FEATURES

Full-featured evaluation board for the AD9910
PC evaluation software for control and measurement of the AD9910
USB interface
Graphic user interface (GUI) software with frequency sweep capability for board control and data analysis
Factory tested and ready to use

PACKAGE CONTENTS

AD9910 evaluation board
AD9910/PCBZ installation software CD
USB cable

GENERAL DESCRIPTION

This data sheet describes how to set up and use the AD9910 evaluation board. The AD9910 is a 1 GSPS DDS with a 14-bit DAC.

The evaluation board software provides a graphical user interface (GUI) for easy communication with the device along with many user-friendly features such as the mouse-over effect.

This data sheet is intended for use in conjunction with the AD9910 data sheet, which is available from Analog Devices, Inc., at www.analog.com.
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REVISION HISTORY

4/08—Revision 0: Initial Version
EVALUATION BOARD HARDWARE

REQUIREMENTS
To successfully use the evaluation board and run the software, the requirements listed in Table 1 must be met.

Table 1. AD9910/PCBZ Requirements

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>Windows® 98/ME/2000/XP</td>
</tr>
<tr>
<td>Processor</td>
<td>Pentium® I or later</td>
</tr>
<tr>
<td>Memory</td>
<td>128 MB minimum</td>
</tr>
<tr>
<td>Ports</td>
<td>One USB port</td>
</tr>
<tr>
<td>Clocking</td>
<td>Signal generator capable of generating sinusoidal waves of at least 0 dBm, up to at least 10 MHz</td>
</tr>
<tr>
<td>Power Supplies</td>
<td>Capability to generate at least two independent dc voltages (1.8 V/3.3 V)</td>
</tr>
<tr>
<td>Measurement</td>
<td>Appropriate measurement device, such as a spectrum analyzer or a high bandwidth oscilloscope</td>
</tr>
<tr>
<td>Cables</td>
<td>USB 1.1/2.0 cable, and SMA-to-X cables (X = SMA or BNC, depending on the connector of the device interfacing with the board)</td>
</tr>
</tbody>
</table>

SETTING UP THE EVALUATION BOARD

DC Power Supply
The AD9910 evaluation board has two power supply connectors (four pins each): TB1 and TB2. TB1 powers the USB interface circuitry, the digital I/O interface, and the digital core. TB2 powers the DAC and the clock input circuitry.

CONNECTORS
Table 2 shows the necessary connections and the appropriate biasing voltage.

Table 2. Connections and Biasing Voltage

<table>
<thead>
<tr>
<th>Connector</th>
<th>Pin No.</th>
<th>Label</th>
<th>Voltage (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB1</td>
<td>1</td>
<td>VCC_USB</td>
<td>3.3</td>
</tr>
<tr>
<td>TB1</td>
<td>2</td>
<td>GND</td>
<td>0</td>
</tr>
<tr>
<td>TB1</td>
<td>3</td>
<td>DVDD_IO</td>
<td>3.3</td>
</tr>
<tr>
<td>TB1</td>
<td>4</td>
<td>DVDD</td>
<td>1.8</td>
</tr>
<tr>
<td>TB2</td>
<td>1, 3</td>
<td>GND</td>
<td>0</td>
</tr>
<tr>
<td>TB2</td>
<td>2</td>
<td>DAC_VDD</td>
<td>3.3</td>
</tr>
<tr>
<td>TB2</td>
<td>4</td>
<td>CLK_VDD</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Device Clock Oscillator Options
The AD9910 architecture provides the user with three options when providing an input signal to the part. The first option allows the user to provide a high frequency input signal, connected to J1. The second option allows the user to connect using a lower input reference frequency, enabling the clock multiplier, and connects through J1. The third option allows the user to connect a crystal resonator on the backside of the board.

To enable the crystal mode, switch the jumper, W7, to the XTAL mode. Remove C51 and 52. Place 0 (zero) Ω resistors at R4 and R11 on the backside of the board. The crystal oscillates at 25 MHz. Refer to the AD9910 data sheet for details on the maximum input speeds and input sensitivities of these two inputs.

