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Evaluation Board for 1 GSPS DDS with 14-Bit DAC

AD9910/PCBZ

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.

EVALUATION BOARD BLOCK DIAGRAM

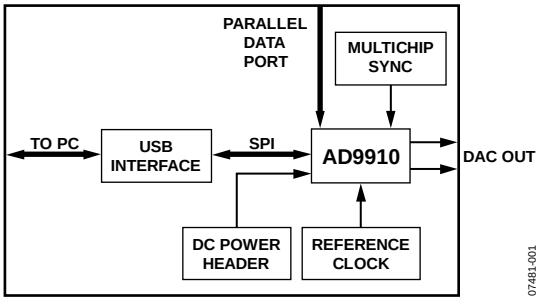


Figure 1.

Rev. 0
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One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106, U.S.A.
Tel: 781.329.4700 www.analog.com
Fax: 781.461.3113
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TABLE OF CONTENTS

Features 1
Package Contents 1
General Description 1
Evaluation Board Block Diagram 1
Evaluation Board Hardware 3
Requirements 3
Setting Up the Evaluation Board 3
Connectors 3
Jumpers 3
Evaluation Board Layout 4
Evaluation Board Software 5
Installing the Software 5
Installing the Driver 5
Launching the Program 5
Control Window 7
Profiles Window 9
Single-Tone Mode 9
View Windows 11
OSK and Digital Ramp Control 12
Multichip Sync Control 13
RAM Operation 14
Debug 15
Register Map (Software Buffer) Values 16
Ordering Information 17
Ordering Guide 17
ESD Caution 17

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

Item	Requirement
Operating System	Windows® 98/ME/2000/XP
Processor	Pentium® I or later
Memory	128 MB minimum
Ports	One USB port
Clocking	Signal generator capable of generating sinusoidal waves of at least 0 dBm, up to at least 10 MHz
Power Supplies	Capability to generate at least two independent dc voltages (1.8 V/3.3 V)
Measurement	Appropriate measurement device, such as a spectrum analyzer or a high bandwidth oscilloscope
Cables	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)

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

Connector	Pin No.	Label	Voltage (V)
TB1	1	VCC_USB	3.3
TB1	2	GND	0
TB1	3	DVDD_IO	3.3
TB1	4	DVDD	1.8
TB2	1, 3	GND	0
TB2	2	DAC_VDD	3.3
TB2	4	CLK_VDD	1.8

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

Mode	Settings
PC Control, USB Port	Set Jumper W1and Jumper W2 to enable. Set Jumper W4 to enable. Place a jumper on W5, W6, and W3.
External Control	Set Jumper W1and Jumper W2 to disable. Set Jumper W4 to disable. Remove the jumper on W5, W6, and W3.

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.

