I2CCHIP

Setting BL233B Baud Rate

Introduction

The BL233 / I2C2PC Baud rate can be changed in the internal eeprom, using the *V* command. (n.b. Baud rate changes at next power-on.) More general detail on the programming of the eeprom can be found in BL233B_EEProm_Programming

If the baud rate is unexpectedly wrong, *Special Pins Mode* can be used to power up the BL233B at the default baud rate of 57,600 so the eeprom can be reset.

For more tips on improving overall performace see BL233B_Maximise_Throughput_and_Speed

Contents

1 Web Configuration Tool

There is now a web tool to help you create and change EEProm settings and macros. It directly calculates the baud rates.

www.i2cchip.com/i2c_front_panels/BL233_EEPROM_Configurator.html
It will generate the command strings to send to the BL233.

You can copy the command strings it generates into Realterm's send tab. Alternatively you can copy them to a command file to send during configuration or for some other purpose. (n.b. Baud rate changes at next power-on.)

The web configurator can conect directly to Realterm, but changes to Windows security are making this impossible.

2 Maximum Baud Rate

The lowest baud rate divisor (highest baud rate) that allows the BL233 to reliably receive commands is 02, which is $\dfrac{FXtal}{48}$

If you are using *XOn / XOff*, then you may have to use lower baud rates, as some devices (e.g. linux routers) take some time to respond to the *XOFF* and may overflow the buffer.

If you do not have handshaking, then you might want to try a low baud rate to prevent buffer overflows.

If you are using long RS232 cables, then the maximum reliable baud rate will be less than 115k or less.

2.1 Read Only Baud Rate

Where you only really need to read bulk data at maximum rate, it is possible to set the baud divisor to 0. The BL233B can transmit data at this speed. However you must be able to put a pause of at least 2 characters between each individual character sent to the BL233 to prevent lost characters on receive.

3 Standard Clock frequency 14.7456MHz

The default baud rate is 57600. Baud rate is changed by changing the divisor set in EEProm.

If you are using the USB interface, then you can use 307,200 bd. If you are using RS232, then 230400 is commonly available.

Baud Rate	Divisor (hex)	Command String	Notes
307.2k	02	V F807 02	USB Only
230.4k	03	V F807 03	
115.2k	07	V F807 07	
57.6k	**0F**	V F807 0F	**Default**
38.4k	17	V F807 17	
19.2k	2F	V F807 2F	
9600	5F	V F807 5F	
4800	BF	V F807 BF	

3.1 Baud Rates below 4800

Below 4800 the control bit fSerial:BaudRateHi must be cleared.

fSerial States	Command String		Notes
Normal - High Baud Rates	VF708 21		
Low Baud Rates	VF708 20		

In Low Baud, the divisors are:

Baud Rate	Divisor (hex)	Command String	Notes
9600	17	V F807 17	
4800	2F	V F807 2F	
2400	5F	V F807 5F	
1200	BF	V F807 BF	

4 Special Clock Frequency 12MHz

12MHz is used when external clock is taken from an FT232R USB chip, rather than using the internal oscillator. The USB interface can support non standard baud rates faster than 57,600.

Baud Rate	Error	Divisor (hex)	Command String	Notes
250k	0	02	V F807 02	USB only
46.88k	0	0F	V F807 0F	Default (USB)
57.6k	0.2%	0C	V F807 0C	
38.4k	0.4%	13	V F807 13	
19.2k	0.2%	26	V F807 26	
9600	0.1%	4D	V F807 4D	
4800		9B	V F807 9B	

5 Other Clock Frequencies

If you are using the BL233 directly (rather than a built up I2C2PC adaptor), then you can choose various clock speeds. The default clock frequency is 14.7456MHz. At 5V you can increase this to 20MHz maximum. This will increase both I2C bus speed and maximum baud rate by 35%. Note that the delay periods and watchdog times will reduce also. The timer base can be changed to keep delay times correct. 1Wire will *not* work as its timing is fixed.

The Maximum baud rate without data loss is $\frac{FXtal}{48}$

Note that not all baud rates can be set at all crystal frequencies. The FTDI USB convertor used in the I2C2PC can work at the highest rates.

Clock (MHz)	Highest Rate (Clk/48)	Highest Standard Baud Rate	Error
9.216	192,000	115,200	0
11.059	230,400	230,400	0
12	250,000	57,600	0.2%
14.7456	307,200	**230,400**	**0**
16	333,333	57,600	2.1%
18.432	384,000	230,400	0
20	416,666	57,600	1.4%

5.1 USB Baud Rates

The I2C2PC uses FTDI chip. These can get any baud rate from formula $Baud = \frac{24MHz}{N}$ when N= 8, 12, 16..16384

Clock (MHz)	Highest Rate (Clk/48)	Highest USB Baud Rate	Error
9.216	192,000	192,000	0
11.059	230,400	230,400	0
12	250,000	250,000	0
14.7456	**307,200**	**307,200**	**0.2%**
16	333,333	333,333	0
18.432	384,000	384,400	0.8%
20	416,666	416,666	1%

5.2 Timer

If you are changing the crystal frequency, then the timer period will not be 1ms.

See Web Configurator to calculate values

Revision History

Rev	Date	Changes
1	20 Aug 2013	Add Web Configurator Link.
2	2 Nov 2013	Minor changes
3	31 Aug 2014	Minor changes. Filename changed, Add fSerial values
4	18 May 2015	Add USB baud rates, other max baud rates.
5	14 Jan 17	colorise bl233 code, SignPDF