Device Communication Requirements
Two interface options are available on the evaluation board.
- USB 1.1/2.0
- Header row (U5 and U9), which places the part under the control of an external controller (such as a microprocessor, FPGA, or DSP)

Analog Devices provides a GUI for the PC; it does not provide control software for external controllers.

JUMPERS
Use the jumper settings listed in Table 3 to enable different modes of communication.

Table 3. Jumper Settings for Communication Modes

<table>
<thead>
<tr>
<th>Mode</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC Control, USB Port</td>
<td>Set Jumper W1 and Jumper W2 to enable. Set Jumper W4 to enable. Place a jumper on W5, W6, and W3.</td>
</tr>
<tr>
<td>External Control</td>
<td>Set Jumper W1 and Jumper W2 to disable. Set Jumper W4 to disable. Remove the jumper on W5, W6, and W3.</td>
</tr>
</tbody>
</table>

Jumper W1, Jumper W2, and Jumper W4 enable the USB circuitry to control the AD9910. Jumper W3 controls the EEPROM, used in starting up the USB circuitry. Jumper W5 and Jumper W6 control Signal SDO and Signal SDIO to and from the AD9910.
Manual I/O Control Headers
These pins provide the communication interface for the AD9910 when the part is under the command of an external controller (see Table 3 for correct jumper settings).

Multidevice Synchronous Control
These connections set up the AD9910 for multidevice synchronous operation.

DAC Output
These connections represent the filtered or unfiltered (default) output of the DAC.

Clock Mode Select
This connection controls whether the reference clock source is a 20 MHz to 30 MHz crystal, or is from an external signal generator.

A 25 MHz crystal is provided on the underside of the AD9910 evaluation board.

Ref Clock Input
This is the input for the external reference clock signal.

Power Supply Connections
These two connectors, TB1 and TB2, provide all necessary supply voltages needed by the AD9910 and the evaluation board (see Table 2).

USB Port
When the part is under PC control (default mode), the evaluation board communicates with the AD9910 via this port.
EVALUATION BOARD SOFTWARE

INSTALLING THE SOFTWARE

Follow these steps to install the AD9910 evaluation software:

1. Log into your PC system with administrative privileges.
2. Uninstall any previous versions of the AD9910 evaluation software from your PC system.
3. Insert the AD9910 evaluation software CD into your CD-ROM drive. Do not connect the AD9910 evaluation board to the computer until the AD9910 evaluation software has been successfully installed. Refer to the Readme.txt file located in the Software folder before proceeding with the installation of the AD9910 evaluation software.
4. Run the setup.exe file located in the Software folder and follow the AD9910 evaluation software onscreen installation instructions.

INSTALLING THE DRIVER

Once the software is successfully installed onto your PC, the next step is to interface the AD9910 evaluation software to the AD9910 evaluation board via the USB Port (see Figure 2).

In order for the evaluation board and software to communicate properly, drivers must be loaded onto your PC system. The following instructions explain how to install these drivers on your PC system.

**Windows 98/ME/2000 Users**

1. Power up the AD9910 evaluation board (see Table 2).
2. Connect the evaluation board to the computer via the USB port using a USB cable. Then, the VBUS LED (CR1 on the AD9910 evaluation board) illuminates. When the USB cable is connected, the Found New Hardware Wizard appears. Click Next to continue to the AD9910 Firmware Loader.
3. Click Continue Anyway when the Hardware Installation Warning window appears.
4. Click Finish in the Found New Hardware Wizard once installation is complete.
5. Click Next when the next Found New Hardware Wizard appears. This is for the EZSSP device.
6. Click Continue Anyway when the Hardware Installation Warning window appears.
7. Click Finish in the Found New Hardware Wizard once installation is complete.

