

# **CDCE(L)9xx and CDCEx06 Programming Evaluation Module**

This user's guide explains how to use the CDCE(L)9xx Programming EVM, which is a generic printed-circuit board. It is designed to program devices in the CDCE(L)9xx and CDCEx06 families. These families use different core voltages, requiring voltage adjustment. This document explains the settings in detail. The CDCE(L)9xx and the CDCEx06 programming is now available.

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## **1 Introduction**

### **1.1 Features**

- Easy-to-use evaluation module for fast programming of prototyping units and low production
- Allows programming of all members of the TI's CDCE(L)9xx family and CDCEx06 family with the same board
- Easy and fast device programming through TI ClockPro software
- EVM completely USB powered

The CDCE(L)9xx programming EVM is designed to program all devices of both the CDCE(L)9xx and the CDCEx06 families.

These families are modular PLL-based, low-cost, high-performance, programmable clock synthesizers.

The CDCE(L)9xx family ranges from three (1-PLL) up to nine (4-PLL) output clocks from a single input frequency. A crystal or LVCMOS clock signal is possible as reference clock. VCXO functionality as well as SSC functionality is built in every device of the CDCE(L)9xx family, which allows synchronizing the output frequency to an external control signal, e.g., a PWM signal. Three free programmable control inputs, S0, S1, and S2, can be used to select different frequencies, or change SSC setting for lowering EMI, or other control features like, outputs disable to low, outputs 3-state, power down, PLL bypass, etc. The device has separate output supply pins, VDDOUT, which is 1.8 V for CDCEL9xx and to 2.5 V to 3.3 V for CDCE9xx.

The CDCEx06 are 3-PLL, 6-output devices with one PLL being SSC-capable. They accept crystals as well as single-ended or differential-ended signals as an input. Two programmable pins can be used either for addressing or be programmed as configuration pins. These devices can be used with a single 3.3-V supply voltage. However, the outputs can be separately supplied by two independent supply pins. Both can be used with 3.3 V or 2.5 V.

A deep M/N divider ratio allows both families the generation of zero ppm audio/video, networking (WLAN, BlueTooth, Ethernet, GPS) or interface (USB, IEEE1394, memory stick) clocks from a 27-MHz reference input frequency, for example.

An in-built EEPROM cuts off the need for reprogramming in a certain application, but reprogramming is still possible with a 2-wire serial interface. Based on the PLL frequency and the divider settings, the internal loop filter components are automatically adjusted to achieve high stability and optimized jitter transfer characteristic of each PLL.

An overview of the devices follows.

CDCE949/CDCEL949: 4-PLL, 9 outputs,  $f_{\max}=230$  MHz, industrial temperature range, 24 pins

CDCE937/CDCEL937: 3-PLL, 7 outputs,  $f_{\max}=230$  MHz, industrial temperature range, 20 pins

CDCE925/CDCEL925: 2-PLL, 5 outputs,  $f_{\max}=230$  MHz, industrial temperature range, 16 pins

CDCE913/CDCEL913: 1-PLL, 3 outputs,  $f_{\max}=230$  MHz, industrial temperature range, 14 pins

CDCE906: 3-PLL, 6 outputs,  $f_{\max}=167$  MHz, industrial temperature range, 20 pins

CDCE706: 3-PLL, 6 outputs,  $f_{\max}=300$  MHz, industrial temperature range, 20 pins

