Locus Engineering Inc.   E3013

FEATURES

- serial bytes are displayed as two hex characters 00-FF
- large 0.56" high digits
- 16 commonly used baud rates from 1.2K to 921.6K
- TTL/3.3V logic compatible inputs
- +3.3V to +5.5V operation
- 30mA supply current
- 2.4"W x 1.1"H size

APPLICATIONS

- custom keyboards
- industrial controls
- engineering development

DESCRIPTION

The E3013 Serial Byte Monitor is a standalone module ideal for verifying serial data at common baud rates. Data is displayed as two large 0.56" high hexadecimal numbers. This display is useful for single stepping serial data without a PC. There are 16 baud rates between 1.2K to 921.6K organized into four baud groups of four specific baud rates. On power up the baud group is set, and following this the specific baud rate can set using the switch settings. Power input is +3.3V to +5.5V and the outputs are TTL or 3.3V logic compatible.

Table 1. Absolute Maximum Ratings

Parameter	Rating
Input Voltage to GND	-0.3 to +5.5V
Operating temperature range	-40 to +85°C
Storage temperature range	-65 to +150°C
Maximum input voltage through RX pin	-0.3V to +Vdd
Maximum total current through Vdd or GND	300mA

Table 2. Electrical Characteristics
Test Conditions: Supply Voltage V_{dd} = +5.0V, $T_{ambient}$ = 25° C, unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{dd}	Supply voltage	3.3	5.0	5.5	V
I_{dd}	Supply current			30	mA
V_{IH}	Digital high input voltage	0.75x Vdd			V
V_{IL}	Digital low input voltage			0.6	V
F_{baud}	Baud Rate	1.2K		921.6K	baud

General Precautions

Charged devices and circuit boards can discharge without warning. Proper ESD precautions should be followed to avoid failure.

This device is not authorized for use in any product where the failure or malfunction of the product can reasonably be expected to cause failure in a life support system or to significantly affect its operation.

Locus Engineering Inc. reserves the right to make changes at any time without notice to improve product features or reliability.

Information is provided by Locus Engineering Inc. with the best of intentions without any warranty expressed or implied. As such Locus Engineering Inc. disclaims all liabilities or responsibilities for any use of the information, any inaccuracies or fitness for a particular purpose.
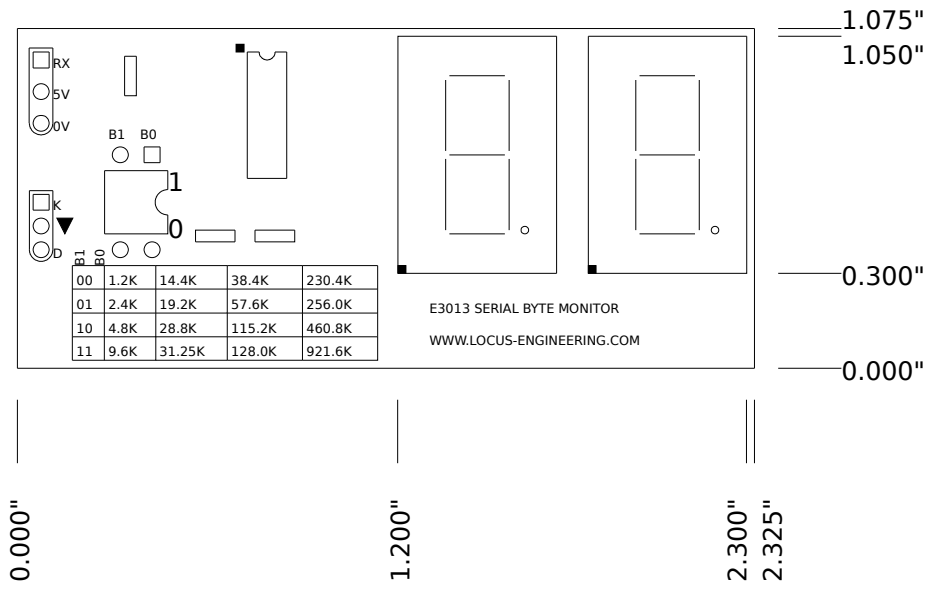
00	1.2K	14.4K	38.4K	230.4K
01	2.4K	19.2K	57.6K	256.0K
10	4.8K	28.8K	115.2K	460.8K
11	9.6K	31.25K	128.0K	921.6K

