



# Evaluation Board for 16-Channel, 1MSPS, 12-Bit ADC with Sequencer

## EVAL-AD7490CB

### FEATURES

Full-Featured Evaluation Board for the AD7490  
EVAL-CONTROL BOARD Compatible  
Stand Alone Capability  
On-Board Analog Buffering and Reference  
Various Linking Options  
PC Software for Control and Data Analysis when used  
with EVAL-BOARD CONTROLLER

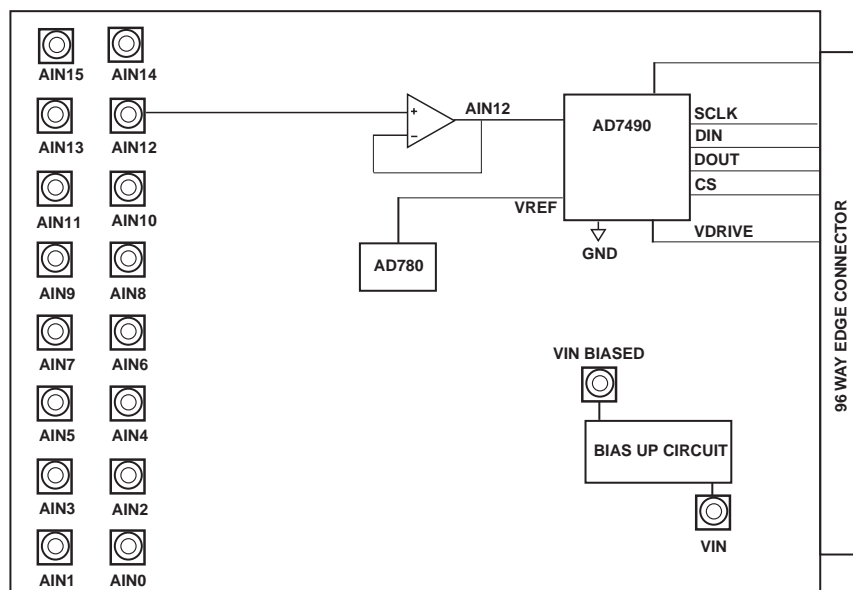
### INTRODUCTION

This Technical Note describes the evaluation board for the AD7490. The AD7490 is a 12-bit high speed, low power, 16 Channel, successive-approximation ADC. The part operates from a single 2.7 V to 5.25 V power supply and features throughput rates up to 1MSPS. Full data on the AD7490 is available in the AD7490 data sheet available from Analog Devices and should be consulted in conjunction with this Technical Note when using the Evaluation Board.

On-board components include an AD780, which is a pin programmable +2.5V or +3V ultra high precision bandgap reference, the REF192 2.5 V reference, four ADG467G quad op-amps used to buffer the analog inputs. There are various link options which are explained in detail on page 2.

Interfacing to this board is through a 96-way connector. This 96-way connector is compatible with the EVAL-BOARD CONTROLLER which is also available from Analog Devices. External sockets are provided for the VREF input and the 16 x VIN inputs.

### FUNCTIONAL BLOCK DIAGRAM



REV. 0

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### OPERATING THE AD7490 EVALUATION BOARD

#### Power Supplies

When using this evaluation board with the EVAL-BOARD CONTROLLER all supplies are provided from the EVAL-BOARD CONTROLLER through the 96 way connector.

When using the board as a stand alone unit external supplies must be provided. This evaluation board has six power supply inputs:  $V_{DD}$ ,  $A_{GND}$ , +12V, -12V,  $A_{GND}$ , and  $D_{GND}$ . If the evaluation board is used in stand-alone mode +5V must be connected to the  $V_{DD}$  input to supply the AD7490  $V_{DD}$  pin and the AD780 voltage reference. +12V and -12V are used to supply the op-amps. The  $V_{DRIVE}$  pin can be driven by a voltage between +3V and +5V allowing the evaluation board to be connected to both +3V and +5V systems. The supplies are decoupled to the relevant ground plane with 10 $\mu$ F tantalum and 0.1 $\mu$ F multilayer ceramic capacitors at the point where they enter the board. The supply pins of all the op-amps and reference are also decoupled to  $A_{GND}$  with 10 $\mu$ F tantalum and a 0.1 $\mu$ F ceramic capacitor. The AD7490  $AV_{DD}$  supply pin is decoupled to  $A_{GND}$  with 10  $\mu$ F tantalum and 0.1 $\mu$ F multilayer ceramic capacitors.

Extensive ground planes are used on this board to minimize the effect of high frequency noise interference. There are two ground planes,  $A_{GND}$  and  $D_{GND}$ . These are connected at one location close to the AD7490.

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## LINK AND SWITCH OPTIONS

There are 19 link options and 19 switch options which must be set for the required operating setup before using the evaluation board. The functions of these options are outlined below.