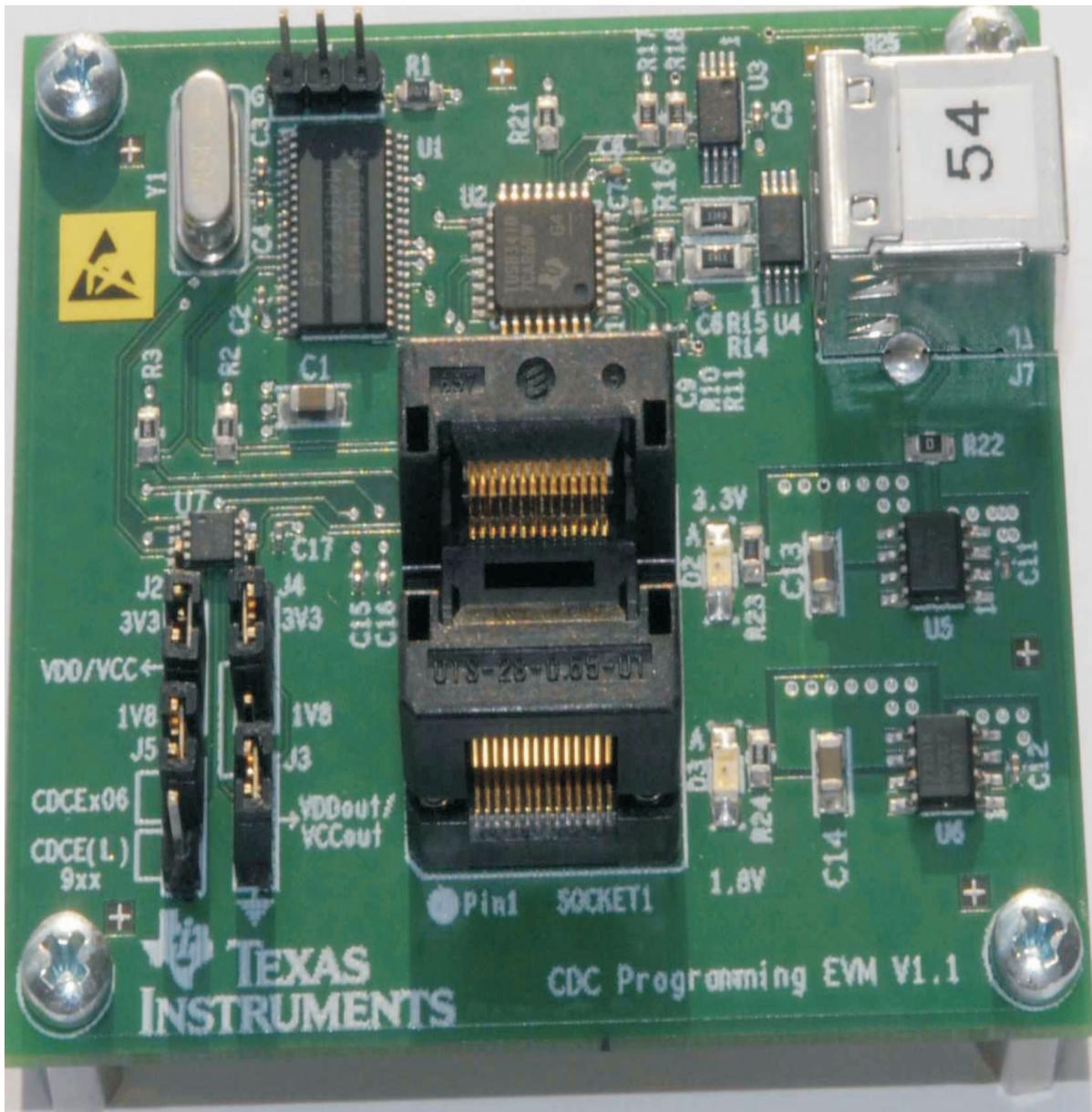


Figure 1. CDC Programming EVM

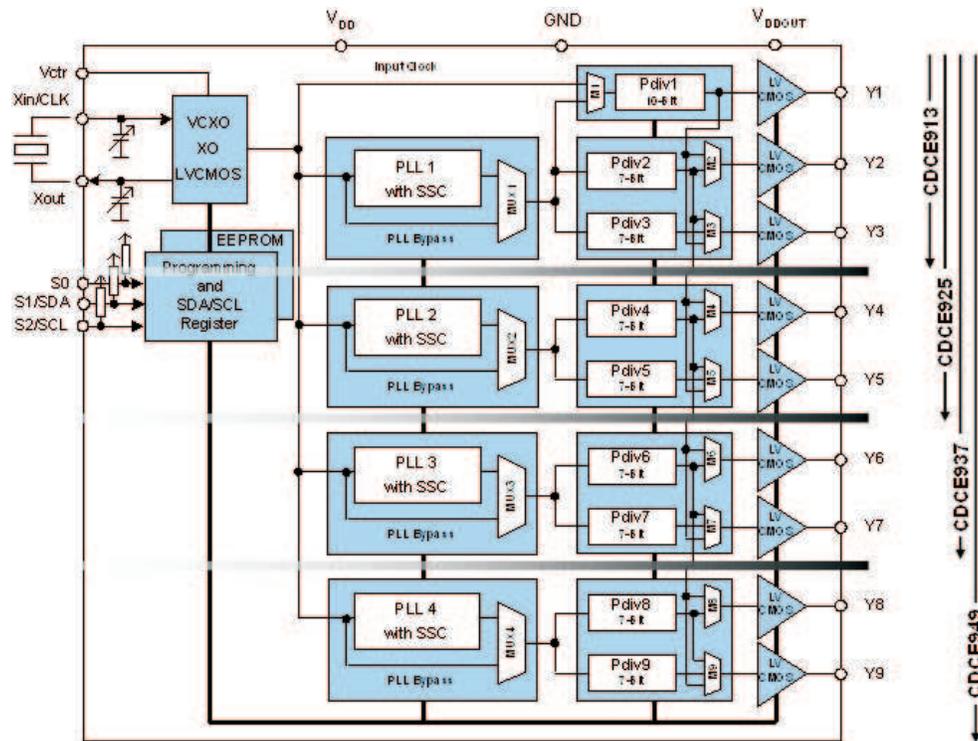


Figure 2. Functional Block Diagram of CDCE(L)9xx

