



# Evaluation Board for Dual 1MSPS, 12-Bit, 2 Channel SAR ADC with Serial Interface

## Preliminary Technical Data

## EVAL-AD7866CB

### FEATURES

Full-Featured Evaluation Board for the AD7866  
Eval-Board Controller 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 AD7866 which is a dual, 12-bit, high speed, low power successive-approximation ADC. This part operates from a single +2.7 V to +5.25 V power supply and features throughput rates up to 1 MSPS. Full details on the AD7866 are available in the AD7866 data sheet which is 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 +2.5 V or +3 V ultra high precision bandgap reference, three AD713 quad op-amps and a SN74LS04

inverter. Various link options are explained in detail on pages 2 and 3.

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 two  $V_{REF}$  inputs; the optional, external SCLK and  $\overline{CS}$  inputs; the optional, external RANGE, A0 and  $V_{DRIVE}$  inputs; the four AD7866 analog inputs; two bipolar analog inputs to the bias circuitry and the two Data out lines.

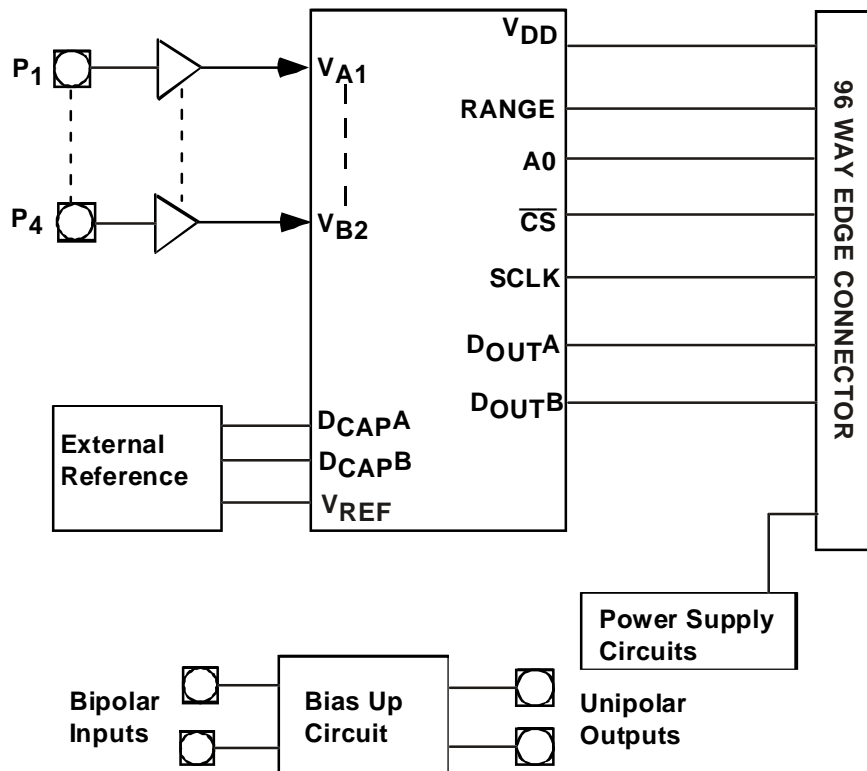
### OPERATING THE AD7866 EVALUATION BOARD

#### 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:  $V_{DD}$  (+3/5 V),  $A_{GND}$ , +12 V, -12 V,  $A_{GND}$ , and  $D_{GND}$ . If the evaluation board is used in stand-alone mode, +3/5 V must be connected to the  $V_{DD}$  input to supply the AD7866  $V_{DD}$

### FUNCTIONAL BLOCK DIAGRAM



REV. 0

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices.

One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106, U.S.A.  
Tel: 781/329-4700 World Wide Web Site: <http://www.analog.com>  
Fax: 781/326-8703 Analog Devices, Inc., 2002

# EVAL-AD7866CB

pin. +12 V and -12 V are used to supply the two AD713 quad op-amps and the AD780 voltage reference. The  $V_{\text{DRIVE}}$  pin can be driven by a voltage between +3 V and +5 V allowing the evaluation board to be connected to both +3 V and +5 V 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 the reference are also decoupled to  $A_{\text{GND}}$  with 10 $\mu$ F tantalum and a 0.1 $\mu$ F ceramic capacitor. The AD7866  $AV_{\text{DD}}$  supply pin is decoupled to  $A_{\text{GND}}$  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,  $A_{\text{GND}}$  and  $D_{\text{GND}}$ . These are connected at one location close to the AD7866.