Link No.	Function.
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LK0-LK15	These link options add a 50Ω termination to AGND at the Ain0 to Ain15 sockets. In most applications these links will be left unconnected. If a 50Ω termination is required, this link should be connected.
S0-S15	<p>These switch options allow the user to connect a particular OP467G op-amp input to ground if the user needs to do this.</p> <p>When these links are in position "H" the signal applied to the particular VIN socket is routed to the input of the OP467G op-amp. This is the normal application for this link when an input channel is being used. When this link is in position "L", the input of the OP467G op-amp is tied to GND.</p>
LK16	<p>This link option selects the source of the <math>\overline{\text{VDRIVE}}</math> input.</p> <p>When this link is in position "A" the <math>\overline{\text{VDRIVE}}</math> supply voltage is provided from VDD.</p> <p>When this link is in position "B" the VDRIVE supply voltage is provided from the EVAL-CONTROL BOARD.</p> <p>When this link is in position "C" an external VDRIVE supply voltage must be supplied via J7.</p>
LK17	<p>This link is used to select the source of the reference voltage applied to the AD7490 VREF pin.</p> <p>When this link is in position "A", the AD780 provides the 2.5V reference to the AD7490.</p> <p>When this link is in position "B" the REF192 provides the 2.5V reference to the AD7490.</p> <p>When this link is in position "C" an external reference must be supplied via J6.</p>
LK18	<p>This link option adds a 50Ω termination to AGND at the Vin input to the Bias up circuit.</p> <p>In most applications this link will be left unconnected. If a 50Ω termination is required, this link should be connected.</p>
LK19	<p>This link option selects the source of the SCLK input.</p> <p>When this link is in position "A" the SCLK input is provided by the EVAL-CONTROL BOARD but it has been buffered before being applied to the SCLK pin of the AD7490.</p> <p>When this link is in position "B" the SCLK input is provided by the EVAL-CONTROL BOARD but it has been inverted before being applied to the SCLK pin of the AD7490.</p> <p>When this link is in position "C" the SCLK input is provided straight from the EVAL-CONTROL BOARD.</p>
S17	<p>This link option is used to select the source of the +12V supply.</p> <p>In position J1, the +12V is supplied from the EVAL-CONTROL BOARD through the 96 way connector J1.</p> <p>In position J2, the +12V is supplied from an external source through the power connector, J3.</p>
S18	<p>This link option is used to select the source of the -12V supply.</p> <p>In position J1, the -12V is supplied from the EVAL-CONTROL BOARD through the 96 way connector.</p> <p>In position J3, the -12V is supplied from an external source through the power connector, J3.</p>
S19	<p>This link option is used to select the source of the AVDD supply.</p> <p>In position J1, the AVDD is supplied from the EVAL-CONTROL BOARD through the 96 way connector.</p> <p>In position J2, the AVDD is supplied from an external source through the power connector, J2.</p>

**SET-UP CONDITIONS**

Care should be taken before applying power and signals to the evaluation board to ensure that all link positions are as per the required operating mode. Table I shows the position in which all the links are set when the evaluation board is sent out.

**Table I. Initial Link and Switch Positions**

Link No.	Position	Function.
LK0 - LK15	unconnected (position ON)	50Ω termination is not selected.
S0	H	AIN0 is connected to the input of the OP467G buffer. Selecting AIN0 as the input channel for the AD7490.
S1-S15	L	This sets the remaining AIN input channels to GND.
LK16	B	VDRIVE input is selected from the EVAL-CONTROL BOARD
LK17	A	Selects the AD780 to supply the reference voltage to the AD7490 REFIN pin.
LK18	unconnected ( not position ON)	50Ω termination is not selected for the Bias up circuit.
LK19	C	SCLK input is supplied straight from the EVAL-CONTROL BOARD via J1.
S17	J1	+12V supplied from EVAL-CONTROL BOARD via J1.
S18	J1	-12V supplied from EVAL-CONTROL BOARD via J1.
S19	J1	AVDD supplied from EVAL-CONTROL BOARD via J1.

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## EVALUATION BOARD INTERFACING

Interfacing to the evaluation board is via a 96-way connector, J1. J1 is used to connect the evaluation board to the EVAL-CONTROL BOARD or other system. The pinout for the J1 connector is shown in Figure 2 and its pin designations are given in Table II.

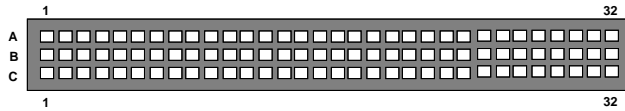


Figure 2. Pin Configuration for the 96-Way Connector, J1

### 96-Way Connector Pin Description

DR	DATA RECEIVE : Serial Data from the AD7490 is provided at this output. Sixteen bits of data are provided with four Channel Address bits followed by twelve bits of conversion data which is provided MSB first.
DT	DATA TRANSMIT : Serial Data from the DSP is provided at this pin. Sixteen/twelve (depending if a write to the control Register or Shadow register is required) bits of data are provided which is provided MSB first.
SCLK	SERIAL CLOCK ZERO: This continuous clock is connected to the SCLK pin of the AD7490 via LK19 to obtain serial data from the AD7490. LK19 should be in position B.
$\overline{\text{TFS0}}$	TRANSMIT FRAME SYNC ZERO,
$\overline{\text{RFS0}}$	RECEIVE FRAME SYNC ZERO: Both of these inputs are connected to the AD7490 $\overline{\text{CS}}$ to initiate conversions and to frame the serial data transfer.
DGND	Digital Ground. These lines are connected to the digital ground plane on the evaluation board. It allows the user to provide the digital supply via the connector along with the other digital signals.
AGND	Analog Ground. These lines are connected to the analog ground plane on the evaluation board.
AV <sub>DD</sub>	Analog +5V Supply. These lines are connected to the AV <sub>DD</sub> supply line on the board via S19.
+12V	+12V Supply. This line is connected to the +12V supply line on the board via S17.
-12V	-12V Supply. This line is connected to the -12V supply line on the board via S18.

Table II. 96-Way Connector Pin Functions.

	ROW A	ROWB	ROWC
1			
2			
3			
4	DGND	DGND	DGND
5	DT0		DR0
6	TFS0		RFS0
7	SCLK0		SCLK0
8			
9			
10			
11			
12	DGND	DGND	DGND
13			
14			
15			
16	DGND	DGND	DGND
17			
18			
19			
20	DGND	DGND	DGND
21	AGND	AGND	AGND
22	AGND	AGND	AGND
23	AGND	AGND	AGND
24	AGND	AGND	AGND
25	AGND	AGND	AGND
26	AGND	AGND	AGND
27		AGND	
28		AGND	
29	AGND	AGND	AGND
30	-12V	AGND	+12V
31			
32	AVDD	AVDD	AVDD

Note : The unused pins of the 96-way connector are not shown.

**CONNECTORS**

There are seven input/output connectors relevant to the operation of the AD7490 on this evaluation board. The function of these connectors is outlined in Table III.