**Windows XP Users**

1. Connect the evaluation board to the computer via the USB port using a USB cable. Then, the VBUS LED (CR1 on the AD9910 evaluation board) illuminates. When the USB cable is connected, the Found New Hardware Wizard appears. Click Next to continue to the AD9910 Firmware Loader.
2. Click Continue Anyway when the Hardware Installation Warning window appears.
3. Click Finish in the Found New Hardware Wizard once installation is complete.
4. Click Next when the next Found New Hardware Wizard appears. This is for the EZSSP device.
5. Click Continue Anyway when the Hardware Installation Warning window appears.
6. Click Finish in the Found New Hardware Wizard once installation is complete.

Once the Found New Hardware Wizard window disappears, the USB status LED (CR2 on the AD9910 evaluation board) flashes, which indicates that the evaluation board is connected properly. If the LED does not flash, verify that all power and USB connections are properly connected.

LAUNCHING THE PROGRAM

Follow these three steps to load the AD9910 evaluation software:

1. Before starting the software, make sure that the AD9910 evaluation board is powered up, connected to the computer, and that the USB status LED is flashing.
2. Click the Start button, located at the bottom left-hand corner of your screen.
3. Select Programs, then the AD9910 Eval Software folder, and then AD9910 Eval Software to load the software.

One of several status messages appears. These messages are discussed in further detail in the next section, Status Messages Upon Loading Software.
Status Messages Upon Loading Software

Once the AD9910 evaluation software is loaded, a green splash window appears. The status box within the splash window displays the status of the AD9910 evaluation software. Green writing in the status box indicates that the software has successfully loaded. A successful load is followed by the status box disappearing.

A splash window with red writing in the status box indicates that an error occurred. You can move the pointer over the red writing, which allows you to scroll up and view the details and possible cause of the error (see Figure 3).

Most status message errors can be resolved by checking jumper settings, making sure that the evaluation board is powered up correctly, and inspecting the USB port and cable connections.

When all power, USB port/cable connections, and jumper settings are correct, an error may still appear if the clock input is not properly configured. If any modifications to the board were made, check the changes against the provided evaluation board schematics for the AD9910. Check to make sure that the clock input source is connected and properly configured.

Figure 3. Splash Window Error Status Box

Figure 4. Example of Window With the Evaluation Software Successfully Loaded
The Control window provides control of the clock input, clock multiplier, DAC gain settings, internal I/O update, and power-down functions of the AD9910 (see Figure 5).

**Configuring the Reference Clock Path**

The Clock section allows you to configure the reference clock path in the AD9910.

**External Clock** inputs the operating frequency of the external reference clock or crystal. The maximum reference clock frequency of the AD9910 is 1 GHz. The default setting is 100 MHz. A red outline indicates that the value entered is out of range.

**Enable Multiplier** selects the PLL multiplication factor (12x to 127x) by which to scale the input frequency. The default setting of this box is disabled (check box cleared), indicating that the reference clock multiplier circuitry is bypassed and the reference clock/crystal (REFCLK) input is piped directly to the DDS core.

**CP Current** selects the charge pump current output of the PLL in the reference clock multiplier circuitry. Selecting a higher current output results in the loop locking faster, but there is a tradeoff. Increasing this current output also increases phase noise. The default setting of this drop-down box is 387 μA.

**VCO Range** allows you to select the range of operation for the VCO on the AD9910. The AD9910 evaluation software automatically determines which range the AD9910 should operate in. However, if you prefer to run a given frequency in a band other than the one selected by the software, a warning box prompts you to confirm this. Note that using a VCO frequency outside of its specified range may result in undesired operation, including nonfunctionality. See the AD9910 data sheet for more information regarding the different VCO bands.

**XTAL Out** selects the output drive strength of the XTAL reference output. There are three drive strengths and a disable mode.

**PLL Lock** indicates when the PLL is in a valid lock state. If the PLL falls out of lock, the indicator light display illuminates. The Refresh button allows you to poll the AD9910 to refresh the PLL Lock flag.
System Clock displays the operating frequency the DDS core (system). The value shown is derived from the values entered in the External Clock text box and the Multiplier spin box. Refer to the AD9910 data sheet for more information regarding clock modes and operation.

Setting the I/O Update Options
Use Internal IO Update sets the I/O update pin to an output. This output generates an active high pulse when the internal I/O update occurs. The rate of the internal I/O update can be programmed through the serial port. Refer to the AD9910 data sheet for more information.