EVALUATION BOARD LAYOUT

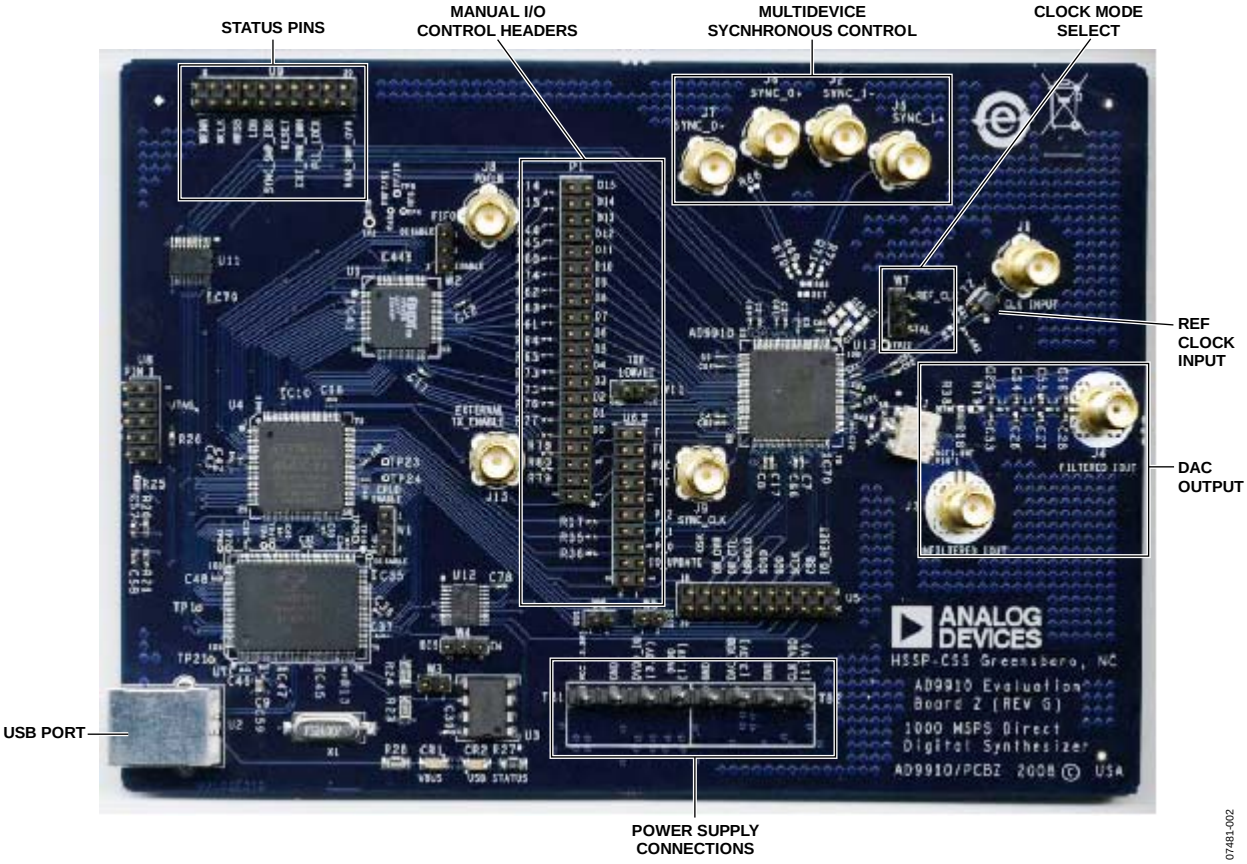


Figure 2. AD9910 PCB Evaluation Board

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 using a USB cable via the USB port. Then, the VBUS LED (CR1 on the AD9910 evaluation board) illuminates. When the USB cable is connected, the **Found New Hardware Wizard** window appears.
3. If you are using Windows 2000, click **Finish** in the **Found New Hardware Wizard**.

After the window has disappeared, the USB Status LED (CR2 on the AD9910 evaluation board) flashes, which indicates that the evaluation board is connected properly.

Windows XP 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.
3. When the USB cable is connected, the **Found New Hardware Wizard** appears. Click **Next** to continue to the AD9910 **Firmware Loader**.
4. Click **Continue Anyway** when the **Hardware Installation Warning** window appears.
5. Click **Finish** in the **Found New Hardware Wizard** once installation is complete.
6. Click **Next** when the next **Found New Hardware Wizard** appears. This is for the EZSSP device.
7. Click **Continue Anyway** when the **Hardware Installation Warning** window appears.
8. 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.