**Table III. Connector Functions**

Connector	Function
J1	96-Way Connector for Serial Interface & Power Supply connections.
J2	External $V_{DD}$ & GND power connector.
J3	External +12V, -12V & AGND power connector
J4	Sub-Miniature BNC socket for $V_{in}$ input for bias up circuit.
J5	Sub-Miniature BNC socket for optional biased $V_{in}$ output.
J6	Sub-Miniature BNC socket for $V_{ref}$ input.
J7	External $V_{DRIVE}$ connector

There are also 16 Sub Miniature BNC socket for  $A_{in}$  inputs  $A_{in0}$  to  $A_{in15}$ .

**OPERATING WITH THE EVAL-BOARD CONTROLLER**

The evaluation board can be operated in a stand-alone mode or operated in conjunction with the EVAL-BOARD CONTROLLER. This EVAL-BOARD CONTROLLER is available from Analog Devices under the order entry "EVAL-CONTROL BRD2". When operated with this control board, all supplies and control signals to operate the AD7490 are provided by the EVAL-BOARD CONTROLLER when it is run under control of the AD7490 software which is provided with the AD7490 evaluation board package. This EVAL-BOARD CONTROLLER will also operate with all Analog Devices evaluation boards which end with the letters CB in their title.

The 96-way connector on the EVAL-AD7490CB plugs directly into the 96-way connector on the EVAL-CONTROL BOARD. No power supplies are required in the system. The EVAL-BOARD CONTROLLER generates all the required supplies for itself and the EVAL-AD7490CB. The EVAL-BOARD CONTROLLER is powered from a 12V ac transformer. This is a standard 12V ac transformer capable of supplying 1A current and is available as an accessory from Analog Devices under the following part numbers:

EVAL-110VAC-US: For use in the U.S. or Japan

EVAL-220VAC-UK: For use in the U.K.

EVAL-220VAC-EU: For use in Europe

These transformers are also available for other suppliers including Digikey (U.S.) and Campbell Collins (U.K.).

Connection between the EVAL-BOARD CONTROLLER and the printer port of a PC is via a standard Printer port cable which is provided as part the EVAL-BOARD CONTROLLER package. As the port is used for both sending and receiving data it must have bidirectional capability. Please refer to the manual which accompanies the EVAL-BOARD CONTROLLER for more details on the EVAL-BOARD CONTROLLER package.

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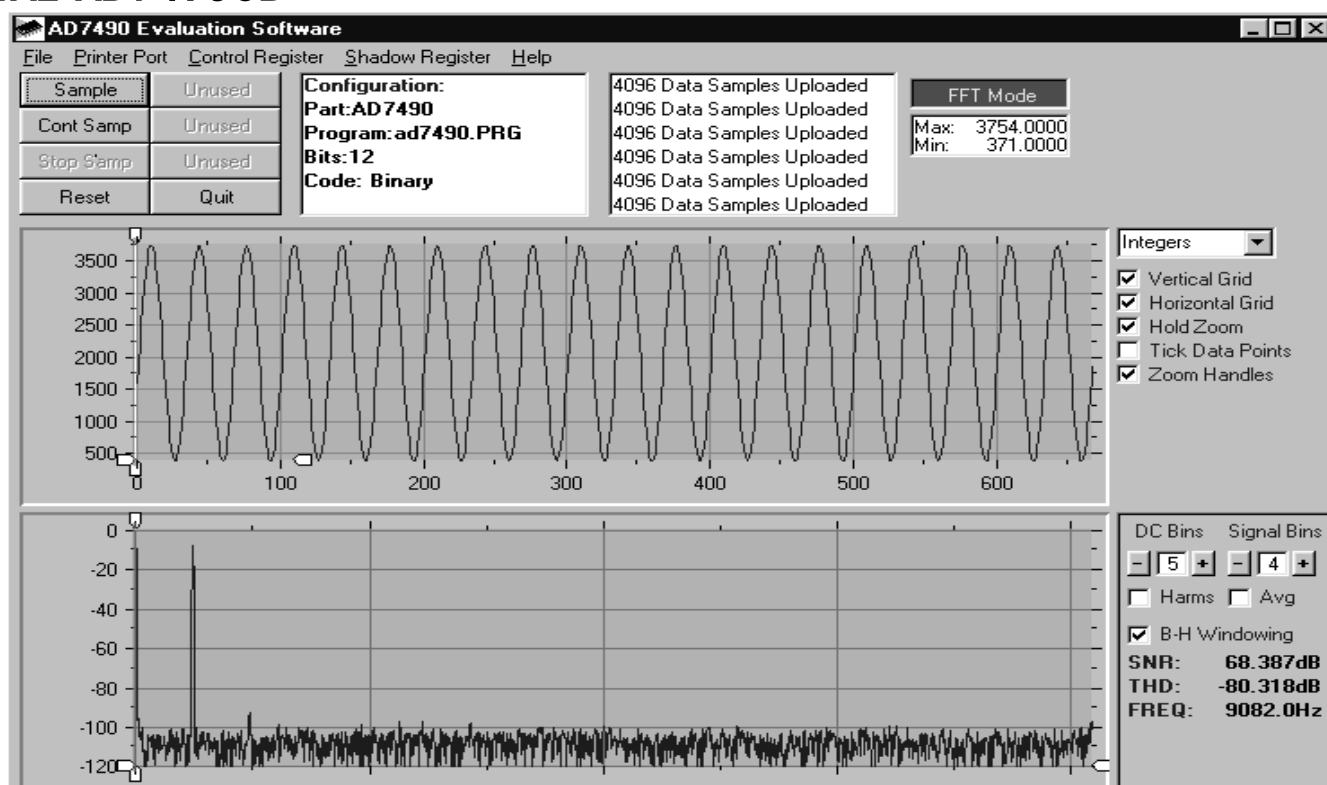


Figure 1. AD7490 Main Screen - FFT Mode

## SOFTWARE DESCRIPTION

Included in the EVAL-AD7490CB evaluation board package is a CD ROM which contains software for controlling and evaluating the performance of the AD7490 when it is operated with the EVAL-BOARD CONTROLLER. When the CD is inserted into the PC an installation program will automatically begin. This program will install the evaluation software onto the users machine and will also install the technical Note for the AD7490 evaluation board as well as the datasheet for the AD7490. All literature on the CD is in Adobe's Portable Documation format (PDF) and will require Acrobat Reader™ to be viewed or printed. The user interface on the PC is a dedicated program written especially for the AD7490.