Powering Down Digital, DAC, Clock Input, and Aux DAC
These power-down controls allows you to power down each of the specific circuit blocks individually.

Setting the Enable Auto PD bit sets the condition when the TxEnable pin is Logic 0, the baseband signal processing chain is flushed of residual data, and the clocks are automatically stopped. Clocks restart when the TxEnable pin is Logic 1. This bit produces no results when cleared.

External PD Mode allows you to control which power-down mode is used in conjunction with the External Power Down Pin button. The Fast Recovery mode sets the AD9910 into a power-down state that keeps clocks running and bias circuits active, but does not allow the part to output data. This mode uses significantly more power than the Full Power Down mode. The Full Power Down mode stops clocks and powers down bias circuits. This mode takes significantly longer to power back up from a power-down state.

The External Power Down Pin button allows you to control the EXT_PWR_DWN (external power-down) pin without having to alter the evaluation board. See the AD9910 data sheet for more information about power down conditions.

AUX DAC Control
DAC Gain Ctrl controls the auxiliary DAC setting to select the full-scale output current of the DAC. See the AD9910 datasheet for more information about DAC Gain setting.

DAC Iout displays the full-scale output current of the DAC. This number is based on a DAC_RSET resistor value of 10 kΩ.

Setting Other Control Window Options
Enable I/O Sync Clock Output Pin allows you to enable or disable the output driver for the I/O Sync Clock output.

Enable Matched Latency allows you to align the application of the frequency tuning word, the phase offset word, and the amplitude scale factor at the same time. If this bit is cleared, then those words are not applied simultaneously.

Auto Clear Phase Accumulator sets the DDS phase accumulator to a reset state when the I/O update pin is set high or when a profile changes.

Clear Phase Accumulator holds the DDS phase accumulator in a reset state as long as this bit (Bit 11) is set.

The Show Warnings check box can be cleared to have the AD9910 evaluation board software suppress any warnings about the operation of the AD9910. For example, a warning appears if you try to program the VCO or PLL to a state that is not recommended in the AD9910 data sheet.

Loading Data
The LOAD button is used to send data to the AD9910. All LOAD buttons found in the evaluation software have the same functionality.

When new data is detected, LOAD flashes orange, indicating that you need to click LOAD to send the updates to the serial I/O buffer where they are stored until an I/O update is issued. The I/O update sends the contents of the serial I/O buffer to active registers.

I/O updates can be sent manually or automatically. By default, the AD9910 evaluation software is set to auto-I/O update, so that when LOAD is clicked, an I/O update signal is automatically sent to the device. If synchronization across channels is desired, clear the Auto check box on the toolbar and click the I/O Update button (see Figure 4) when you wish to send an I/O update.

The Show Warnings check box, located above LOAD, can be selected to display warnings when you have entered data that exceeds the specifications of the AD9910.
PROFILES WINDOW

The Profiles window allows you to change the different profile settings easily. Figure 6 shows the Profiles window for using the single-tone mode.

SINGLE-TONE MODE

Output Freq is used to set the frequency generated by the DDS. The AD9910 generates a sine/cosine wave at this output frequency.

Phase Offset controls the phase of the DDS output. This can be changed from 0° to 360° with 16-bit resolution. The spin boxes for phase offset are set to 1 bit by default. The phase offset degree and number of bits can be changed to your preference by typing in the text box and spin box, respectively.

Amplitude SF digitally controls the amplitude of the carrier from the DDS. This scalar has 14 bits of resolution. Note that this can be used in conjunction with DAC Gain Ctrl in the AUX DAC Control section (see Figure 5) to increase the flexibility of the output amplitude. The spin boxes for amplitude SF are set to 1 bit by default. The number of bits can be changed to your preference by typing in the spin box.

