings next to the RJ-11 sockets (these are not soldered directly in the PCB this instance). The markings say SL-8x and TK respectively.

SL-8x ≤ 100 m

Config LED ⊓

SL-845

iButton Booster

TK-x ≤ 5 m