DEMO MANUAL DC2073B

LTC1799, LTC6900, LTC6905, LTC6905-XXX, LTC6906, LTC6907 LTC6908 SOT23 Silicon Oscillators

DESCRIPTION

DC2073B demo board features Linear Technology's SOT23 packaged silicon oscillators. The DC2073B demo board is available in eleven different options; DC2073B-A through DC2073B-K. These eleven options provide for the evaluation of resistor-set oscillator ICs and fixed frequency ICs (Table1).

Design files for this circuit board are available at http://www.linear.com/demo/DC2073B

Table 1. Resistor-Set Oscillator ICs and Maximum Frequency Error at T_A = 25°C

PART NUMBER, BOARD ASSEMBLY	FREQUENCY PROGRAM METHOD	DESCRIPTION
LTC®6905, DC2073B-A	Resistor Programmable	17.225MHz ≤ f_{OSC} ≤ 170MHz, ±1.4% at V^+ = 2.7V and ±2.2% at V^+ = 5V
LTC1799, DC2073B-B	Resistor Programmable	5kHz ≤ f_{OSC} ≤ 10MHz, ±1.5% at V^+ = 3V and ±1.5% at V^+ = 5V (Up to 20MHz)
LTC6900, DC2073B-C	Resistor Programmable	5kHz ≤ f_{OSC} ≤ 10MHz, ±1.5% at V^+ = 3V and ±1.5% at V^+ = 5V (Up to 20MHz)
LTC6905-133, DC2073B-D	Three Fixed Frequencies Set by Three-State Input	f_{OSC} = 133MHz, 66.7MHz and 33.5MHz, ±1.0% at V^+ = 3V and ±1.5% Typical at V^+ = 5V
LTC6905-100, DC2073B-E	Three Fixed Frequencies Set by Three-State Input	f_{OSC} = 100MHz, 50MHz and 25MHz, ±1.0% at V^+ = 3V and ±1.5% Typical at V^+ = 5V
LTC6905-96, DC2073B-F	Three Fixed Frequencies Set by Three-State Input	f_{OSC} = 96MHz, 48MHz and 24MHz, ±1.0% at V^+ = 3V and ±1.5% Typical at V^+ = 5V
LTC6905-80, DC2073B-G	Three Fixed Frequencies Set by Three-State Input	f_{OSC} = 80MHz, 40MHz and 20MHz, ±1.0% at V^+ = 3V and ±1.5% typical at V^+ = 5V
LTC6906, DC2073B-H	Resistor Programmable	10kHz ≤ f_{OSC} ≤ 1MHz, ±0.5% at V^+ = 2.7V to 3.6V and ±0.7% at V^+ = 2.25V
LTC6907, DC2073B-I	Resistor Programmable	400kHz ≤ f_{OSC} ≤ 4MHz, ±0.65% at V^+ = 3V to 3.6V
LTC6908-1, DC2073B-J	Spread Spectrum Modulation, Complementary Outputs (0°/180°) Resistor Programmable	250kHz ≤ f_{OSC} ≤ 5MHz, ±1.5% at V^+ = 2.7V and ±2.0% at V^+ = 5V
LTC6908-2, DC2073B-K	Spread Spectrum Modulation, Quadrature Outputs (0°/90°) Resistor Programmable	250kHz ≤ f_{OSC} ≤ 5MHz, ±1.5% at V^+ = 2.7V and ±2.0% at V^+ = 5V

QUICK START PROCEDURE

Test Equipment:

1. A single 3V power supply.
2. An oscilloscope with a bandwidth of at least 5x f_{OSC}. (For example, if f_{OSC} = 100MHz then use a 500MHz oscilloscope).
3. A screwdriver to adjust the potentiometer.

   Note: The DC2073B potentiometer is shorted with a zero ohm resistor for factory testing. The zero ohm (RJ10) resistor must be removed to allow setting the frequency with a screwdriver. If the potentiometer is set to a high value (>100k), then touching the DC2073B can produce output jitter.