The software which controls the Evaluation Board Controller and hence the AD7490 evaluation board has three main screens. The screen shown in Figure 1 shows the screen which appears when the software is run. The main function of the screen is to allow the user to read a predetermined number of samples from the evaluation board and display them in both the time and frequency domain. The screen can be divided into 3 sections. The upper most section of the screen contains the control buttons, the menu bar and the status windows. The controll buttons allow the user to enter the set-up menu, take samples, and get information about the software. The Control Register and Shadow Register drop down menus allow the user to select a particular operating mode of the AD7490. The operating conditions selected in the Control Register drop down menu set up the operating conditions of the AD7490, on selecting the particular conditions a 12 bit word is sent to the AD7490 control register on the next serial transfer. When the users wishes to set up a particular sequence through which the AD7490 will cycle, the relavent sequence channels must be selected in the Shadow Register drop down menu before the SAMPLE button is pressed.

The menu bar allows the user to select which printer port is to be used to control the Evaluation Board Controller, load and save data etc. The status window indicates the set up of the AD7490 evaluation board, the number of samples taken and any information messages that are generated.

The middle section of the AD7490 Main Screen is a Digital Storage Oscilloscope (DSO). When samples are uploaded from the Evaluation Board Controller they are displayed here. The samples can be displayed as either interger values or as voltages. Once the samples are displayed clicking any point on the graph will display the sample number and the value of the point directly beneath the cursor. Along the axis of the graph are the " zoom handles ". These allow the user to zoom in and out to get a closer look at a particular sample if required. When another set of samples are taken the graph will attempt to display all values collected unless the Hold Zoom check box is ticked. If the Hold zoom box is ticked the graph will keep the same axis settings as for the previous set of data samples. There are additional check boxes in this section to give the user control over the vertical and horizontal grids and data points.

The lowest section of the screen will show either a Fast Fourier Transform (FFT) of the data, or a histogram, which shows the number of occurances of each particular code read back. The FFT ( default option ) is typically used when the user is concerned with examining the AD7490's performance in the frequency domain, while the Histogram will give an indication of the AD7490's performance to dc signals. The option displayed can be changed by clicking on the FFT Mode/Histogram Mode button in the top right of the screen. Figure 2 shows how the Main Screen would look if the Histogram Mode was selected.

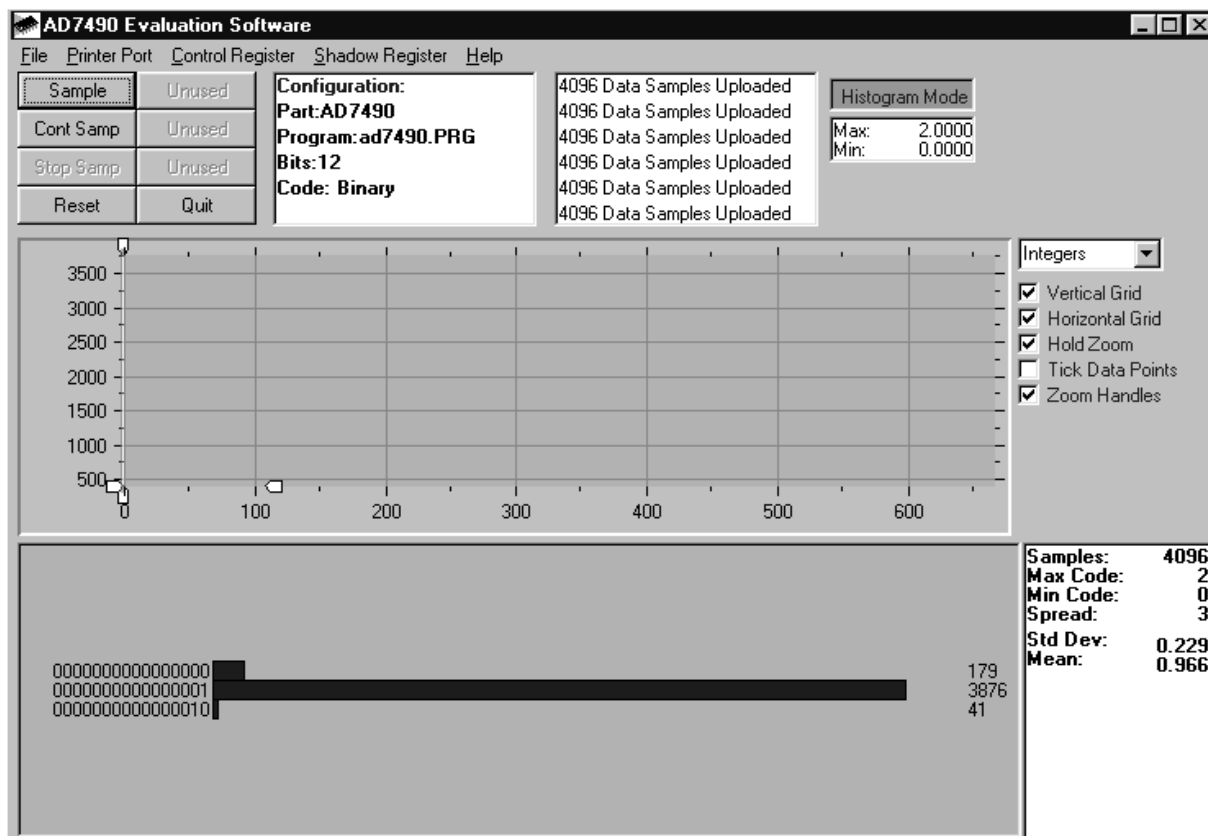


Figure 2 AD7490 Main Screen - Histogram Mode

### Setup Screen

The Setup Screen is responsible for allowing the user to load the AD7490 configuration file for the evaluation board. The configuration file will give the software detailed information about the AD7490 evaluation board and part connected to the Evaluation Board Controller such as number of bits, maximum sampling rate, power supply requirements etc. The AD7490 configuration file also tells the software the name of the DSP program file which it should download to the Evaluation Board Controller. These files are supplied by Analog Devices with the evaluation board. Figure 3 shows the Setup Screen.