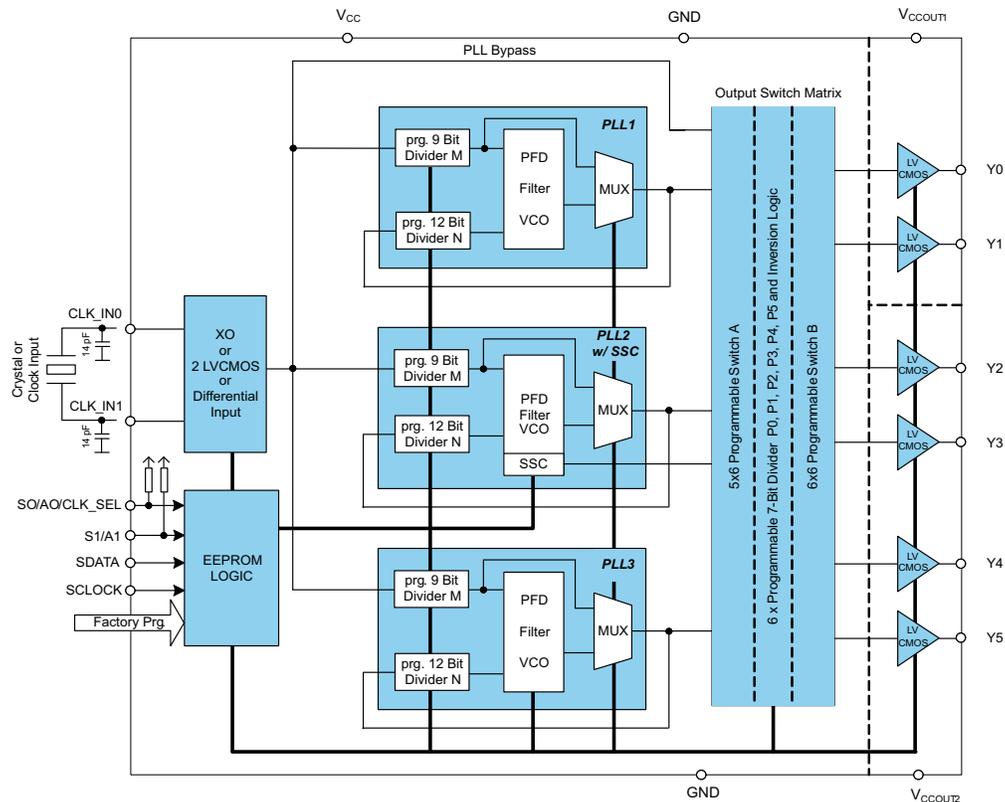


Figure 3. Functional Block Diagram of CDCEX06

## 2 Quick Start – USB Plug 'N' Play

Follow these steps to quickly start using the EVM.