## LINK OPTIONS

There are 27 link options which must be set for the required operating setup before using the evaluation board. The functions of these options are outlined below. The two ADCs onboard the AD7866 are referred to as ADC A and ADC B.

Link No.	Function.
LK1 & LK2	These link options are used to select the source of the analog inputs into ADC A. When these links are in position "A" the VA1 and VA2 sockets are tied to the VA1 and VA2 analog buffers respectively; if the links are in position "B" the inputs to the respective analog buffers are tied to the output of the bias circuitry, which is used if a bipolar input requires level shifting; when the links are in position "C" the input to the analog buffers are tied to $A_{\text{GND}}$ .
LK3 & LK4	These link options are used to select the source of the analog inputs into ADC B. When these links are in position "A" the VB1 and VB2 sockets are tied to the VB1 and VB2 analog buffers respectively; if the links are in position "B" or "C" the inputs to the respective analog buffers are tied to the outputs of the bias circuitry, which are used if a bipolar input requires level shifting; when the links are in position "D" the input to the analog buffers are tied to $A_{\text{GND}}$ .
LK5	This link option is used to select the source of an external reference to be applied to ADC A through the $D_{\text{CAPA}}$ pin. If this link is in position "A", an external reference voltage must be applied to $D_{\text{CAPA}}$ via P5 ( $V_{\text{REF1}}$ socket). If this link is in position "B", the AD780 provides a reference voltage to ADC A on the AD7866 via $D_{\text{CAPA}}$ . This link should be removed if a reference is not being supplied to ADC A on the AD7866 via $D_{\text{CAPA}}$ .
LK6	This link option is used to select the source of an external reference to be applied to ADC B through the $D_{\text{CAPB}}$ pin. If this link is in position "A", an external reference voltage must be applied to $D_{\text{CAPB}}$ via P6 ( $V_{\text{REF2}}$ socket). If this link is in position "B", the AD780 provides a reference voltage to ADC B on the AD7866 via $D_{\text{CAPB}}$ . This link should be removed if a reference is not being supplied to ADC B on the AD7866 via $D_{\text{CAPB}}$ .
LK7	This link option is used to select the source of the reference voltage applied to the AD7866 $V_{\text{REF}}$ pin. When this link is in position "A" an external voltage reference must be supplied to the $V_{\text{REF}}$ pin via P6 ( $V_{\text{REF2}}$ socket). When this link is in position "B", the AD780 provides the voltage reference to the AD7866 via the $V_{\text{REF}}$ pin. When this link is in position "C", the $V_{\text{REF}}$ pin of the AD7866 is tied to $A_{\text{GND}}$ .
LK8	This link option controls the program pin of the AD780 reference voltage. When this link is "inserted" the AD780 output voltage is set to +3.0 V. When this link is "removed" the AD780 output voltage is set to +2.5 V.
LK9	This link option selects the source of the $AV_{\text{DD}}$ +5 V supply. When this link is in position "A", the +5 V is supplied from the EVAL-BOARD CONTROLLER. When this link is in position "B", the +5 V must be supplied from an external source via J2.
LK10	This link option selects the source of the $DV_{\text{DD}}$ supply. When this link is in position "A", $DV_{\text{DD}}$ is supplied from the EVAL-BOARD CONTROLLER. When this link is in position "B", $DV_{\text{DD}}$ must be supplied from an external source via J3.
LK11	This link option selects the source of the $V_{\text{DRIVE}}$ input. When this link is in position "A", the $V_{\text{DRIVE}}$ supply voltage is provided from $DV_{\text{DD}}$ . When this link is in position "B", an external $V_{\text{DRIVE}}$ supply voltage must be supplied via J4.
LK12	This link option selects the input to the REF SELECT pin. When this link is in position "A", an external reference can be supplied to the AD7866 through the $V_{\text{REF}}$ pin. When this link is in position "B" (connected to ground), the on-chip +2.5 V reference is used as the reference source for both ADC A and ADC B. If both REF SELECT and $V_{\text{REF}}$ are connected to ground, an individual, external reference can be applied to both ADC A and ADC B through the $D_{\text{CAPA}}$ and $D_{\text{CAPB}}$ pins.
LK13	This link option is used to select the input to the RANGE pin. When this link is in position "A", the RANGE pin is tied high and so the analog input range will be 0 to $2 \cdot V_{\text{REF}}$ and the output coding for the part will be 2's complement. When this link is in this position, the config file "AD7866-1.cfg" must be selected and loaded.

