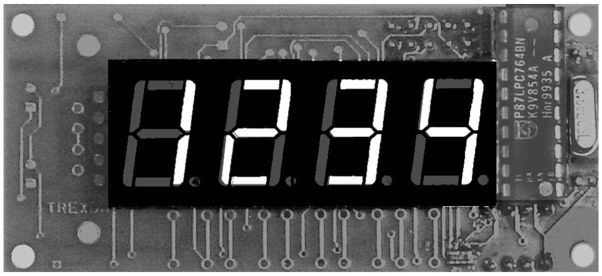
SERIAL LED MODULE Model: SLED



Actual Size

Applications

- Digital Instruments
- Alarms
- Machine controls
- Operator Displays
- Vending machines
- Parts counters
- Test instruments
- Controllers

Features

- Same size as industry-standard 16 x 2 LCD modules
- Similar interface to serial LCD modules, only one port pin required
- Bright, attractive 4 digit 0.56" high display, with decimal points
- Super-efficient RE leds used to reduce current consumption to less than a typical backlit LCD
- Accurate clock for stable RS-232 communication over time and over the full operating temperature range
- Professional qulity conservative design and manufacturing
- Serial ASCII, hex bitmap, and hex binary modes
- Requires no refresh overhead
- Fast multiplexing reduces display breakup in applications with vibration
- Highly visible in low-light conditions, as well as normal viewing environment

Specifications

Supply voltage:	5V +/-5%
Current:	35mA typical, 80mA max (display on) 10mA typical (display off)
Operating temperature:	-10~60°C
Dimensions:	80mm x 36mm x 20mm +/-2 (3.2" x 1.4 x 0.8" +/-0.08)
Mounting holes:	75mm x 31mm, centered, four holes 2.5mm diameter.

Digit size:	14mm (0.56")
Color:	660nm (Red) standard, GaAlAs ultra high efficiency 565nm (Green) available upon request (current requirements will be higher)
Interface:	RS-232 2-wire interface, 9600 baud (factory setting) or 2400 baud.(9600 N 8 1 or 2400 N 8 1) (no parity, 8 bits, one stop bit) I2C available upon request. Accepts TTL levels or RS-232 levels.
Processor:	8 bit with 4K of memory running at 3.6864 MHz

Switch settings

DIPSW1	ON = 9600 baud (9600 N 8 1) factory setting OFF= 2400 baud (2400 N 8 1)
DIPSW2	unused
DIPSW3	unused Pin 4 on module connector, Low if ON, High if OFF
DIPSW4	unused Pin 8 on module connector, Low if ON, High if OFF

Module Connections (from back)

N.C.	D-SW3	Sout	D-SW4	N.C.
2	**4**	**6**	**8**	**10**
O	O	O	O	O
O	O	O	O	O
1	**3**	**5**	**7**	**9**
+5V	0V	Serin	0V	+5V

1	+5V +/- 5% supply
2	N.C. (no connection)
3	0V supply
4	Dipswitch 3 (low = on, high = off)
5	Serial input RS-232
6	Serial output (do not connect)
7	0V supply
8	Dipswitch 4 (low = on, high = off)
9	+5V +/-5% supply
10	N.C. (no connection).

For short cable runs of 6" or less, you may use either of the pair of power supply connections, for longer runs of light-gauge ribbon cable, it is preferable to parallel the two 5V and 0V connections. A standard 10-conductor ribbon cable with IDC connectors may be used to run connections to the module.

Note: As with any semiconductor device, applying in excess of 6VDC, reversing supply voltage or applying normal supply voltage to non-power supply pins will likely severely damage the module. Such damage is not covered under warranty.

PC Port Connections (9-pin)

1	Jumper to 4 and 6 on 9-pin connector (only)
2	N.C.
3	Connect to module Serial input (MODULE PIN5)
4	Jumper to 1 and 6 on 9-pin connector (only)
5	Connect to ground (MODULE PIN 3 and/or MODULE PIN 7)
6	Jumper 1 and 4 on 9-pin connector (only)
7	Jumper to 8
8	Jumper to 7
9	N.C.

If pins 7 & 8, and 1 & 4 & 6 are not jumpered, some software will not operate correctly. The terminal program from Windows 3.11 (**terminal.exe**) is an excellent program for checking out the module.

SLED Module Commands

HEX	DECIMAL	CTRL CHAR	FUNCTION
00	0	^@	No operation
01	1	^A	Cursor home (to left)
02	2	^B	**Bitmap**: Following 8 hex characters are bitmap
04	4	^D	Hide cursor (power-on default)
05	5	^E	Flash digit where cursor is (to off)
06	6	^F	Ex-or flash digit where cursor is (invert)
08	8	^H	Backspace (erase character)
0C	12	^L	Linefeed (erase display, home cursor to left)
0D	13	^M	Carriage return (cursor home to left)
0E	14	^N	Display ON (power-on default)
0F	15	^O	Display OFF
10	16	^P	**Position Curso** : Following hex character
11	17	^Q	**Binary**: following 5 hex characters are binary number and decimal point position
12	18	^R	Display flash ON
13	19	^S	Display flash OFF (power-on default)

Sending ASCII data:

The SLED module contains a lookup table that has patterns that attempt to simulate all printable ASCII characters on the 7-segment display. A judicious choice of letters can yield a useful display, for example, "Err3" displays quite readably. Some letters such as Q, W and K have no good way of displaying them.
Example: **Ctrl-L**1234 will display 1234 on the display
Ctrl-L3.141 will display 3.141 on the display
Ctrl-L End will display End on the display

Positioning the cursor:

The cursor starts out at power up at the left of the display. If you send one ASCII character, it will be displayed in the left-most character. To position the cursor within the ASCII buffer, send a **Ctrl-Px**, where x is number from 0 to 8, with 0 being the left-most character in the buffer.

Example: **Ctrl-P**09999 will display 9999 on the display
Ctrl-P10 will display 9099 on the display, without erasing it first

Sending bitmap data:

The bitmap data is from the left-most character to the right, in hex digits. You can consider them grouped in pairs as bytes, one byte for each character on the display. The segments from A to G (clockwise from the top segment, ending at the middle) and the decimal point are assigned to bits 0 to 7 respectively.
This is the most flexible way of sending data to the display , any combination of LEDs can be lit. The data is buffered before being sent to the display, and is updated all at once, when the final (valid) character has been received. If an invalid character is received, it will revert to displaying ASCII characters.

Example: **Ctrl-B**00000000 will blank the display
Ctrl-BFFFFFFF will turn on all segments and decimal points
Ctrl-B006FEF6F will display 99.9
Ctrl-B00000006 will display 1

Sending binary number data:

This mode is provided as a convenience to allow devices to avoid using **printf()** or similar commands to convert to ASCII. Instead a binary number may be sent directly to the **SLE** module in hex and the module will display it, with a fixed decimal point position, if desired. The number is sent with the decimal point position first (0 = far right, 3 = far left, 4 = off), followed by 4 hex digits that represent a signed 16-bit integer. Numbers that are larger than 9999 or smaller than -999 cannot be displayed, and the display will show EEEE.

Example: **Ctrl-Q**40000 will display 0 in the display (leading zeros are blanked)
Ctrl-Q30000 will display 0.000 in the display
Ctrl-Q4FFFF will display -1 in the display
Ctrl-Q1270F will display 999.9 in the display
Ctrl-Q1271F will display EEE.E in the display
Ctrl-Q4FC19 will display -999 in the display

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