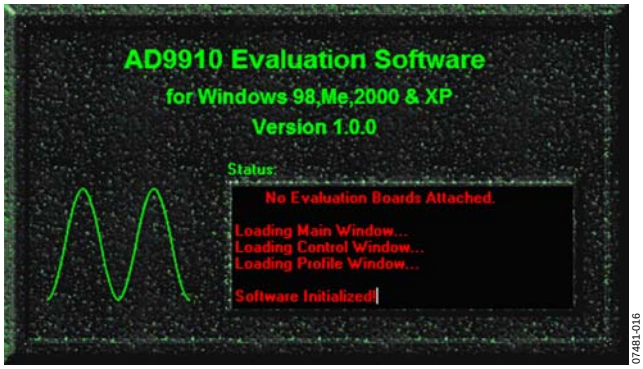


Figure 3. Splash Window Error Status Box

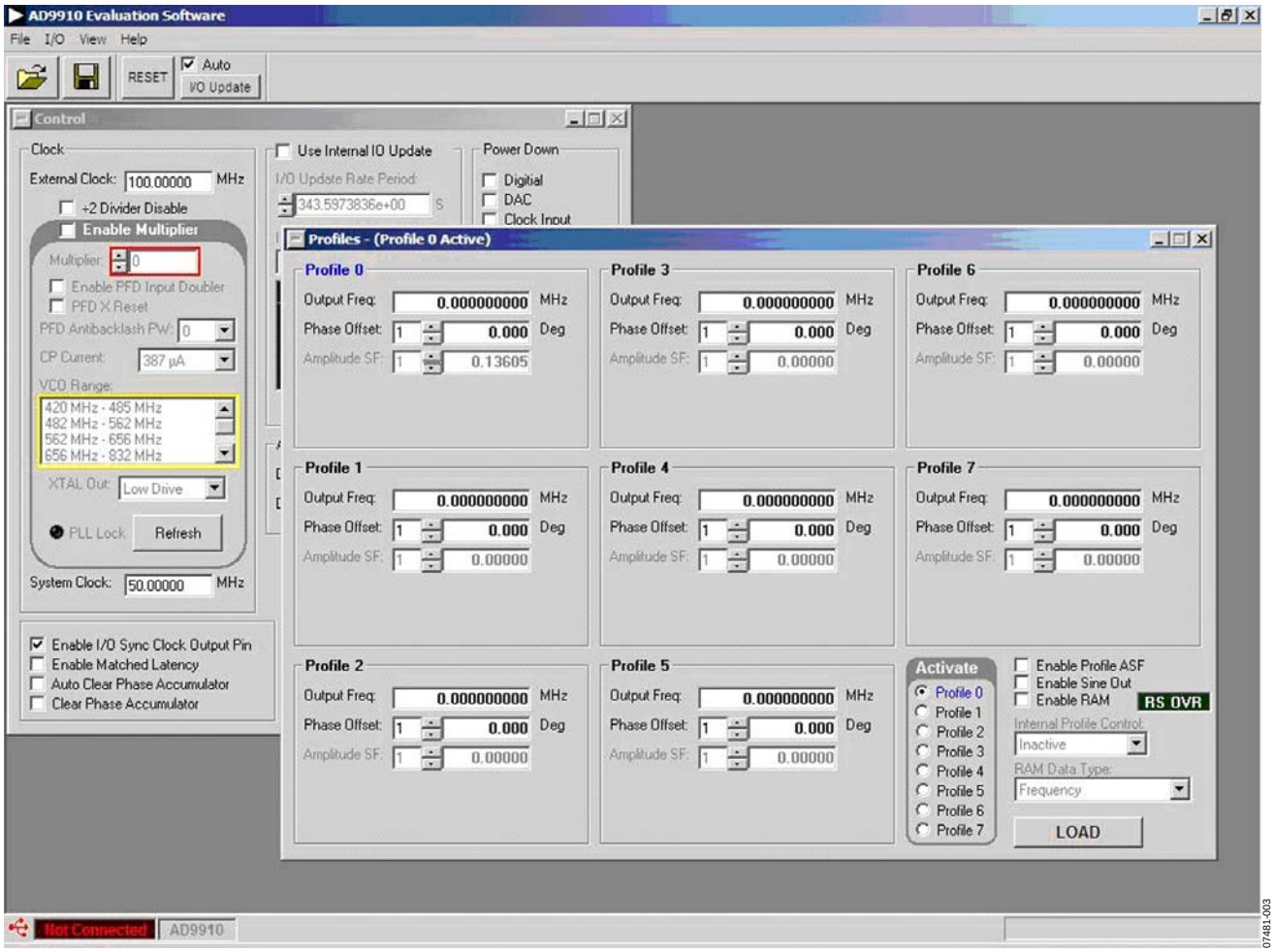


Figure 4. Example of Window With the Evaluation Software Successfully Loaded

CONTROL WINDOW

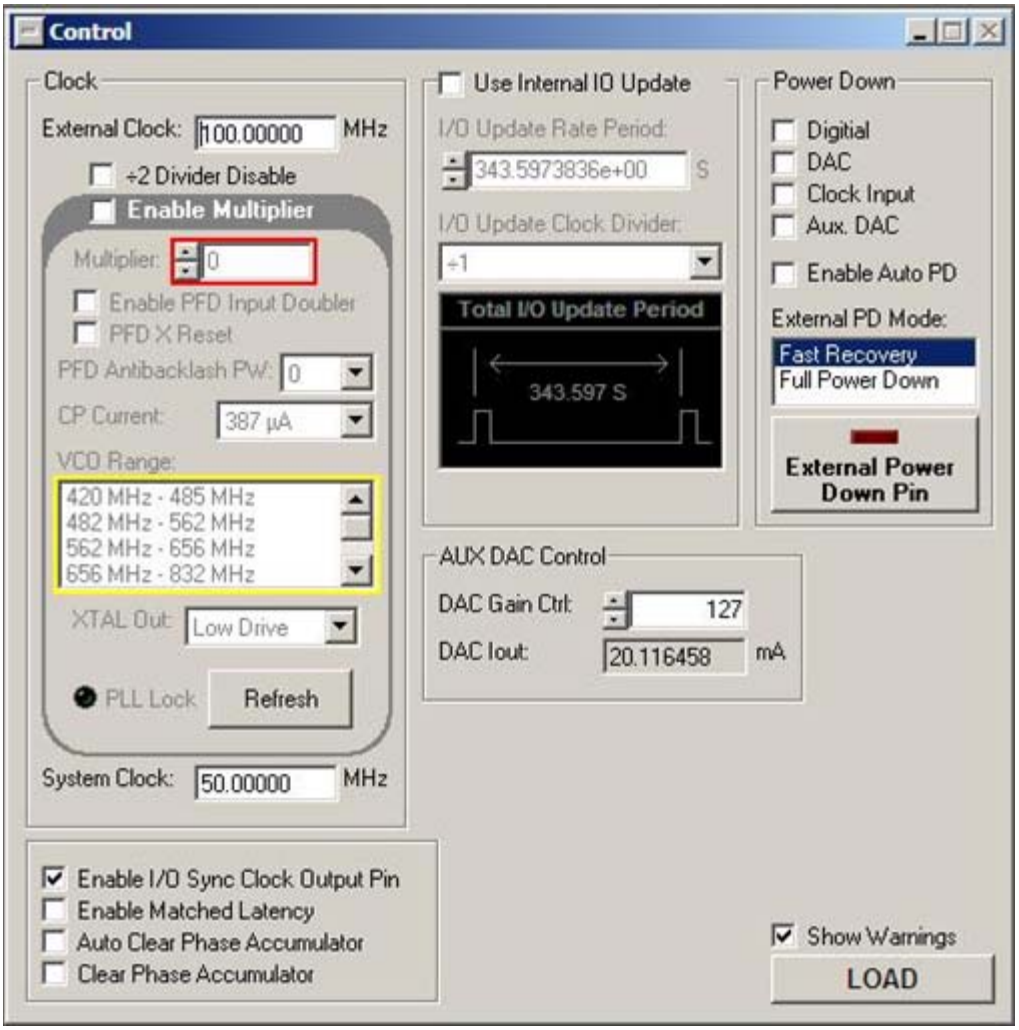