Link No.	Function.
	<p>When this link is in position "B", the RANGE pin, and therefore the analog input range and the output coding for the part, can be controlled by a flag, FL1 from the EVAL-BOARD CONTROLLER.</p> <p>When this link is in position "C", the RANGE pin is tied low and so the analog input range will be 0 to <math>V_{REF}</math> and the output coding for the part will be straight binary. When this link is in this position, the config file "AD7866.cfg" must be selected and loaded.</p> <p>When this link is in position "D", an external input can be supplied to the RANGE pin via P7 (EXT_RANGE socket).</p>
LK14	<p>This link option is used to select the input to the A0 pin.</p> <p>When this link is in position "A", the conversion will be performed on channel two of each ADC, i.e. VA2 and VB2.</p> <p>When this link is in position "B", the channel on each ADC to be converted is controlled by the user via the software through the flag FLO.</p> <p>When this link is in position "C", the conversion will be performed on channel one of each ADC, i.e. VA1 and VB1.</p> <p>When this link is in position "D", an external signal can be applied to the A0 pin via P14 (EXT A0 socket).</p>
LK15	<p>This link option selects the source of the <math>\overline{CS}</math> input.</p> <p>When this link is in position "A", the <math>\overline{CS}</math> input is provided via the external socket, P8.</p> <p>When this link is in position "B", the <math>\overline{CS}</math> input is provided by the EVAL-BOARD CONTROLLER.</p>
LK16	<p>This link may be used to control the polarity of the serial clock applied to the SCLK pin.</p> <p>This link must be in position "A" when LK17 is in position "B" and the SCLK is provided by the EVAL-BOARD CONTROLLER. This means data is valid on the falling edge of SCLK. This link may be placed in position "B" when LK17 is in position "A", to invert an SCLK from P9 if necessary. This would mean data could be read on the rising edge of SCLK but would only be possible with a slower SCLK frequency.</p>
LK17	<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 via the external socket, P9.</p> <p>When this link is in position "B", the SCLK input is provided by the EVAL-BOARD CONTROLLER.</p>
LK18 & LK19	<p>These link options select where the data out appears.</p> <p>When these links are in position "A", the data may be read via external sockets, P10 and P11.</p> <p>When these links are in position "B", the data is read by the EVAL-BOARD CONTROLLER.</p>
LK20 & LK23	<p>These link options set the DC bias voltages that are applied to the optional bias up circuits.</p> <p>When these links are in position "A", the bias voltages are set to <math>V_{REF}</math>.</p> <p>When these links are in position "B", the bias voltages are set to the voltages applied at <math>D_{CAPA}</math> and <math>D_{CAPB}</math>.</p> <p>When these links are in position "C", the bias voltages are set to AGND. In this configuration, the bias-up circuits are not used.</p>
LK21 & LK24	<p>These link options are only necessary when the bias-up circuits are being utilised. The options choose the ratio of resistors required to perform the appropriate biasing up of the bipolar analog inputs, depending on the input range. These links should be in position "A" if the analog input range has been set as 0V to <math>2 \cdot V_{REF}</math>. These links should be in position "B" if the analog input range is 0V to <math>V_{REF}</math>.</p>
LK22 & LK25	<p>These link options add a 50<math>\Omega</math> termination to AGND at the Vin socket of each bias up circuit. If a 50<math>\Omega</math> termination is required, these links should be inserted, if not they should be left unconnected.</p>
LK26	<p>This link option is used to select the source of the +12 V supply.</p> <p>In position "A", the +12 V is supplied from the EVAL-BOARD CONTROLLER through the 96-way connector.</p> <p>In position "B", the +12 V is supplied from an external source through the power connector, J5.</p>
LK27	<p>This link option is used to select the source of the -12 V supply.</p> <p>In position "A", the -12 V is supplied from the EVAL-BOARD CONTROLLER through the 96-way connector.</p> <p>In position "B", the -12 V is supplied from an external source through the power connector, J5.</p>

# EVAL-AD7866CB

## 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 shipped. The board is compatible with the EVAL-BOARD CONTROLLER when shipped.