Data Entry Windows

The Edit output frequency dialog box (see Figure 7) appears by double-clicking the Output Freq text box in the Profiles window. The Edit output frequency window allows you to set individual bits in the frequency tuning word register. These bits can be typed in as decimal, hexadecimal, or binary format in the Tuning Word Values area. This window also allows you to enter in a tuning word and see the correct decimal, hexadecimal, or binary representations for this word. The Frequency spin box allows you to scroll through the different tuning words one bit at a time using the up and down arrows.

Figure 6. Profile Control Window

Figure 7. Edit Output Frequency Pop-Up Dialog Box
The Edit Phase Offset dialog box (see Figure 8) appears by double-clicking the Phase Offset text box in the Profiles window. The Edit Phase Offset window allows you to set individual bits in the phase offset word register. These bits can be typed in as decimal, hexadecimal, or binary in the Register Values area. This window also allows you to type in a tuning word and see the correct decimal, hexadecimal, or binary representations for this word. The Phase Offset spin box allows you to scroll through the different tuning words one bit at a time using the up and down arrows.

![Figure 8. Edit Phase Offset Pop-Up Dialog Box](image)

The Edit Output Scale Factor dialog box (see Figure 9) appears by double-clicking the Amplifier SF text box in the Profiles window. The Edit Output Scale Factor window allows you to set individual bits in the ASF scale factor register. These can be typed in as decimal, hexadecimal, or binary. This window also allows you to type in a tuning word and see the correct decimal, hexadecimal, or binary representations for this word. The Output Scale Factor spin box allows you to scroll through the different tuning words one bit at a time using the up and down arrows.

![Figure 9. Edit Output Scale Factor Pop-Up Dialog Box](image)

The Edit Output Scale Factor dialog box (see Figure 9) appears by double-clicking the Amplifier SF text box in the Profiles window. The Edit Output Scale Factor window allows you to set individual bits in the ASF scale factor register. These can be typed in as decimal, hexadecimal, or binary. This window also allows you to type in a tuning word and see the correct decimal, hexadecimal, or binary representations for this word. The Output Scale Factor spin box allows you to scroll through the different tuning words one bit at a time using the up and down arrows.

![Figure 8. Edit Phase Offset Pop-Up Dialog Box](image)

**Activate**

In the Activate area of the Profiles window, you can select which profile register to activate. The active profile register is the one that supplies the frequency tuning and phase offset words, along with the amplitude control and the DDS core. This window controls three external pins, which can also be driven by an external source.

**Other Controls**

**Enable Profile ASF** allows you to set the amplitude scale factor in the Profile window. This allows the device to ramp to a value less than full scale.

**Enable Sine Out** activates the sine output of the DDS; otherwise, the cosine output is active.

**Enable RAM** allows you to enable the RAM playback from this window. (See the RAM Operation section for more information on using the RAM.)

The RS OVR message box alerts you when a RAM sweep is complete.
VIEW WINDOWS
To access additional windows, select View from the AD9910 Evaluation Software drop-down menu bar.

Figure 10. Windows Accessed from View Menu
To access the OSK & Digital Ramp Control window, select OSK Digital Ramp Control Window from the View drop-down menu.

**Digital Ramp Generator**

To use the digital ramp generator (DRG) function of the AD9910, select the Enable Digital Ramp Generator check box. Under Mode, select the frequency, phase, or amplitude to be generated. The Auto Clear Digital Ramp Accum. check box allows you to set the clear digital ramp accumulator bit when the I/O update signal is applied or when there is a profile change. The clear bit is then released.

The Clear Digital Ramp Accumulator check box allows you to set and keep the digital ramp accumulator cleared until that bit is cleared. The Load DRR @ I/O Update box allows you to reload the digital ramp rate when an I/O update is issued or when there is a profile change.

**Sweep Frequency 0** and **Sweep Frequency 1** are the starting and stopping frequencies of the ramp. Note that this is frequency, phase, or amplitude depending on which ramp generator is selected. It is important that the value in the Sweep 0 register is always less than the value in the Sweep 1 register.

Use the Rising Step Size and Falling Step Size check boxes to set the step size of the rising or falling ramp. The unit for these changes depending on what type of ramp is being generated. The Rising Step Interval and Falling Step Interval are used to set the time between each rising or falling step on the ramp. This is in units of microseconds.