Figure 5. Control Window

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 (12× to 127×) 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

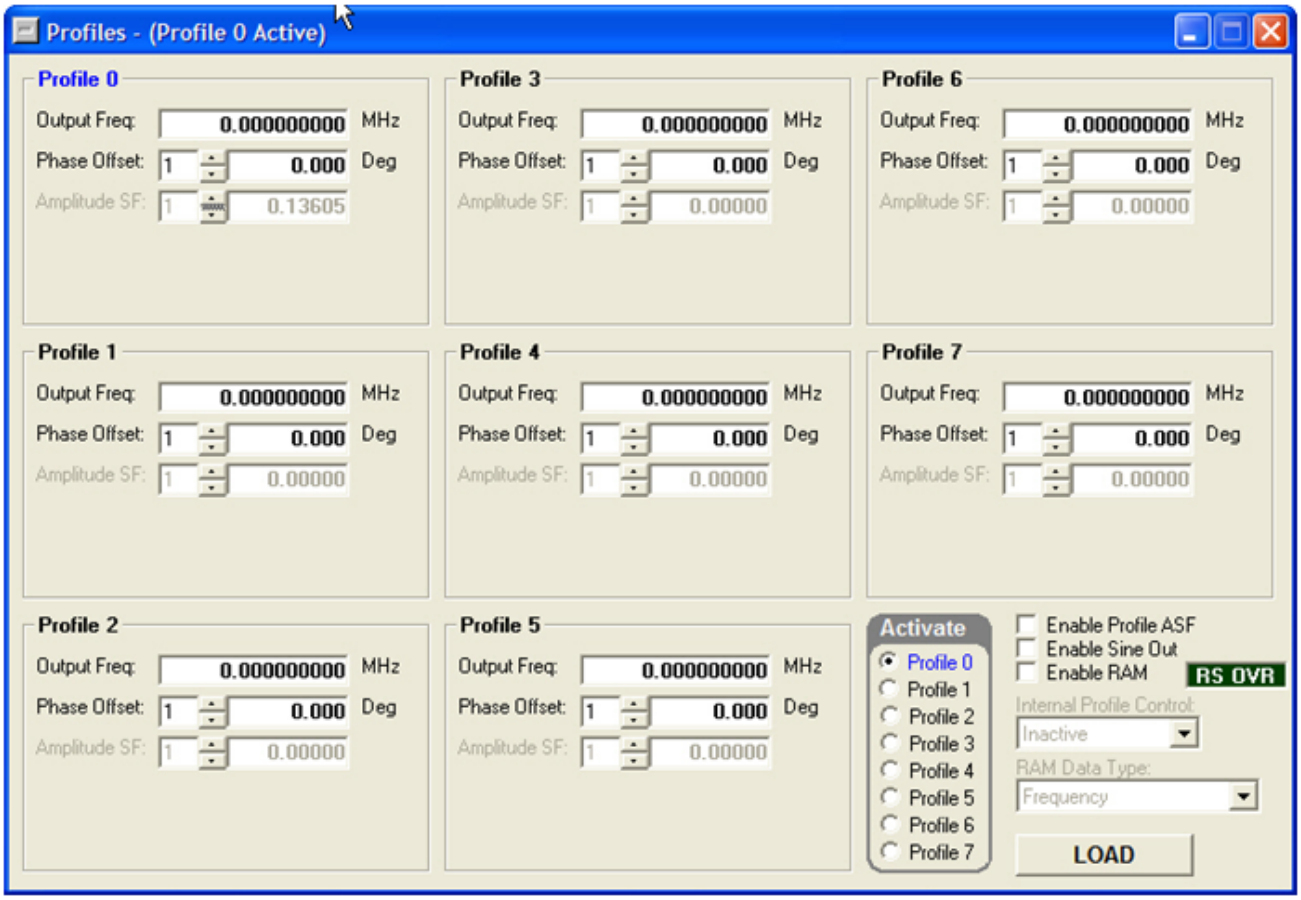


Figure 6. Profile Control Window

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.