E3013 SERIAL BYTE MONITOR

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1.075"
1.050"
0.300"
0.000"

0.000"
1.200"
2.300"
2.325"

Figure 1. Mechanical Dimensions

Table 3. Pin Descriptions

Pin#	Name	Function
1	RX	Serial input, 0-5.0V, 1.2Kbaud to 921.6Kbaud
2	5V	+3.3V to +5.5V
3	0V	Ground

Do not make any connections to the K/D area as this is used for programming the module.

Power Supply

The E3013 Serial Byte Monitor will operate from voltages between +3.3V to +5.5V, and uses approximately 30mA of current worst case. An onboard low dropout (~40mVf @ 10mA) regulator supplies ~3.3V to the microcontroller. For supply voltages lower than ~3.3V, the microcontroller will continue operating to ~2V however the display brightness will be reduced accordingly, therefore compatibility with the receiving circuit needs to be assured.

Serial Input

The RX digital input pin is compatible with 5V TTL or LVC inputs or 3.3V logic. The RX input has a 10K pullup to Vcc. To receive data to a PC, the input needs to be converted from RS-232 levels using a MAX232™ or equivalent to TTL. The received serial byte format is 8N1, i.e. eight bits, no parity, and one stop bit. Thus each byte received uses 10 bits. The period for each byte is roughly 10/baud rate. Thus a byte at 1.2Kbaud takes ~10/1,200 = 8.333msec, and a byte at 921.6Kbaud takes ~10/921,600 = 10.85 μsec. The byte received has one start bit (always low) + eight bits + stop bit (always high), and is sent least significant bit first.
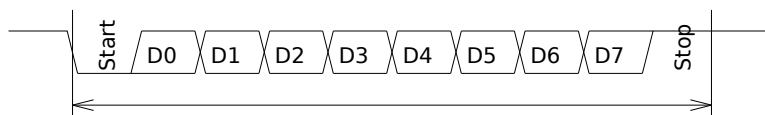

Figure 2. Serial Bit Order

The baud rate will affect the maximum distance for reliable data transmission. Lower baud rates allow longer distances. Cable length is typically halved for every doubling of the baud rate. Cable lengths for the highest baud rates should be limited to under 25cm or 10".

Reset

The power-on reset circuitry is self-contained within the module. Ensure the power supply ramp is faster than 1msec. On reset, the baud rate group and actual baud rate are initialized.

Operation

Two dipswitches are used to set the baud group and baud rate. This allows 16 baud rates in total. Each dipswitch setting is a "1" in the up position, and a "0" in the down position. The baud group is set from the power-up state of the dipswitches, and after power-up, the baud rate can be changed to one of four values within the baud rate group. For example, for B1 B0 = 10, the baud rate becomes 115.2Kbaud on power up. Changing the BR1 BR0 dipswitch now allows the baud rate to be set to 38.4K, 57.6K, 115.2K, or 128.0K for 00, 01, 10, 11 settings.

00	1.2K		00	14.4K		00	38.4K		00	230.4K
01	2.4K		01	19.2K		01	57.6K		01	256.0K
10	4.8K		10	28.8K		10	115.2K		10	460.8K
11	9.6K		11	31.25K		11	128.0K		11	921.6K

Figure 3. Baud Rate Settings

The E3013 displays serial bytes as they arrive. Received data is prioritized over the display process so there are no errors. The display will always show the last byte received.

Display

A translucent red plastic piece can improve the readability in bright lighting conditions.