The No Dwell High and No Dwell Low boxes set the corresponding bit functions in the register map. Use the Up, Down, and Pause buttons at the bottom of the window to control the direction or to pause the ramp. The Ramp Finished message box lights up when the ramp is complete.
OSK
To use the OSK function of the AD9910, select the Enable Output Shift Keying check box. Set the Amplitude Scale Factor to control the final amplitude of the signal. Select the Use External OSK Pin box for manual control of the OSK. Use the OSK Pin button to turn OSK on/off manually. The OSK Pin button controls a pin that can be driven externally. Select the Enable Auto OSK to use the automatic OSK function. Set the Amplitude Ramp Rate and the Amplitude Step Adjust using the text box and drop-down box provided. The Load ARR @I/O Update box allows you to reload the ramp rate timer when an I/O update is issued or when there is a profile change.

Auxiliary Sources
The Auxiliary Sources area allows you to set the Output Frequency and Phase Offset when using the internal RAM. Refer to the RAM Operation section and the AD9910 data sheet for more detailed information.

MULTICHIP SYNC CONTROL
The Multi-Chip Sync window allows you to set up the sync function. This allows you to sync multiple chips to one master AD9910. Refer to the AD9910 data sheet for a full discussion on multichip sync functions. The Input Sync Pulse Delay drop-down box sets the input delay of the synchronization receiver in 150 ps steps. The Output Sync Pulse Delay sets the output delay of the synchronization generator in 150 ps steps. The Sync Window Delay sets the state that the internal clock generator assumes when it receives a sync pulse. The Sync Enable check box allows you to set the synchronization clock receiver to active. The Sync Driver Enable check box sets the synchronization clock generator to active. The Generate Sync Pulse area allows you to select the sync pulse generation corresponding to the rising or falling SYSCLK edge. The Sync Sample Error area notifies you when there is a sync sample error. The No Error message box changes to Error and blinks when an error occurs. Using the Clear Error button, you can clear a sample error. Refer to the AD9910 data sheet for details on synchronizing multiple parts.
Use of RAM on the AD9910 should not be attempted without using the AD9910 data sheet as a reference. The AD9910 data sheet contains detailed information on RAM operation. To use the RAM on the AD9910, select the Enable RAM check box on the Profiles window. This changes the appearance of the window from single-tone mode to RAM control mode.

Each RAM Segment section corresponds to a different profile. RAM Segment 0 corresponds to Profile 0. Use the Beginning Address and Final Address text boxes to set the beginning and ending addresses for the RAM sweep. The Address Step Rate sets the 16-bit address step rate value. The Mode Control drop-down box sets the 3-bit RAM control word mode. See the AD9910 data sheet for a complete description of the RAM operating modes. The Zero Crossing check box sets the zero-crossing bit. This bit is effective only in RAM mode using direct switch. The No Dwell box sets the no-dwell high bit. This bit is only effective when the RAM mode is in ramp-up.

Use the Activate area to switch between profiles. Use the Internal Profile Control drop-down box to select the internal profile control configurations. Refer to the AD9910 data sheet for detailed information on the RAM internal profile control modes. Use the RAM Data Type drop-down box to select the RAM playback destination. Refer to the AD9910 data sheet for further details on the RAM playback destination bits.

Use the LOAD button to display the RAM I/O window.

**RAM I/O**

![RAM I/O Window](image)

**Figure 14. RAM I/O Window**
The **RAM I/O Window** allows you to easily interface RAM data into the AD9910. Use the **RAM Data File** box to locate the RAM file on the PC. Use the **Data Format** drop-down box to select the file format. The options are: **RAW Binary**, **RAW Hex**, and **RAW Decimal**. Use the **Load File** button to transfer the data to the AD9910. The **Read RAM to File** button allows you to read the data from the RAM to a file in the same folder as the evaluation board software. The **Output Data Format** allows you to select the format of the output file. The options are: **RAW Binary**, **RAW Hex**, and **RAW Decimal**. Use the **Open File in Notepad** check box to view the file immediately.