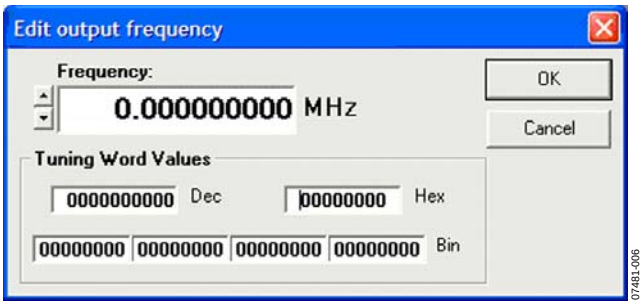


Figure 7. Edit Output Frequency Pop-Up Dialog Box

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.

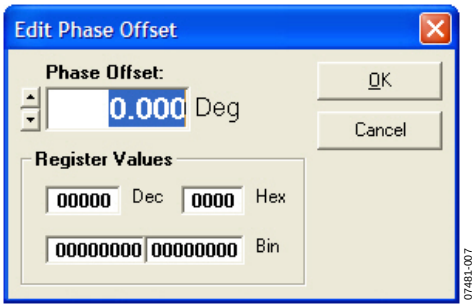


Figure 8. Edit Phase Offset Pop-Up Dialog Box

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.

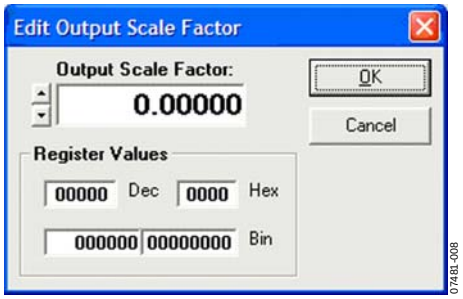


Figure 9. Edit Output Scale Factor Pop-Up Dialog Box

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.