### SETTING UP THE EVALUATION BOARD CONTROLLER

The following text describes how the evaluation board Evaluation Board Controller and how AD7490 software should be set up for the user to begin using the complete system. The Evaluation Board Controller and AD7490 evaluation board should be connected together (via the 96 way connector). The power should be applied to the Evaluation Board Controller. At this stage the red LED should be flashing which indicates that the Evaluation Board Controller is functional and ready to receive instructions. The AD7490 software which should have been installed should be loaded before the printer port cable is connected between the Evaluation Board Controller and the PC. This will ensure that the printer port has been initialized properly. The printer port cable can then be connected between the PC and the Evaluation Board Controller.

### Running the AD7490 Software

With the hardware setup the user is now in a position to use the software to control the Evaluation Board Controller and evaluation board. In the software the user should select the **File** menu and click on **Setup**. This will display the setup form. A window on the left of the setup form list all the available configuration files. The configuration files are text based files which contain information about the particular evaluation board to be tested - AD7490.cfg. The information will cover such things as the part name, number of samples to be taken, default and maximum sampling frequency power supply settings etc. The configuration file also contains the name of the DSP program file which is to be downloaded to the Evaluation Board Controller. The user should select the AD7490.cfg configuration file and click **Load**. The Evaluation Board Controller will be reset and the DSP program will be downloaded. When the download has been completed the power supply settings indicated in the configuration file are set and the user may hear some of the relays clicking. The pull-down menus items such as number of samples and sampling frequency will have been set to the default values specified by the configuration file. The user is free to change these at will. Once all the settings had been decided the user can click **Close** to return to the main form. The AD7490 is Evaluation system is defaulted to convert on Channel 0 from the 0 to Ref in Range in Normal mode with Straight Natural Binary output coding. By pressing the SAMPLE button the information displayed on the Main Screen will be the conversion result from Channel 0 input.

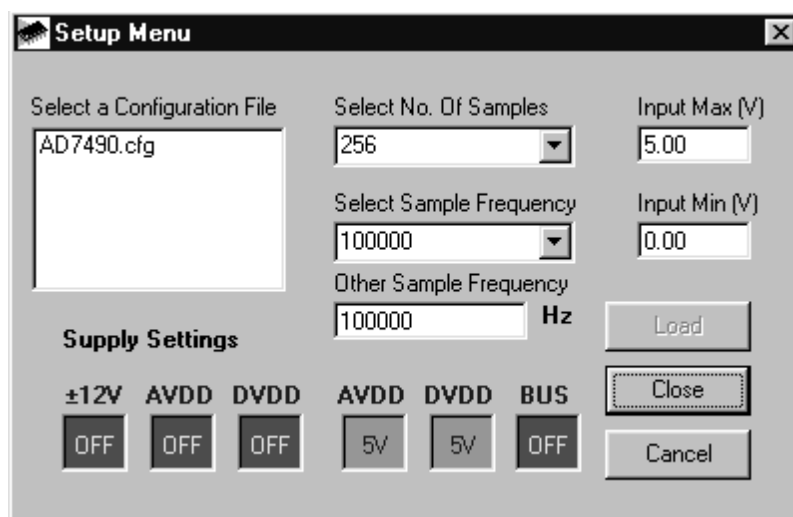


Figure 3. The Setup Screen

## Taking Samples

When the user clicks **Sample** the software will instruct the Evaluation Board Controller to take the required number of samples at the required frequency from the evaluation board. These samples are then uploaded and displayed. An FFT and Histogram are also calculated and displayed. If the user clicks **Cont Samp** the software will repeat the process indefinitely until the user clicks the button again. While the software is continuously sampling data the other control buttons are disabled.

## Other Buttons

The **Reset** button will cause the Evaluation Board Controller to perform a reset function. When this happens the power supplies are turned off and the program in DSP memory is lost. The user should repeat the setup instructions to download another program if required.

The **Quit** button will exit the software, the program running on the Evaluation Board Controller is not terminated.

## MENU BAR ITEMS

The main screen of the Evaluation Board Controller contains a number of options available as pull-down menu items. The functions of these are listed below.

### File Menu:

**Setup Menu:** Selecting this option displays the Setup Screen as shown in Figure 3.

**Load Raw Data:** Selecting this option allows the user to load data which had been saved by the software during a previous session. This applies when operating the AD7490 in Normal mode, when the user wishes to debug each channel individually.

**Save Raw Data:** Selecting this option allows the user to save the current set of sample data points. The data can be reloaded to the Evaluation Board Controller software at a later date or can be used by other programs for further analysis. This option applies when operating the AD7490 in Normal mode, when the user wishes to debug each channel individually.

**Save Binary Data:** Selecting this option allows the user to save the current set of sample data points. The data is saved in binary format as a text file. This method can be useful for examining code flicker, looking for stuck bits etc. This option applies when operating the AD7490 in Normal mode, when the user wishes to debug each channel individually.

**Save FFT Data:** Selecting this option allows the user to save the current set of FFT data points. FFT data cannot be reloaded into the Evaluation Board Controller software but can be loaded into other software packages for further analysis. This option applies when operating the AD7490 in Normal mode, when the user wishes to debug each channel individually.

**Exit:** Quits the program.

### Printer Port:

This menu item allows the user to select which printer port should be used for communication with the Evaluation Board Controller.