1. Connect the EVM with the PC with a 2.0 USB cable.
2. Install the driver software using the provided CD-ROM.
3. The EVM is now running and completely powered through USB. The LED's D2 (3.3 V) and D3 (1.8 V) indicate the availability of the supply voltages.
4. Programming the device is also possible using the TI ClockPro dedicated software.

## 3 EVM Hardware

This section gives an extended description of the board hardware, providing the user with a comprehensive overview of its configuration; detailed information regarding onboard jumpers and communication interface (I<sup>2</sup>C/SMBus) is also provided, allowing the user to change the setup.

The EVM is powered fully by the USB. Two onboard LDOs generate the needed 3.3-V and 1.8-V supply voltages for the board components and the device.

### 3.1 Jumper Settings

The CDCE(L)9xx programming EVM uses five jumpers to allow for a combination of different devices and voltages to be programmed.

- J1:** Jumper 1 is used to factory-program the components on the board. Do not use this jumper.
- J2:** Selects the voltage supply of the core. For CDCE(L)9xx, this jumper must be connected to 1.8 V. For CDCEx06, this jumper must be connected to 3.3 V.
- J3:** Applies the voltage to VDDOUT. It can either be the voltages selected in jumper J4 or ground.
- J4:** Selects the voltage to be applied to VDDOUT. For CDCE(L)9xx, the jumper must be connected to 1.8 V; for all other devices, it must be connected to 3.3 V.
- J5:** Selects the device to be programmed. For CDCE(L)9xx, the jumper has to be placed next to J2 (upper two pins). For CDCEx06, the jumper has to be connected to the lower two pins. Note that the silkscreen for the jumper is incorrect for older board versions.

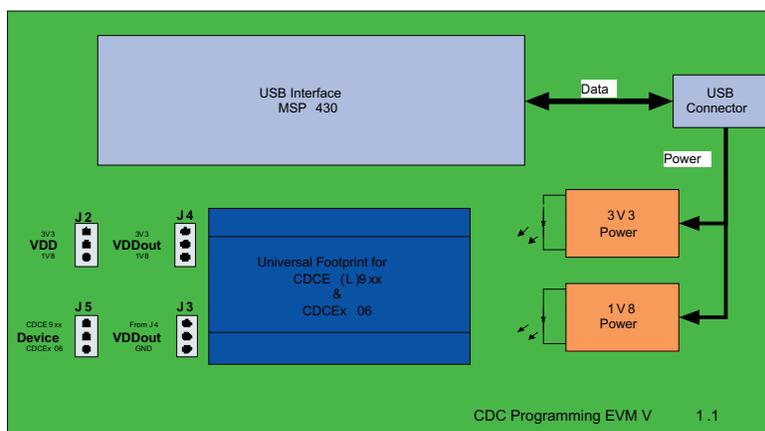


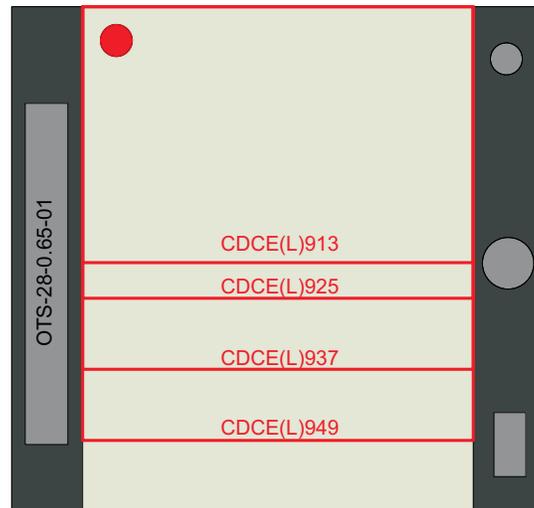
Figure 4. CDCE(L)9xx and CDCEx06 Programming EVM Block Diagram

### 3.2 Positioning of the Devices in the Socket

The socket is slightly bigger than the devices to be programmed. This allows for different devices to be programmed with only one EVM. Therefore, the positioning of the device on the socket is important.