**Table I. Initial Link Positions**

Link No.	Position	Function.
LK1	C	The input of the VA1 buffer is tied to AGND.
LK2	C	The input of the VA2 buffer is tied to AGND.
LK3	D	The input of the VB1 buffer is tied to AGND.
LK4	D	The input of the VB2 buffer is tied to AGND.
LK5	Removed	The reference for ADCA is not applied through the D <sub>CAP</sub> A pin, but through the V <sub>REF</sub> pin.
LK6	Removed	The reference for ADC B is not applied through the D <sub>CAP</sub> B pin, but through the V <sub>REF</sub> pin.
LK7	B	The AD780 supplies the reference to V <sub>REF</sub> .
LK8	Removed	AD780 is set to provide a +2.5 V reference.
LK9	A	AV <sub>DD</sub> is supplied by the Evaluation Board Controller.
LK10	A	DV <sub>DD</sub> is supplied by the Evaluation Board Controller.
LK11	A	V <sub>DRIVE</sub> is supplied by DV <sub>DD</sub> .
LK12	A	Set up V <sub>REF</sub> to be supplied externally.
LK13	C	The RANGE pin is connected to ground, setting the initial analog input range to 0V to V <sub>REF</sub> and the output coding to binary. The config file "AD7866.cfg" must be loaded.
LK14	B	Connect the A0 pin to a FL0 so it can be controlled by the software.
LK15	B	$\overline{CS}$ is supplied by the Evaluation Board Controller.
LK16	A	SCLK is not inverted.
LK17	B	SCLK is supplied by the Evaluation Board Controller.
LK18	B	DoutA is read by the Evaluation Board controller.
LK19	B	DoutB is read by the Evaluation Board controller.
LK20	A	The reference for the optional Bias-up circuit 1 is taken from V <sub>REF</sub> .
LK21	B	Initially the analog input range is set to 0 to V <sub>REF</sub> so the resistor configuration in Bias-up circuit 1 is set accordingly. It is very important that this link is changed when the analog input range is changed.
LK22	Removed	A 50ohm termination is not applied to the input of Bias-up circuit 1.
LK23	A	The reference for the optional Bias-up circuit 2 is taken from V <sub>REF</sub> .
LK24	B	Initially the analog input range is set to 0 to V <sub>REF</sub> so the resistor configuration in Bias-up circuit 2 is set accordingly. It is very important that this link is changed when the analog input range is changed.
LK25	Removed	A 50ohm termination is not applied to the input of Bias up circuit 2.
LK26	A	+12 V is supplied by the Evaluation Board Controller.
LK27	A	-12 V is supplied by the Evaluation Board Controller.

## 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-BOARD CONTROLLER or other system. The pinout for the J1 connector is shown in Figure 1 and its pin designations are given in Table II.

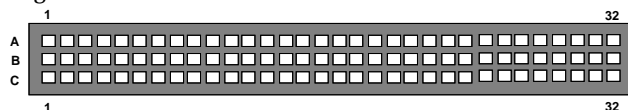


Figure 1. Pin Configuration for the 96-Way Connector, J1

### 96-Way Connector Pin Description

Pin	Description
FL0	Flag Zero. This output is connected to the A0 pin of the AD7866 via LK14.
FL1	Flag One. The output of this is connected to the RANGE pin of the AD7866 via LK13.
DR0	Data Receive Zero. This input is connected to the DoutA pin of the AD7866 via LK18. Four leading zeroes and twelve bits of data are provided on this input from the AD7866 serial output.
DR1	Data Receive One. This input is connected to the DoutB pin of the AD7866 via LK19. Four leading zeroes and twelve bits of serial data are provided on this input from the AD7866 serial output.
SCLK0	Serial Clock Zero. This continuous clock output is connected to the SCLK pin of the AD7866 via LK17.
SCLK1	Serial Clock One. This is also connected to the SCLK0 pin of the ADSP2189 via LK17 and acts as an input.
TFS0	Transmit Frame Sync Zero. This output is connected to the CS pin of the AD7866 via LK15 to initiate conversions and to frame the serial data transfer.
RFS0	Receive Frame Sync Zero/One. These inputs,
RFS1	are connected to the TFS0 pin of the ADSP2189 to frame the serial data read.
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 +5 V Supply. These lines are connected to the V <sub>DD</sub> supply line on the board via LK9.
+12V	+12 V Supply. This line is connected to the +12V supply line on the board via LK26.
-12V	-12 V Supply. This line is connected to the -12 V supply line on the board via LK27.