**LPT1:** This option selects 0x378 as the printer port address. This is the default option.

**LPT2:** This option selects 0x278 as the printer port address.

**PRN:** This option selects 0x3BC as the printer port address.



**SOFTWARE CONFIGURATION FILES**

Software Configuration Files give the Evaluation Board Controller software information on how the software and hardware should perform. They contain information such as the name of the DSP program to download, the default and maximum sample frequencies, the number of samples to take and the power supply settings to use. A typical Software Configuration File (\*.cfg) is shown in Listing 1.

```
[EVAL-CONTROL BOARD]
partname:AD7490
programname:ad7490.PRG

samplefrequency:100000
maxsamplefrequency:1000000
samples:2048

+/-15V:on
dvdd:5:on
avdd:5:on
bus:on
;options 2scomp, binary
dataformat:binary
numberofbits:12
inputVmax:2.5
inputVmin:0
```

**OPERATING THE AD7490 EVALUATION BOARD IN SEQUENCER MODE.****FFT MODE**

In FFT MODE when operating the AD7490 evaluation board with the Sequence and Shadow bits set to 01 in the Control Register the user should operate the evaluation board as described next. On selecting this combination of the SEQ and SHADOW bits in the Control Register drop down menu the Shadow Register drop down menu will automatically be enabled. The user should select a particular sequence of channels by checking the Vin channels in the Shadow Register menu. Next the user should press SAMPLE. When the Evaluation board is finished taking samples on the selected channels the resulting FFTs will be shown in the third section of the Main Menu screen. The SNR, THD and FREQ result correspond to the last channel in the programmed sequence. This also applies when operating the part with the Sequence and Shadow bits set to 11 in the Control Register i.e. the SNR, THD and FREQ result correspond to the last channel in the programmed sequence.

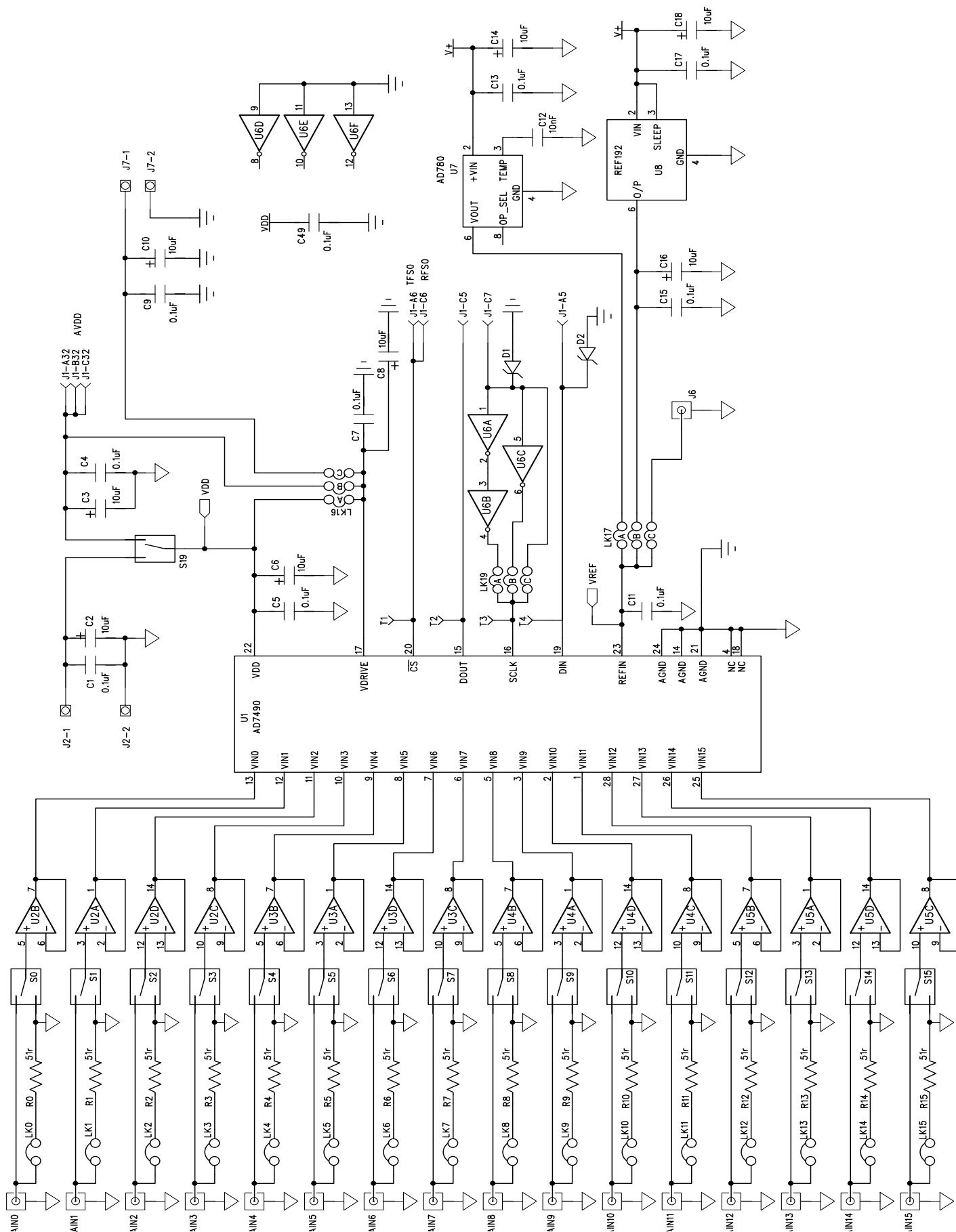
If the user wishes to get the SNR, THD and FREQ result from each individual channel, they should operate the part in normal mode with SEQ and SHADOW bits set to 00 and select the relevant channel in the Control Register.

**HISTOGRAM MODE**

In HISTOGRAM MODE when operating the AD7490 evaluation board with the Sequence and Shadow bits set to 01 in the Control Register the user should operate the evaluation board as described next. On selecting this combination of the SEQ and SHADOW bits in the Control Register drop down menu the Shadow Register drop down menu will automatically be enabled. The user should select a particular sequence of channels by checking the Vin channels in the Shadow Register menu. Next the user should press SAMPLE. When the Evaluation board is finished taking samples on the selected channels the resulting HISTOGRAM will be shown in the third section of the Main Menu screen. The HISTOGRAM will correspond to the first Channel in the sequence. The max code, min code, spread, std dev and mean result correspond to the first channel in the programmed sequence. This also applies when operating the part with the Sequence and Shadow bits set to 11 in the Control Register i.e. the max code, min code, spread, std dev and mean result correspond to the first channel in the programmed sequence.