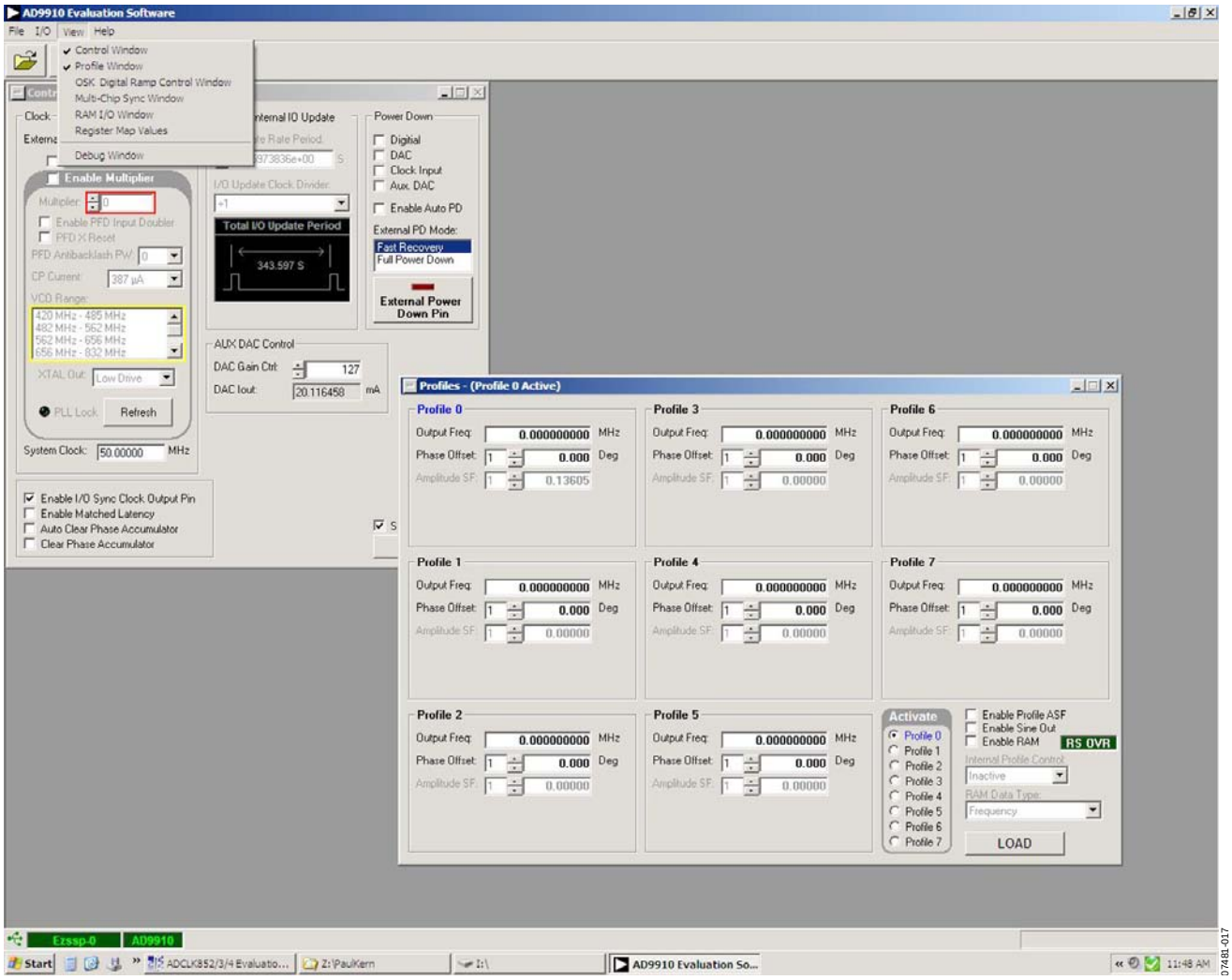


Figure 10. Windows Accessed from View Menu

OSK AND DIGITAL RAMP CONTROL

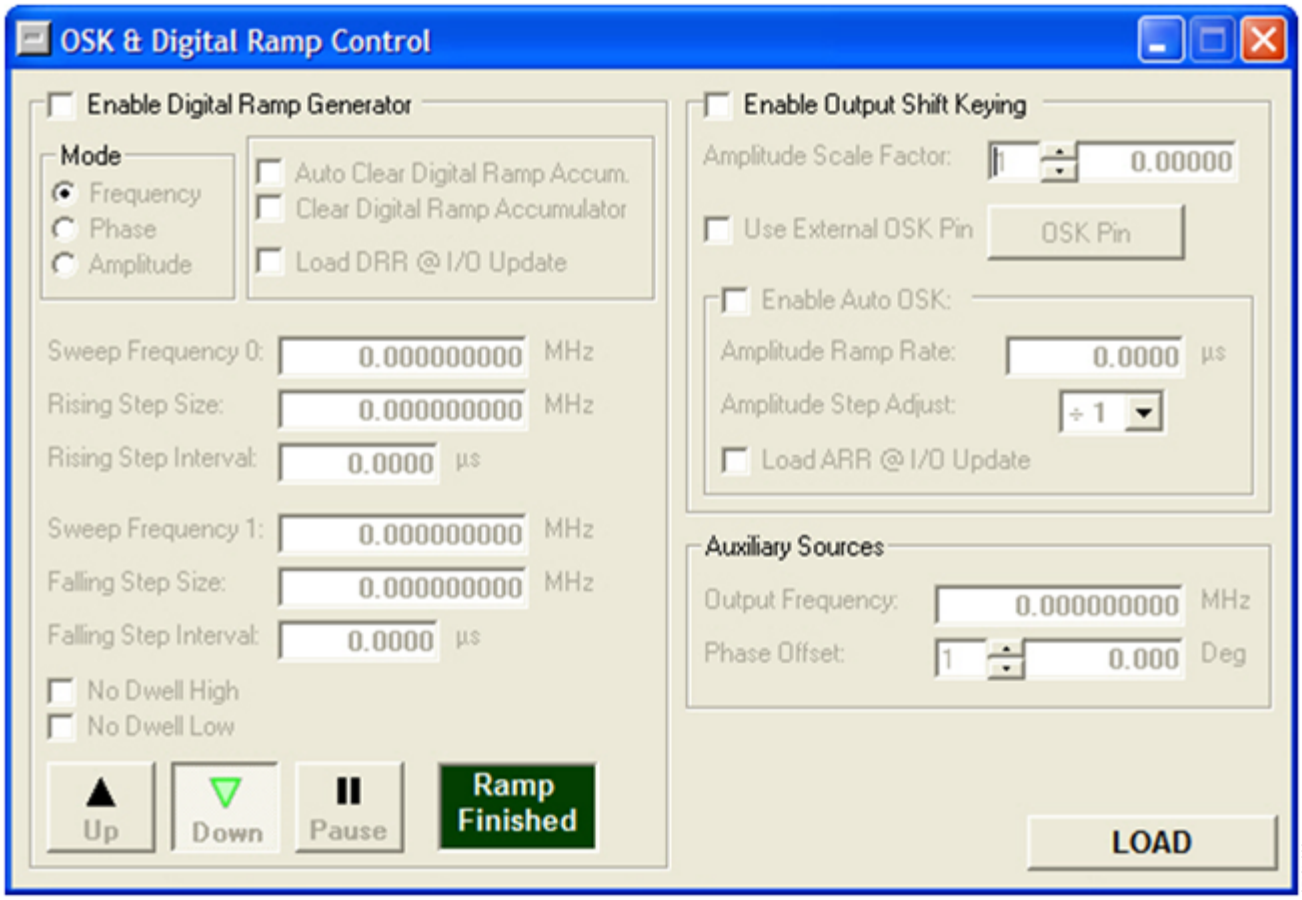


Figure 11. OSK and Digital Ramp Control Window

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

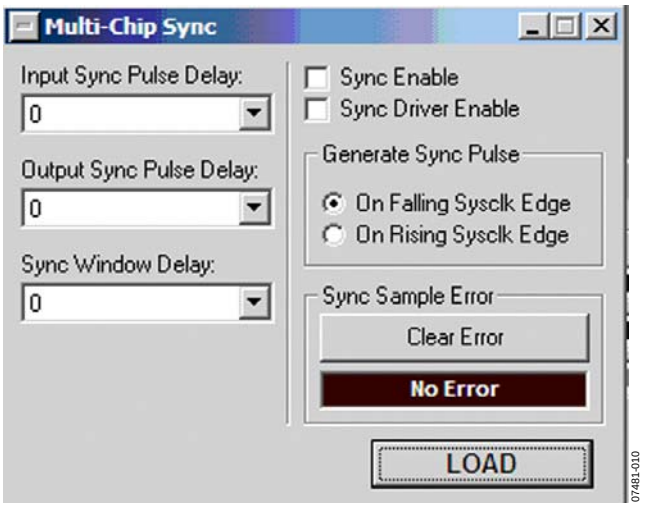


Figure 12. Multi-Chip Sync Window

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.