Basic Test Procedure:

1. Connect power supply to V^+ and GND, turrets E4 and E5.
2. Connect oscilloscope probe to OUT1 and GND.

   Note: The ground lead of an oscilloscope probe has a series inductance that can generate a resonant circuit with the probe's capacitance. Probe resonance adds transient peaks and ringing on a high speed waveform. Reliable probing of the high frequency LTC6905 and LTC6905-XXX (with corresponding demo boards DC2073B-A, -D, -E, -F or -G), must use a very short connection of the oscilloscope probe ground to the board GND (see probe tip picture in Figure 1 Test Setup).
3. Set the JP1 jumper to the N divider position for the desired frequency shown on Table2.
4. Turn on supply.
5. The oscilloscope display shows a 3V squarewave (0V to 3V).
6. For the resistor-set ICs (DC2073B-A, -B, -C, -H, -I, -J or -K) turn the RPOT potentiometer for the desired frequency. (The frequency adjustment is very coarse when the potentiometer is turned near the fully clockwise or counter-clockwise position).

Verify Oscillator Accuracy

The f_{OSC} accuracy of the resistor-set ICs (DC2073B-A, -B, -C, -H, -I, -J or -K), can be verified by setting RSET to the exact value from the f_{OSC} equation shown in Table 2. For the DC2073B-A, -B, -C, -J, -K, RSET = RPOT + RSET2. RSET1 and RSET2 are never installed on the same board. Connecting an ohmmeter across RPOT and RSET1 or RSET2 forces current into the IC set pin (Pin 3 or 4) and causes an error in the ohmmeter reading. The RS resistor is in series with RPOT and equal to RSET1 or RSET2 and the equivalent RSET = RPOT + RS.

Procedure to Verify Oscillator Accuracy

a. Calculate RSET for the desired frequency (RSET in Table 2).

b. Remove the power supply leads from DC2073B and connect an ohmmeter from POT (E6) to V^+ (DC2073B-A, -B, -C, -J or -K) or GND (DC2073B-H or-I).

C. Adjust RPOT for the exact value of RSET needed.

   Note: If the potentiometer is turned near the fully clockwise or counter-clockwise position the RPOT adjustment may be too coarse for setting an exact RSET value. In addition, for a frequency adjustment near the upper or lower f_{OSC} range, RSET may be greater or less than the default DC2073B RPOT + RSET1 or RSET2 value, in this case the RSET1 or RSET2 resistor must be removed and replaced with a lower or higher value.