If the user wishes to get the min code, max code etc corresponding to a particular channel they should operate the part in normal mode with SEQ and SHADOW bits set to 00 and select the relevant channel in the Control Register.

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Table IV. AD7490 Evaluation Board Bill Of Materials.

Item	Qty	RefDes	Part Description	Disti Stock No
1	22	C1 C4 C7 C9 C13 C15 C17 C19 C21 C23 C25 C27 C29 C31 C33 C35 C37 C39 C41 C43 C45 C49	0.1uF Multilayer Ceramic capacitor (SMD 0805)	FEC 499-687
2	21	C2 C3 C8 C10 C14 C16 C18 C20 C22 C24 C26 C28 C30 C32 C34 C36 C38 C40 C42 C44 C46	10uF 20V Tantalum Capacitor (TAJ-B)	FEC 498-737
3	2	C5 C11	0.1uF Multilayer Ceramic capacitor (SMD 0603)	FEC 499-675
4	1	C6	10uF 6.3V Tantalum Capacitor (TAJ-A)	FEC 197-130
5	1	C12	10nF Multilayer Ceramic capacitor (SMD 0805)	FEC 499-225
6	2	C47 C48	68pF Multilayer Ceramic capacitor (SMD 0805)	FEC 237-024
7	2	D1 D2	SD103C Schottky Diode	ITT Cannon
8	1	J1	DIN CON41612 96 pin Connector	FEC 225-393
9	2	J2 J7	2 Pin Terminal Block	FEC 151-785
10	1	J3	3 Pin Terminal Block	FEC 151-786
11	19	J4 J5 J6 AIN0-AIN15	50 Ohm SMB Connector	FEC 310-682
12	17	LK0 - LK15 LK18	2 Pin Header (0.1" pitch)	FEC 986-501
13	3	LK16 LK17 LK19	3x2 Pin Header (0.1" pitch)	FEC 511-780
14	3	LK16 LK17 LK19	Jumper Socket	FEC 150-411
15	17	R0 - R16	51 ohm Resistor (SMD 0805)	FEC 321-7905
16	1	R17	3K ohm Resistor (SMD 0805)	FEC 554-467
17	6	R18 - R23	1K ohm Resistor (SMD 0805)	FEC 554-005
18	20	S0 - S20	Changeover Header	Futura JSC-16-GO
19	4	T1 - T4	Testpoint	FEC 240-333
20	1	U1	AD7490BRU	ADI Issue
21	5	U2 U3 U4 U5 U9	OP467GP	ADI Issue
22	1	U6	74HC04D	FEC 492-279
23	1	U7	AD780AN	ADI Issue
24	1	U8	REF192AN	ADI Issue
25	86	U2 U3 U4 U5 U7 U8 U9	Ultra Low Profile Sockets	FEC 519-959
26	4	Each Corner	Rubber Stick-on Feet	FEC 148-922