RAM OPERATION

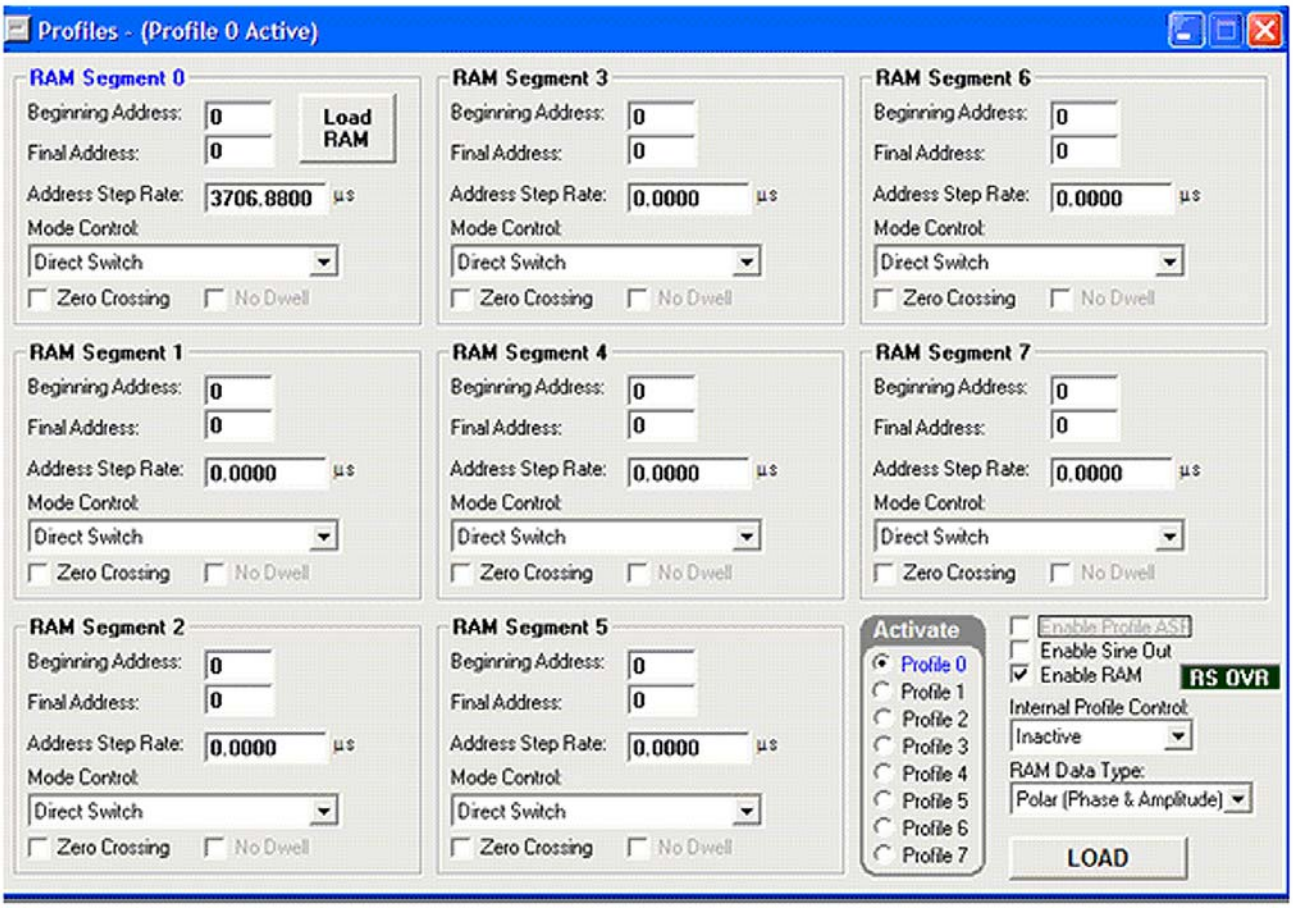


Figure 13. Profiles Window When Using the RAM

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

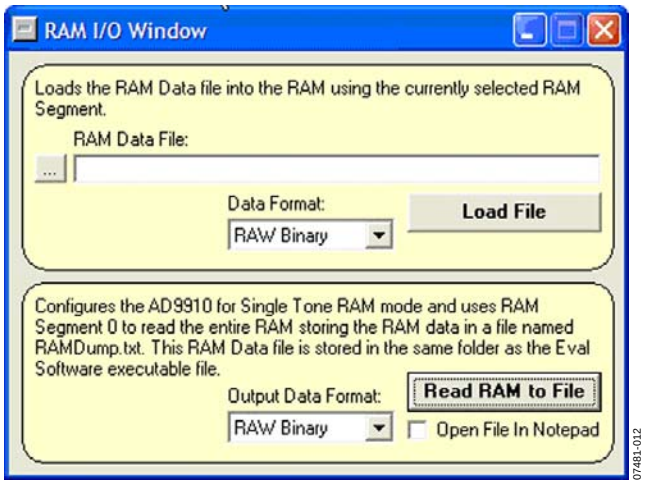


Figure 14. RAM I/O Window

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).

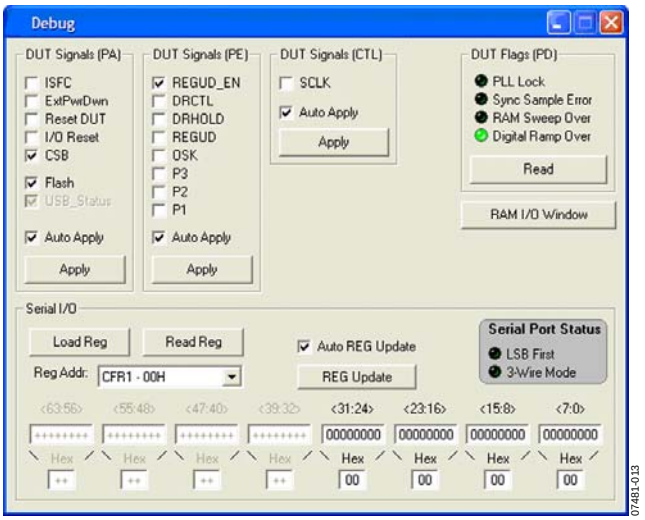


Figure 15. Debug Window

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 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).

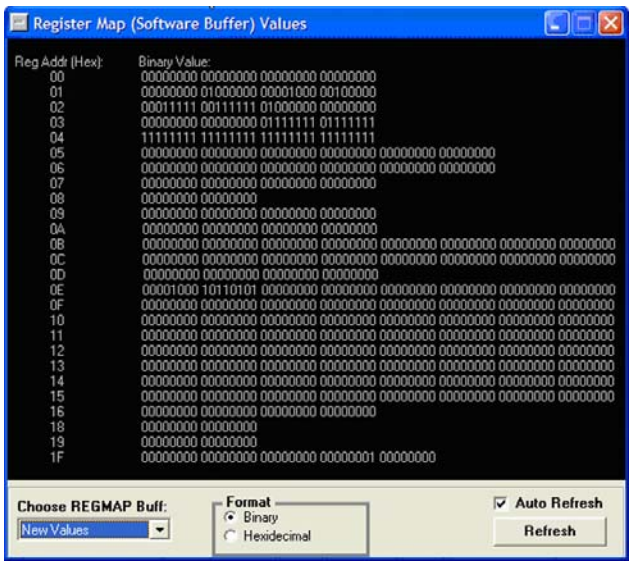


Figure 16. Register Map (Software Buffer) Values window

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 chose 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.

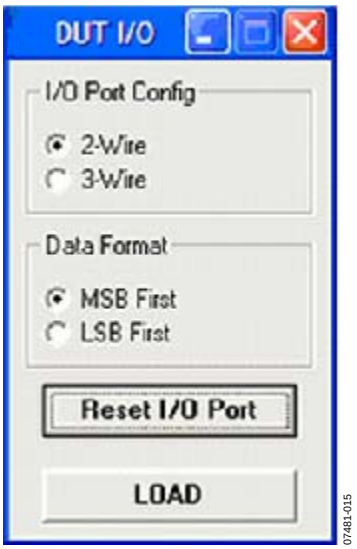


Figure 17. DUT I/O Window

ORDERING INFORMATION

ORDERING GUIDE

Model	Description
AD9910/PCBZ[1]	Evaluation Board

[1] Z = RoHS Compliant Part.

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.

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