Table II. 96-Way Connector Pin Functions.

	ROW A	ROWB	ROWC
1		FL1	DR1
2			RFS1
3	SCLK1		SCLK1
4	DGND	DGND	DGND
5			DR0
6	TFS0		RFS0
7	SCLK0		SCLK0
8			
9			
10			
11			
12	DGND	DGND	DGND
13			
14			
15			
16	DGND	DGND	DGND
17	FL0		
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.

# EVAL-AD7866CB

## SOCKETS

There are fourteen input sockets relevant to the operation of the AD7866 on this evaluation board. The functions of these sockets are outlined in Table III.

**Table III. Socket Functions**

Socket	Function
P1	Sub-Miniature BNC socket for the unipolar analog input to VA1.
P2	Sub-Miniature BNC socket for the unipolar analog input to VA2.
P3	Sub-Miniature BNC socket for the unipolar analog input to VB1.
P4	Sub-Miniature BNC socket for the unipolar analog input to VB2.
P5	Sub-Miniature BNC socket for an external reference input ( $V_{REF1}$ ).
P6	Sub-Miniature BNC socket for an external reference input ( $V_{REF2}$ ).
P7	Sub-Miniature BNC socket for an external RANGE input.
P8	Sub-Miniature BNC socket for an external $\overline{CS}$ input.
P9	Sub-Miniature BNC socket for an external SCLK input.
P10	Sub-Miniature BNC socket for DoutA output.
P11	Sub-Miniature BNC socket for DoutB output.
P12	Sub-Miniature BNC socket for bipolar analog input to bias-up circuit 1.
P13	Sub-Miniature BNC socket for bipolar analog input to bias-up circuit 2.
P14	Sub-Miniature BNC socket for an external A0 input.

## CONNECTORS

There are five connectors on the AD7866 evaluation board as outlined in Table IV.

**Table IV. Connector Functions**

Connector	Function
J1	96-Way Connector for Serial Interface & Power Supply connections.
J2	External $AV_{DD}$ & GND power connector.
J3	External $DV_{DD}$ & GND power connector.
J4	External $V_{DRIVE}$ connector.
J5	External +12 V, -12 V & AGND power connector.

## 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. The 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 AD7866 are provided by the EVAL-BOARD CONTROLLER. Software to communicate with the Control Board and AD7866 is provided with the AD7866 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-AD7866CB plugs directly into the 96-way connector on the EVAL-BOARD CONTROLLER. The EVAL-BOARD CONTROLLER provides all the supplies for the evaluation board. It is powered from a 12V AC transformer. Suitable transformers are available from Analog Devices as an accessory 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 from other suppliers including Digikey (U.S.) and Campbell Collins (U.K.).

Connection between the EVAL-BOARD CONTROLLER and the serial port of a PC is via a standard Centronics printer port cable which is provided as part of the EVAL-BOARD CONTROLLER package. Please refer to the manual which accompanies the EVAL-BOARD CONTROLLER for more details on the EVAL-BOARD CONTROLLER package.