### 3.2.1 Programming the CDCE(L)9xx

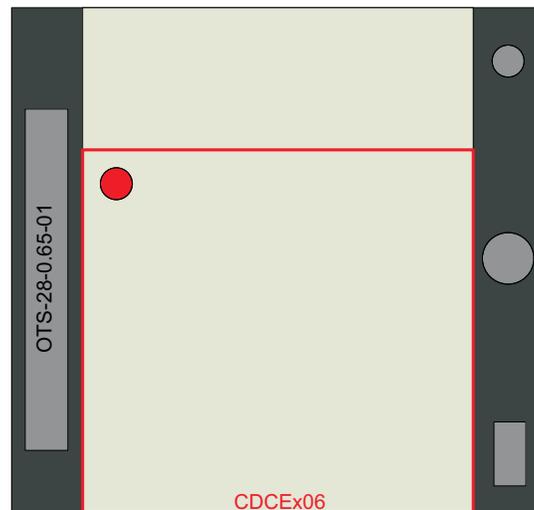
All devices of the CDCE(L)9xx family are programmed by positioning on the upper edge of the socket with pin 1 toward the pin 1 marking of the socket. (see [Figure 5](#)).



**Figure 5. CDCE(L)9xx Device Location in Socket**

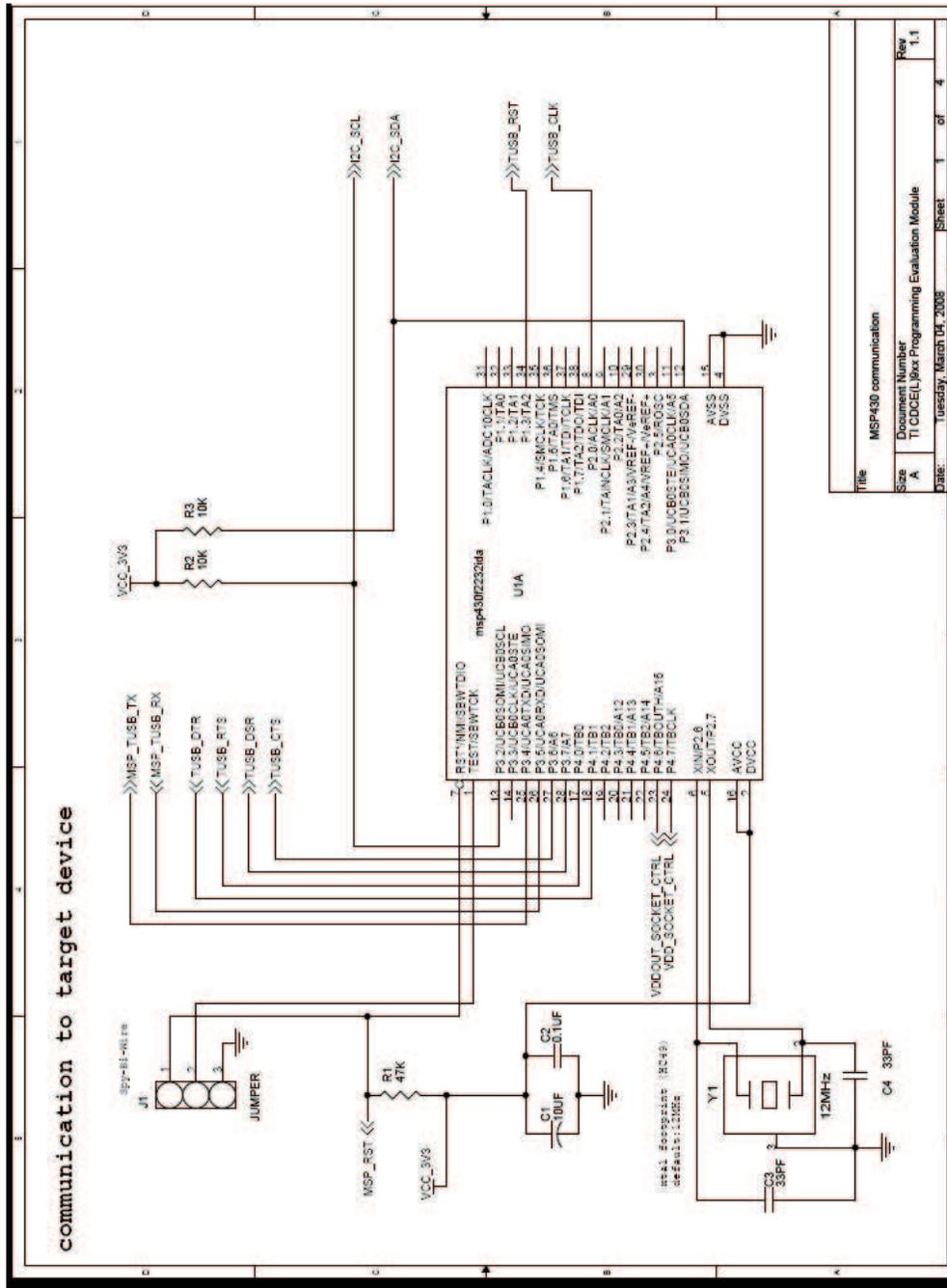
### 3.2.2 Programming the CDCEx06

All devices of the CDCEx06 family are programmed by positioning on the lower edge of the socket with pin 1 toward the pin 1 marking of the socket. (see [Figure 6](#)).