**DEBUG**

To access the **Debug** window, select **Debug Window** from the **View** drop-down menu (see Figure 10).

The **Debug window** gives you complete direct access to the register map as well as control of many external pins. The **Debug** window is intended for debugging issues with the AD9910. It can be used for all programming, but is not user-friendly; this may result in improper programming of reserved bits.

**DUT Signals (PA)**

The ISFC, ExtPwrDwn, Reset DUT, I/O Reset, and CSB check boxes control the pins to which they correspond. All of these functions are available elsewhere in the software. A check in the box means that the pin is in its active state. Note that this does not mean that the pin is logic high or low. This is determined by the active state on that pin. See the AD9910 data sheet for information about external pins. The **Flash** and **USB_Status** check boxes are used to control the two LEDs on the AD9910 evaluation board.

**DUT Signals (PE)**

The **REGUD_EN**, **DRCTL**, **DRHOLD**, **REGUD**, **OSK**, **P3**, **P2**, and **P1** check boxes control their selected pins. **REGUD** issues an I/O update to the device under test (DUT), whereas **REGUD_EN** allows the software to control the I/O_UPDATE pin. **P3**, **P2**, and **P1** control the profile register pins. See the AD9910 data sheet for information about external pins. The **Digital Ramp Over** alerts indicate an active state on each of those external pins. See the AD9910 data sheet for the logic to control the profiles via the external pins.

**DUT Signals (CTL)**

The **SCLK** (serial clock pin) check box is used to synchronize data to and from the AD9910, and to run the internal state machines. This window allows you to toggle the external pin.

**DUT Flags (PD)**

The **PLL Lock**, **Sync Sample Error**, **RAM Sweep Over**, and **Digital Ramp Over** alerts indicate an active state on each of those external pins. See the AD9910 data sheet for descriptions of the active state of each pin.

**Serial I/O**

The **Serial I/O** area allows direct access to the register map. The **Reg Addr** drop-down box allows you to select the register of interest. The bit numbers are shown above each byte in the register. The maximum size of any given register is eight bytes. For registers that are smaller, the unavailable bytes are grayed out. You can type the register values in either binary or hexadecimal format. The **Serial Port Status** area displays alerts for the serial operating mode of the AD9910, LSB First or 3-Wire Mode.

**Auto Apply**

Note that when the **Auto Apply** check boxes in the **DUT Signals (PA)**, **DUT Signals (PE)**, and **DUT Signals (CTL)** areas are selected, the action is automatically taken without the need to click the **Apply** button.
REGISTER MAP (SOFTWARE BUFFER) VALUES
To access the Register Map (Software Buffer) Values window, select Register Map Values from the View drop-down menu (see Figure 10).

The Register Map (Software Buffer) Values window allows you to switch between the current values and the values that are loaded in the software buffer. This window does not allow changes to the register map. Instead, this window can be used in conjunction with any other control window to observe register changes that are written from the software buffer.

The drop-down menu labeled Choose REGMAP Buff allows you to switch between the Current Values and the New Values. Under Format, you can choose to view the registers in binary or hexadecimal format by selecting the applicable option. Note that when the Auto Refresh check box is selected, the action is automatically taken without the need to click the Refresh button.

DUT I/O
To access the DUT I/O window, select from the I/O drop-down menu (see Figure 10).

The DUT I/O window allows you to select the serial I/O port configuration. Under I/O Port Config, you can select either 2-Wire or 3-Wire mode. Under Data Format, you can select MSB First or LSB First. See the AD9910 data sheet for more information on these serial port modes. The Reset I/O Port effectively resets the I/O port to fix communication errors. This feature should be used if the part stops responding due to errors in the data sent to the part. Resetting the part completely has the same effect, but simply resetting the I/O port is a more desirable solution.
### ORDERING INFORMATION

#### ORDERING GUIDE

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<th>Model</th>
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<td>AD9910/PCBZ1</td>
<td>Evaluation Board</td>
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1 Z = RoHS Compliant Part.

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#### ESD CAUTION

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.