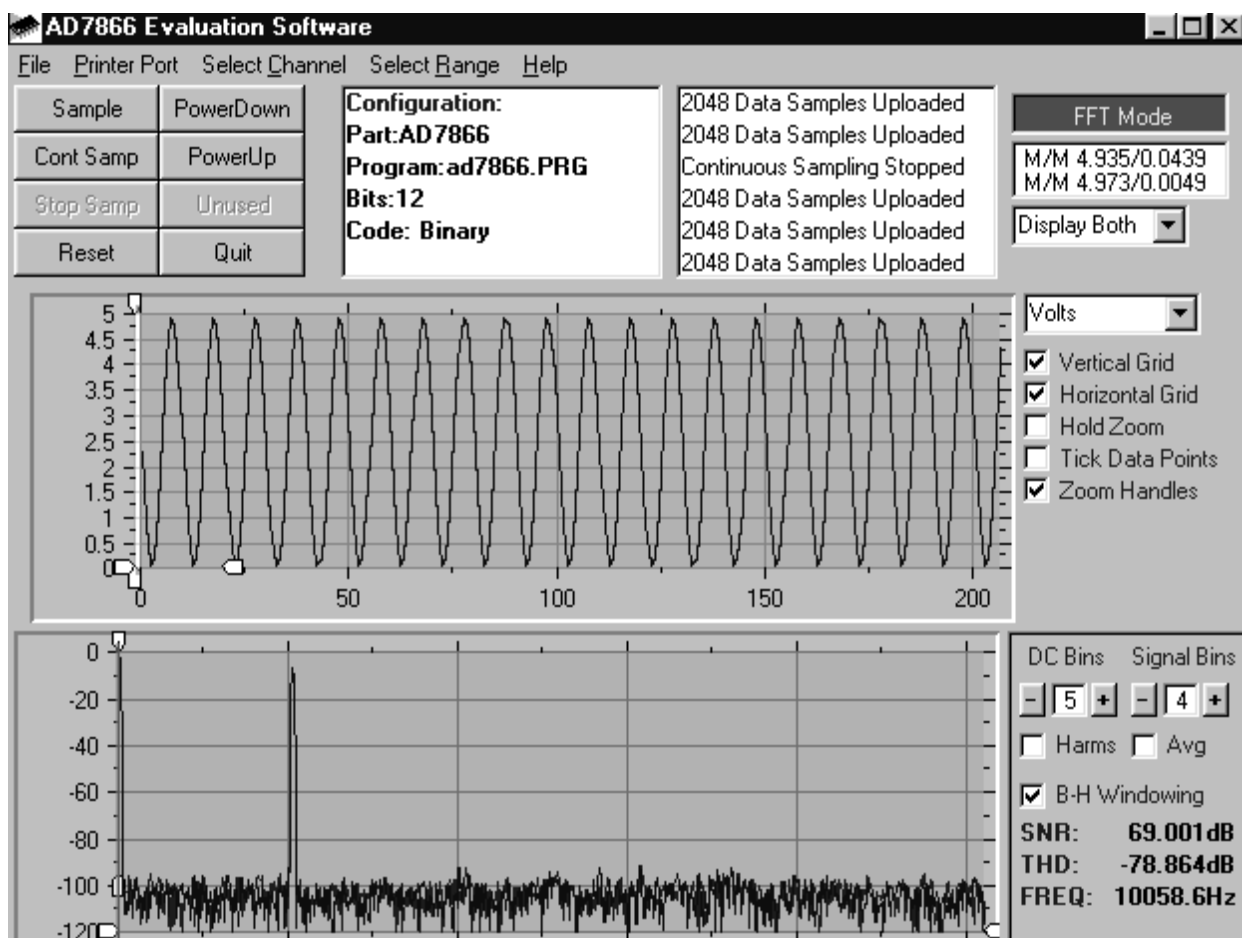


Figure 2. AD7866 Main Screen

### SOFTWARE DESCRIPTION

The software which controls the Evaluation Board Controller and hence the evaluation board has three main screens. The screen shown in Figure 2 is the screen which appears when the software is run. The main function of this 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 three sections. The upper third of the screen contains the control buttons, the menu bar and various status windows. The control buttons allow the user to take samples, reset the part and quit the program. There are also power-down/up options in the control buttons. These buttons allow the user to place the part into power-down, and power the part up again. There are two power-down modes associated with the AD7866, partial power-down and full power-down. To enter partial power-down, the "PowerDown" button should be pressed once. To enter full power-down, the "PowerDown" button should be pressed twice. Press the power-up button to power the part up again (see "Modes of Operation" section in the AD7866 datasheet). The menu bar allows the user to enter the setup menu, select which printer port is to be used to control the Evaluation Board Controller, load and save data, get information about the software and control which channel of each ADC is to be converted. The status windows indicate the setup of the evaluation board/device, number of samples taken and any information/error messages that are generated. The middle third of the 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 either as integer values or as voltages (determined by the input range of the device in question). Once samples have been displayed clicking at any point in the graph will display the sample number and 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 is taken the graph will attempt to display all values collected unless the **Hold Zoom** check box is ticked. In this case the graph will keep the same axis settings as for the previous set of data samples. Additional check boxes are provided to give the user control over the vertical and horizontal grids and data points. The lower third of the screen will show either a Fast Fourier Transform (FFT) of the data or a Histogram which shows the number of occurrences of each particular code read back. The FFT (the default option) is typically used when the user is concerned with examining an ADC's performance in the frequency domain while the Histogram will give an indication of the ADC's performance to DC signals. The option displayed can be toggled by clicking on the FFT Mode/Histogram Mode button in the top right of the screen. Figure 3 shows how the main screen looks when the Histogram Option is selected. The user can choose to display information from ADC A, ADC B or both on the screen. When the software is in "Display Both" mode, either channel 1 or