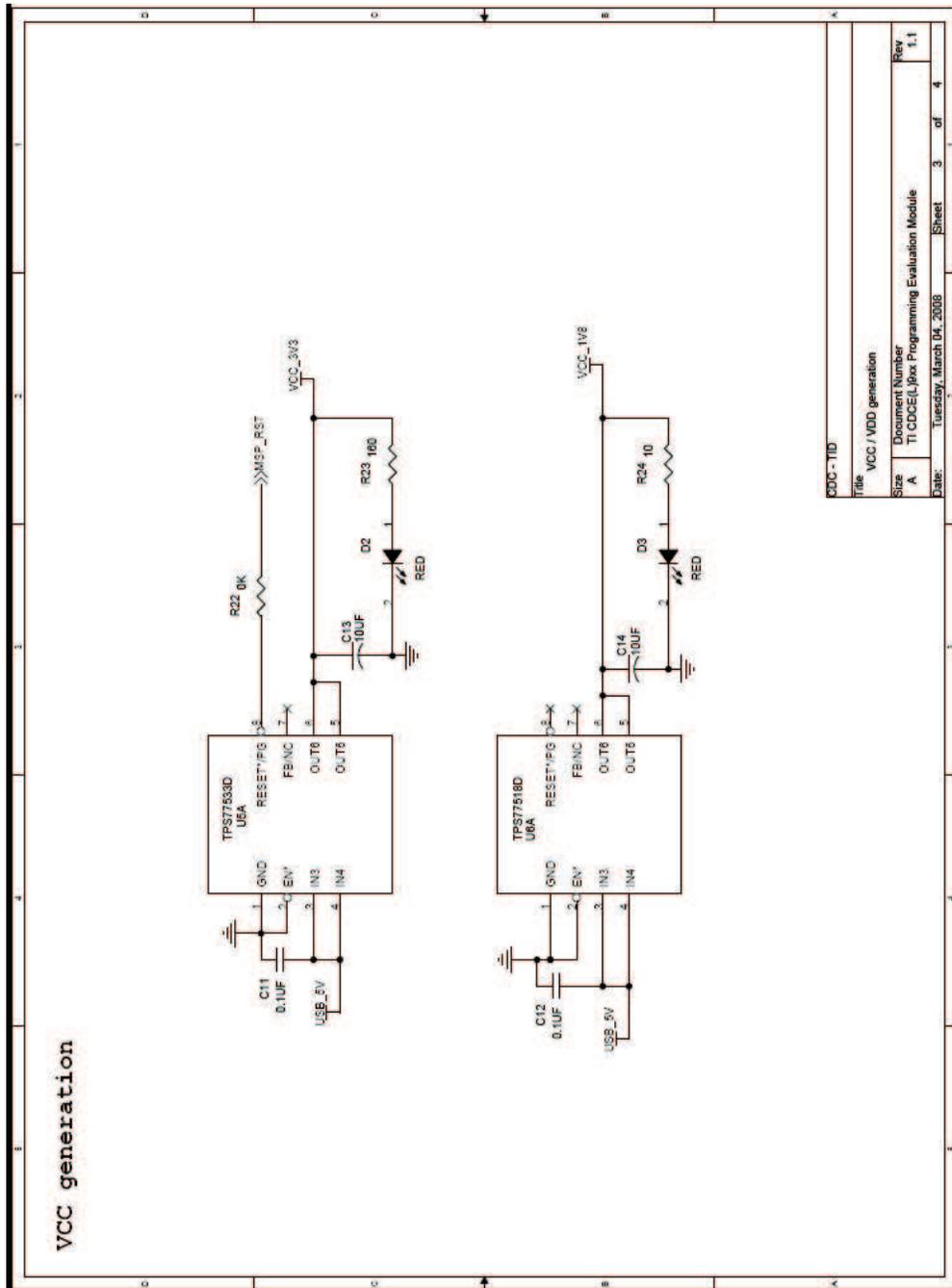


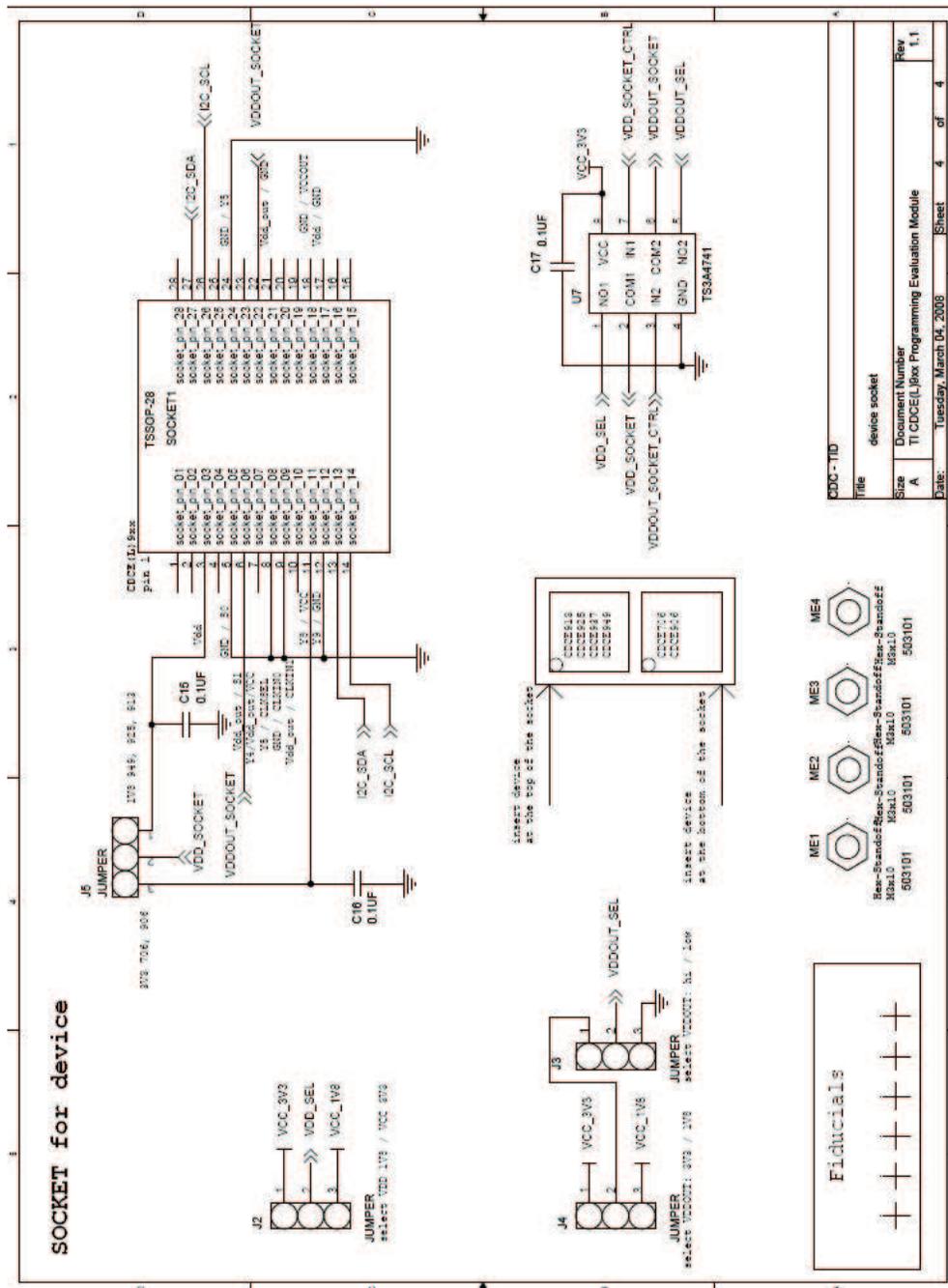
**Figure 6. CDCEx06 Device Location in Socket**

