I2C-OSC™ I²C 1KHz – 68MHz Programmable Oscillator User Manual

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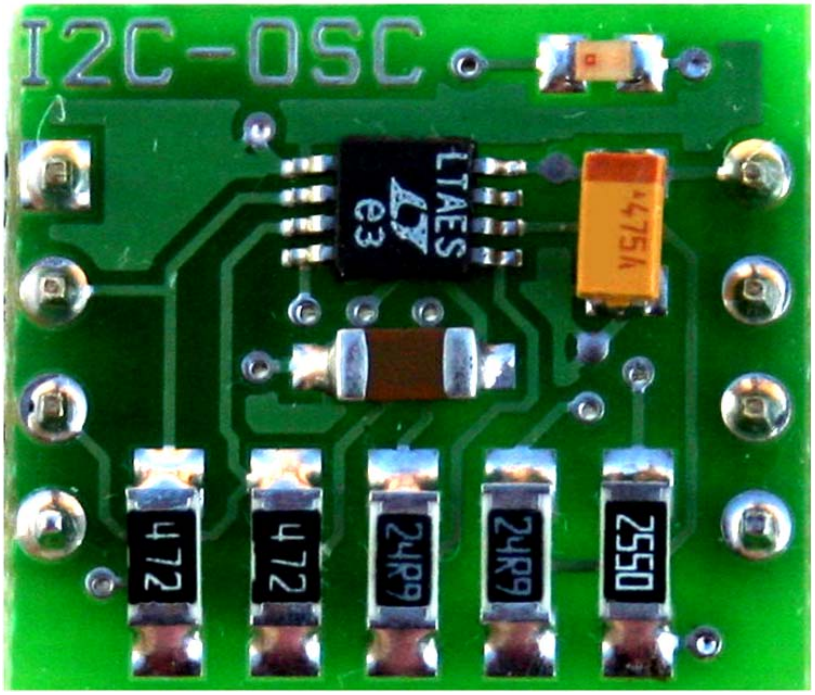

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GRAVITECH GROUP

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Description

The I2C-OSC board is an 8-pin CMOS 1KHz – 68MHz Programmable Oscillator device using I²C bus. There are no external components required. Only two signal lines SDA and SCL plus supply voltage and ground are required to be connected. This makes it perfect for embedded systems that require programmable oscillator.

This board features innovations that set it apart from other programmable oscillator module. Innovations feature like on-board I²C address jumpers, pull-up resistors, and power LED. The module can be quickly connected directly on to the breadboard. The board is small and compact in size 0.70 x 0.61 inches.

The I2C-OSC is designed base on LTC6904 IC. It is a low power self contained digital frequency sources providing a precision frequency from 1KHz to 68MHz, set through an I²C bys. It operates over a single wide supply range of 2.7V to 5.5V.

The LTC6904 feature a proprietary feedback loop that linearizes the relationship between digital control setting and frequency, resulting in a very simple frequency setting equation:

$$f = 2^{OCT} \bullet \frac{2078(Hz)}{\left(2 - \frac{DAC}{1024}\right)}; 1kHz < f < 68MHz$$

A jumper pins vary the fixed I²C address and allow up to two I2C-OSC to share the same I²C bus.

Features

- Up to 2 I2C-OSC on the same bus
- 1KHz to 68MHz square wave output
- 0.5% (Typ) initial frequency accuracy
- Frequency error <1.1% over all settings
- 0.1% resolution
- Jitter < 0.4% typical 1KHz to 8MHz
- I²C Interface up to 3.4 Mbps
- Stand alone module, no external components required
- On-board I²C address jumpers, pull-up resistors and power LED
- Decoupling supply voltage
- Design easy for breadboard
- High quality double sided PCB
- All SMT components
- Small and compact in size 0.70 x 0.61 inches
- Dual row 0.6” width, 0.1” pitch header pins
- Flexible operating power supply voltage range of +2.7V to +5.5V
- Suitable for 3.3V or 5.0V microcontroller

Applications

- Precision Digitally Controlled Oscillator
- Power Management
- Direct Digital Frequency Synthesis (DDS) Replacement
- Switched Capacitor Filter Clock
- And much more…

* I²C is a trademark of Philips Semiconductors Corporation.