# EVAL-AD7866CB

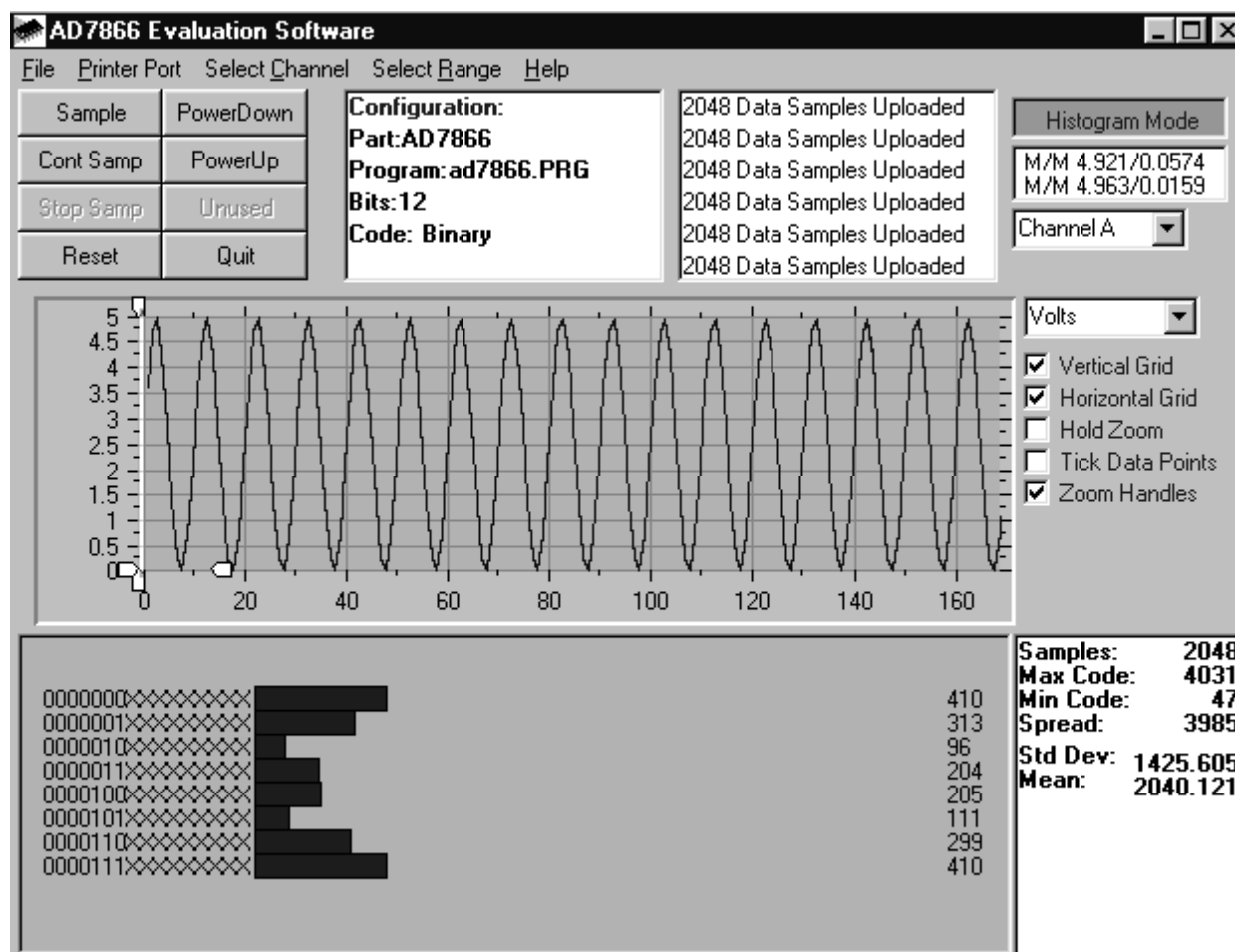


Figure 3. AD7866 Main Screen - Histogram Mode

channel 2 of each ADC is displayed on the same screen. In color, they can be distinguished by light blue (ADC A) or dark blue (ADC B). Information about both ADCs in Histogram mode can not be shown, only either the codes from ADC A or ADC B may be shown. The user can also choose to display either channel 1 or channel 2 of each ADC.

## Setup Screen

The Setup Screen is responsible for allowing the user to load the required configuration file for the evaluation board. There are two configuration files associated with this part. When either is loaded, the software will acquire detailed information about the evaluation board and part connected to the Evaluation Board Controller such as number of bits, maximum sampling rate, output coding, maximum analog input, power supply requirements etc. The configuration files also tell the software the name of the DSP program file which it should download to the Evaluation Board Controller. The file "AD7866.cfg" should be loaded if the analog input range is 0 to  $V_{REF}$  and the output coding is binary and the file "AD7866-1.cfg" should be loaded if the analog input range is 0 to  $2 \cdot V_{REF}$  and the output coding is 2's complement. These files are supplied by Analog Devices with the evaluation board. Figure 4 shows the Setup Screen.

## SETTING UP THE EVALUATION BOARD CONTROLLER

The following text describes how the evaluation board, Evaluation Board Controller and software should be set up for the user to begin using the complete system. The Evaluation Board Controller and 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 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 Software