4 Schematics









## 5 Related Documentation From Texas Instruments

- *CDCE949, CDCEL949, Programmable 4-PLL VCXO Clock Synthesizer With 1.8V, 2.5V, and 3.3V LVC MOS Outputs* data sheet ([SCAS844](#))
- *CDCE937, CDCEL937, Programmable 3-PLL VCXO Clock Synthesizer With 1.8V, 2.5V, and 3.3V LVC MOS Outputs* data sheet ([SLAS564](#))
- *CDCE9252, CDCEL925, Programmable 2-PLL VCXO Clock Synthesizer With 1.8V, 2.5V, and 3.3V LVC MOS Outputs* data sheet ([SCAS847](#))
- *CDCE913, CDCEL913, Programmable 1-PLL VCXO Clock Synthesizer With 1.8V, 2.5V, and 3.3V LVC MOS Outputs* data sheet ([SCAS849](#))
- *VCXO Application Guideline for CDCE(L)9xx Family* application report ([SCAA085](#))
- *CDCE(L)9xx Performance Evaluation Module user's guide* ([SCAU022](#))

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## EVM Warnings and Restrictions

It is important to operate this EVM within the input voltage range of 0 V to 5 V and the output voltage range of 0 V to 3.6 V .

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than 85°C. The EVM is designed to operate properly with certain components above 85°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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DLP® Products	<a href="http://www.dlp.com">www.dlp.com</a>	Communications and Telecom	<a href="http://www.ti.com/communications">www.ti.com/communications</a>
DSP	<a href="http://dsp.ti.com">dsp.ti.com</a>	Computers and Peripherals	<a href="http://www.ti.com/computers">www.ti.com/computers</a>
Clocks and Timers	<a href="http://www.ti.com/clocks">www.ti.com/clocks</a>	Consumer Electronics	<a href="http://www.ti.com/consumer-apps">www.ti.com/consumer-apps</a>
Interface	<a href="http://interface.ti.com">interface.ti.com</a>	Energy	<a href="http://www.ti.com/energy">www.ti.com/energy</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>	Industrial	<a href="http://www.ti.com/industrial">www.ti.com/industrial</a>
Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>	Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</a>
Microcontrollers	<a href="http://microcontroller.ti.com">microcontroller.ti.com</a>	Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
RFID	<a href="http://www.ti-rfid.com">www.ti-rfid.com</a>	Space, Avionics & Defense	<a href="http://www.ti.com/space-avionics-defense">www.ti.com/space-avionics-defense</a>
RF/IF and ZigBee® Solutions	<a href="http://www.ti.com/lprf">www.ti.com/lprf</a>	Video and Imaging	<a href="http://www.ti.com/video">www.ti.com/video</a>
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