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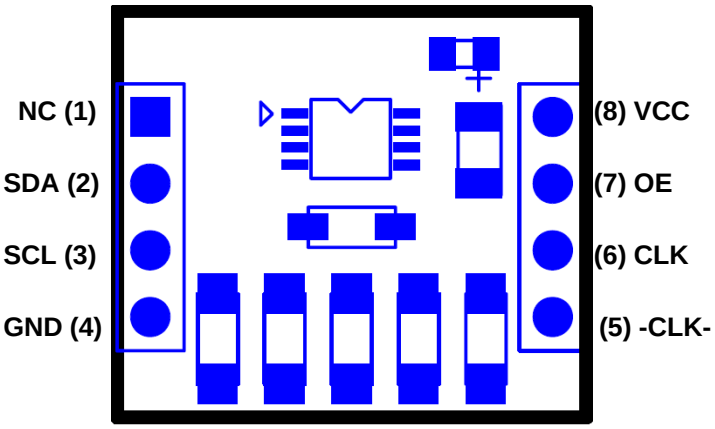
Pin Configuration



Pin No.	Name	Type	Description
1	NC	NC	No connect
2	SDA	I/O	Serial data line
3	SCL	Input	Serial clock line
4	GND	PWR	Supply ground
5	-CLK-	Output	Auxiliary clock output
6	CLK	Output	Main clock output
7	OE	Input	Asynchronous output enable
8	VCC	PWR	Supply voltage

Interfaces

Power:

The I2C-OSC board needs an external +2.7VDC – +5.5VDC supply.

- **VCC:** is an input power +2.7VDC – +5.5VDC to I2C-OSC board.
- **GND:** is a common ground for every pin. This pin MUST be connected to ground of the external power supply.

I²C pins:

The I2C-OSC operates as a slave on the I²C bus. Only two signal lines SDA and SCL are required for I²C bus. Please refer to I²C specification for more information.

CLK and –CLK- pins:

These are the main and auxiliary clock output from the I2C-OSC. Please refer to LTC6904 datasheet for more detail on frequency setting information.

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OE pin:

This is an active high asynchronous output enable. CLK and –CLK- pins are set LOW when this pin is LOW.

Module Configuration

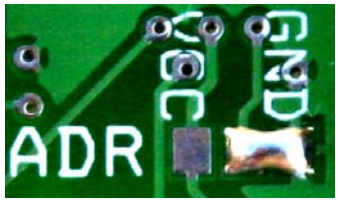
I²C address:

Default address shipped from the manufacture is 0x2E for write and 0x2F for read.

ADR = GND

0	0	1	0	1	1	$\overline{ADR}$	WR

The address can be easily change by solder the bridge between the ADR pin to VCC or GND at the bottom of the module. This is allows up to two I2C-OSC to share the same I²C bus.



Power-on LED:

The green LED on the module is illuminating when the power applied. The power-on LED is enabled from the manufacture. It can be disabling for light sensitive or low current requirement application by remove the solder bridge on "PW" at the bottom of the module.

I²C pull-up resistors:

I²C bus specification required to have pull-up resistors on SDA and SCL pin. I2C-OSC come with these two pull-up resistors enabled from the manufacture. It can be disabling when connect to I²C bus that already have pull-up resistors by remove the solder bridge on the "PU" at the bottom of the module.

OE pin:

When OE is high, the output clock is enabling. When OE is low, CLK and –CLK- pins are set LOW.

To always enable the output, solder a bridge on "OE" at the bottom of the module (default from manufacture). To use external signal to control enable line simply remove the solder bridge and connect enable signal to OE pin7.

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Below are the default settings from the manufacture.