QUICK START PROCEDURE

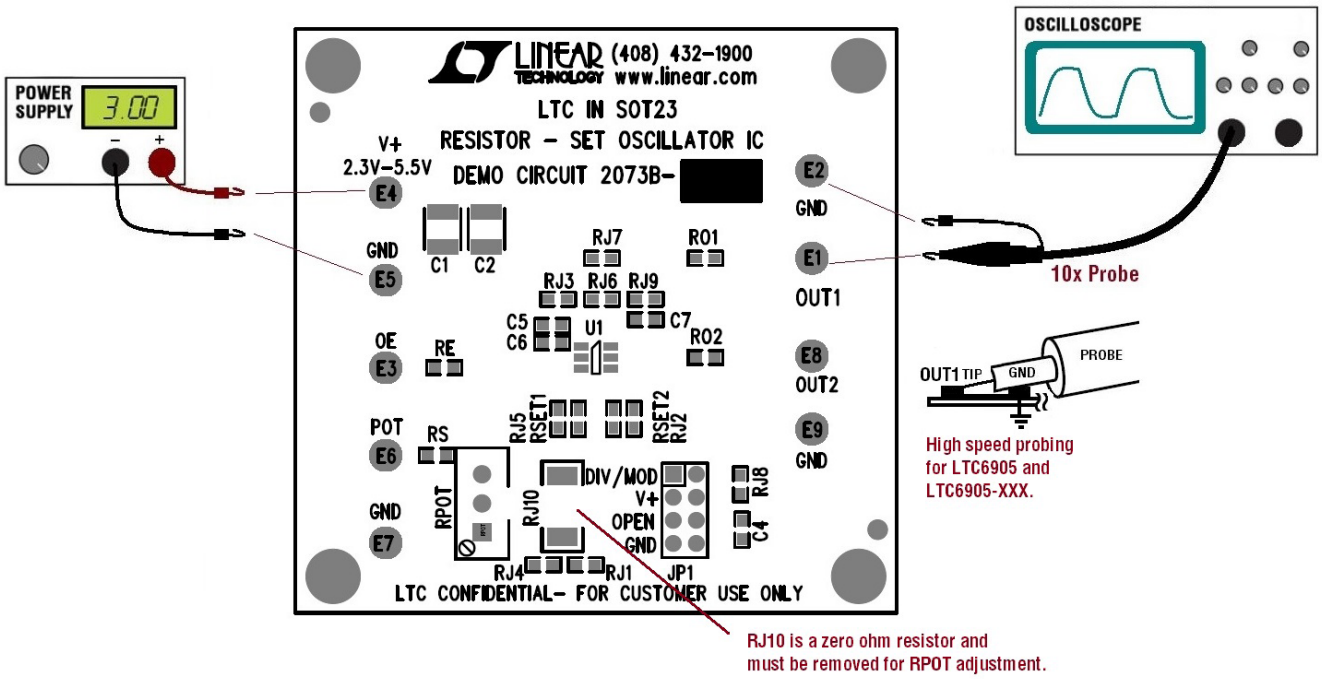

Figure 1. Test Setup

QUICK START PROCEDURE

Table 2. f_{OSC} Frequency and N Divider Setting

LTC6905, DC2073B-A

$$f_{OSC} = \left(\frac{168.5MHz \bullet 10k\Omega}{R_{SET}} + 1.5MHZ\right) \bullet \frac{1}{N},\ R_{SET} = \frac{168.5MHz \bullet 10k\Omega}{N \bullet f_{OSC} - 1.5MHz}$$

N = 1 (JP1 to V+), 68.9MHz ≤ f_{OSC} ≤ 170MHz
N = 2 (JP1 to OPEN), 34.45MHz ≤ f_{OSC} ≤ 85MHz
N = 4 (JP1 to GND), 7.225MHz ≤ f_{OSC} ≤ 42.5MHz

LTC1799, DC2073B-B

$$f_{OSC} = \frac{10MHz}{N} \bullet \frac{10k\Omega}{R_{SET}},\ R_{SET} = \frac{10MHz}{f_{OSC}} \bullet \frac{10k\Omega}{N}$$

N = 1 (JP1 to GND), 500kHz ≤ f_{OSC} ≤ 20MHz
N = 10 (JP1 to OPEN), 50kHz ≤ f_{OSC} ≤ 2MHz
N = 100 (JP1 to V+), 5kHz ≤ f_{OSC} ≤ 200kHz

LTC6900, DC1073A-C

$$f_{OSC} = \frac{10MHz}{N} \bullet \frac{20k\Omega}{R_{SET}},\ R_{SET} = \frac{10MHz}{f_{OSC}} \bullet \frac{20k\Omega}{N}$$

N = 1 (JP1 to GND), 500kHz ≤ f_{OSC} ≤ 20MHz
N = 10 (JP1 to OPEN), 50kHz ≤ f_{OSC} ≤ 2MHz
N = 100 (JP1 to V+), 5kHz ≤ f_{OSC} ≤ 200kHz

LTC6905-133, DC2073B-D

$$f_{OSC} = \frac{133MHz}{N}$$

N = 1 (JP1 to V+), f_{OSC} = 133MHz
N = 2 (JP1 to OPEN), f_{OSC} = 66.7MHz
N = 4 (JP1 to GND), f_{OSC} = 33.5MHz

LTC6905-10, DC2073B-E

$$f_{OSC} = \frac{100MHz}{N}$$

N = 1 (JP1 to V+), f_{OSC} = 100MHz
N = 2 (JP1 to OPEN), f_{OSC} = 50MHz
N = 4 (JP1 to GND), f_{OSC} = 25MHz

LTC6905-96, DC2073B-F

$$f_{OSC} = \frac{96MHz}{N}$$

N = 1 (JP1 to V+), f_{OSC} = 96MHz
N = 2 (JP1 to OPEN), f_{OSC} = 48MHz
N = 4 (JP1 to GND), f_{OSC} = 24MHz