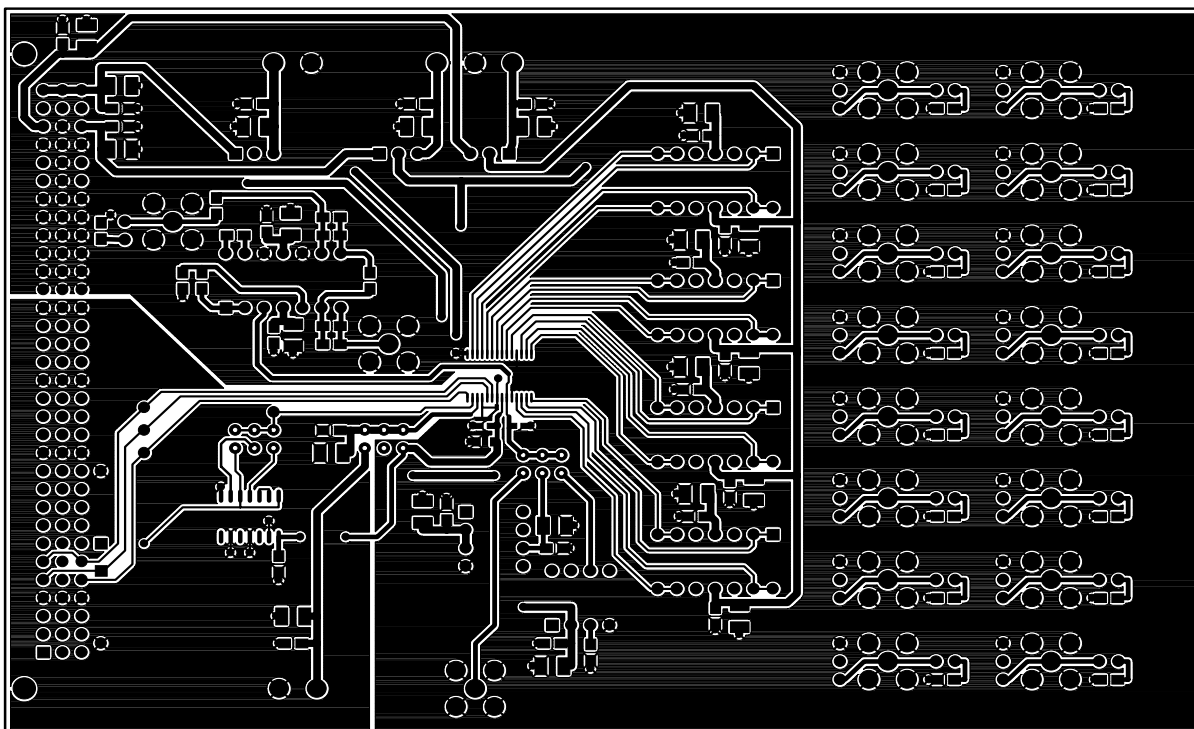


Figure 5. Component Side Artwork

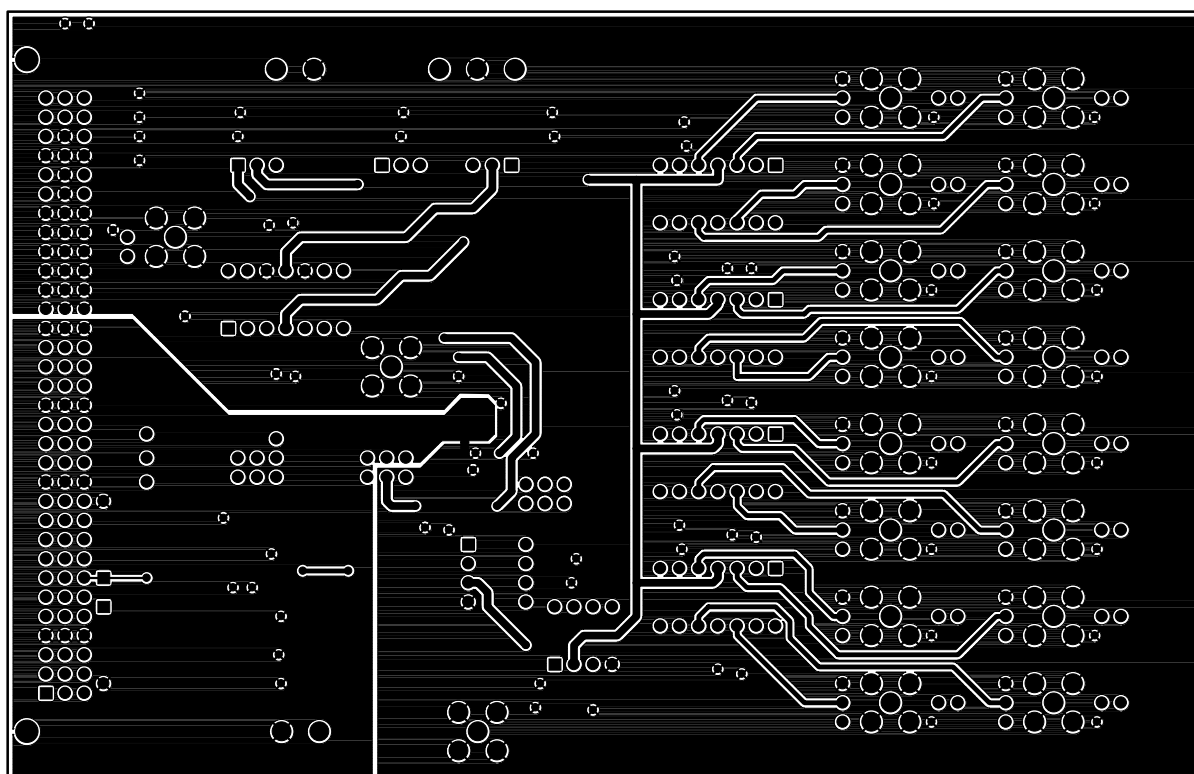


Figure 6. Solder Side Artwork

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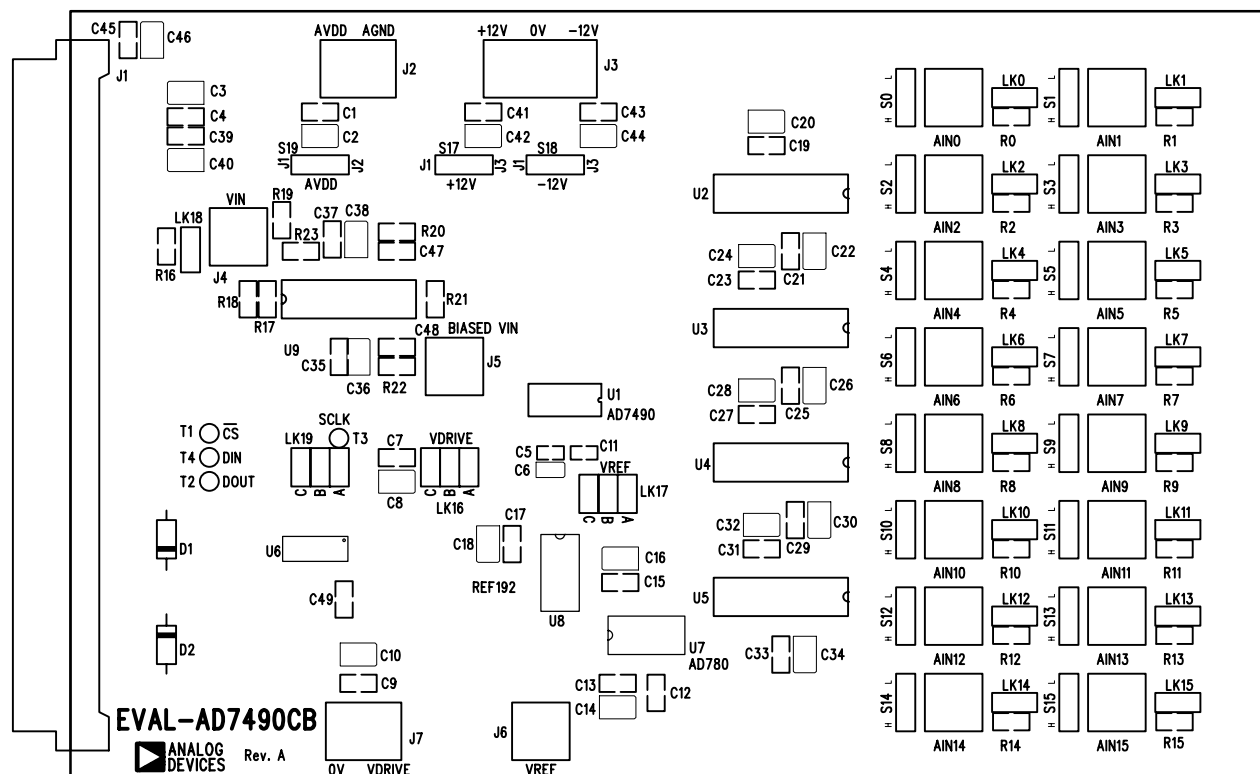


Figure 7. AD7490 Evaluation Board Component Placement Drawing.