LTC6905-80, DC2073B-G

$$f_{OSC} = \frac{80MHz}{N}$$

N = 1 (JP1 to V+), f_{OSC} = 80MHz
N = 2 (JP1 to OPEN), f_{OSC} = 40MHz
N = 4 (JP1 to GND), f_{OSC} = 20MHz

LTC6906, DC2073B-H

$$f_{OSC} = \frac{1MHz}{N} \bullet \frac{100k\Omega}{R_{SET}},\ R_{SET} = \frac{1MHz}{f_{OSC}} \bullet \frac{100k\Omega}{N}$$

N = 1 (JP1 to GND), 0.1MHz ≤ f_{OSC} ≤ 1MHz
N = 3 (JP1 to OPEN), 33kHz ≤ f_{OSC} ≤ 333kHz
N = 10 (JP1 to V+), 10kHz ≤ f_{OSC} ≤ 100kHz

LTC6907, DC2073B-I

$$f_{OSC} = \frac{4MHz}{N} \bullet \frac{50k\Omega}{R_{SET}},\ R_{SET} = \frac{4MHz}{f_{OSC}} \bullet \frac{50k\Omega}{N}$$

N = 1 (JP1 to GND), 0.4MHz ≤ f_{OSC} ≤ 4MHz
N = 3 (JP1 to OPEN), 133kHz ≤ f_{OSC} ≤ 1.33MHz
N = 10 (JP1 to V+), 40kHz ≤ f_{OSC} ≤ 400kHz

LTC6908-1, DC2073B-J

Complementary Outputs (0°/180°) without Modulation:
250kHz ≤ f_{OSC} ≤ 5MHz, (JP1 to DIV/MOD)

$$f_{OSC} = \frac{10MHz}{N} \bullet \frac{10k\Omega}{R_{SET}},\ R_{SET} = \frac{10MHz}{f_{OSC}} \bullet \frac{10k\Omega}{N}$$

Spread Spectrum Modulation Rate:

(JP1 to GND), f_{OSC}/16
(JP1 to OPEN), f_{OSC}/32
(JP1 to V+), f_{OSC}/64

LTC6908-1, DC2073B-K

Quadrature Outputs (0°/90°) without Modulation:
250kHz ≤ f_{OSC} ≤ 5MHz, (JP1 to DIV/MOD)

$$f_{OSC} = \frac{10MHz}{N} \bullet \frac{10k\Omega}{R_{SET}},\ R_{SET} = \frac{10MHz}{f_{OSC}} \bullet \frac{10k\Omega}{N}$$

Spread Spectrum Modulation Rate:

(JP1 to GND), f_{OSC}/16
(JP1 to OPEN), f_{OSC}/32
(JP1 to V+), f_{OSC}/64

DEMONSTRATION BOARD IMPORTANT NOTICE

Linear Technology Corporation (LTC) provides the enclosed product(s) under the following **AS IS** conditions:

This demonstration board (DEMO BOARD) kit being sold or provided by Linear Technology is intended for use for **ENGINEERING DEVELOPMENT OR EVALUATION PURPOSES ONLY** and is not provided by LTC for commercial use. As such, the DEMO BOARD herein may not be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including but not limited to product safety measures typically found in finished commercial goods. As a prototype, this product does not fall within the scope of the European Union directive on electromagnetic compatibility and therefore may or may not meet the technical requirements of the directive, or other regulations.

If this evaluation kit does not meet the specifications recited in the DEMO BOARD manual the kit may be returned within 30 days from the date of delivery for a full refund. THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY THE SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. EXCEPT TO THE EXTENT OF THIS INDEMNITY, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user releases LTC from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge. Also be aware that the products herein may not be regulatory compliant or agency certified (FCC, UL, CE, etc.).

No License is granted under any patent right or other intellectual property whatsoever. **LTC assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or any other intellectual property rights of any kind.**

LTC currently services a variety of customers for products around the world, and therefore this transaction **is not exclusive**.

Please read the DEMO BOARD manual prior to handling the product. Persons handling this product must have electronics training and observe good laboratory practice standards. **Common sense is encouraged**.

This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

Mailing Address:

Linear Technology
1630 McCarthy Blvd.
Milpitas, CA 95035

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:
moschip.ru
moschip.ru_4
moschip.ru_6
moschip.ru_9