With the hardware set up the user is now in a position to use the software to control the Evaluation Board Controller and the 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 lists all the available configuration files. The configuration files are text based files which contain information about the particular evaluation board to be tested. The information will cover such things as the part name, number of samples to be taken, default and maximum sampling frequency, power supply



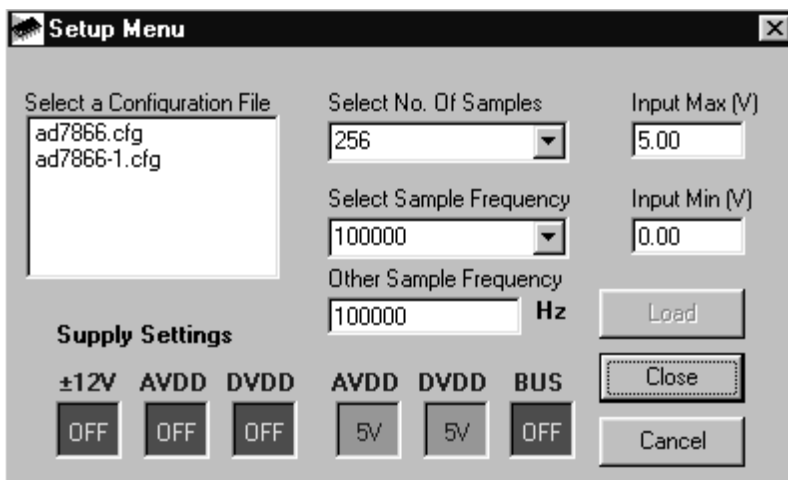


Figure 4. The Setup Screen

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 relevant 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 menu 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 have been decided, the user can click **Close** to return to the main form.

### 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. The AD7866 evaluation board will run up to 1 MSPS so the user can choose the sampling frequency up to this rate and may also choose the number of samples to be taken. 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 4.

**Load Raw Data:** Selecting this option allows the user to load data which had been saved by the software during a previous session.

**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.

**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.

**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.

**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.

### Change Channel

This menu item allows the user to select the channel on each ADC to be converted and displayed.

**Channel 1:** This option selects channel 1 of each ADC to be converted and displayed.

**Channel 2:** This option selects channel 2 of each ADC to be converted and displayed

### Help

This menu item gives information about the current revision of software for the particular evaluation board being used.

# EVAL-AD7866CB

## 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:AD7866
programname:ad7866.PRG

samplefrequency:10000
maxsamplefrequency:1000000
samples:8192

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

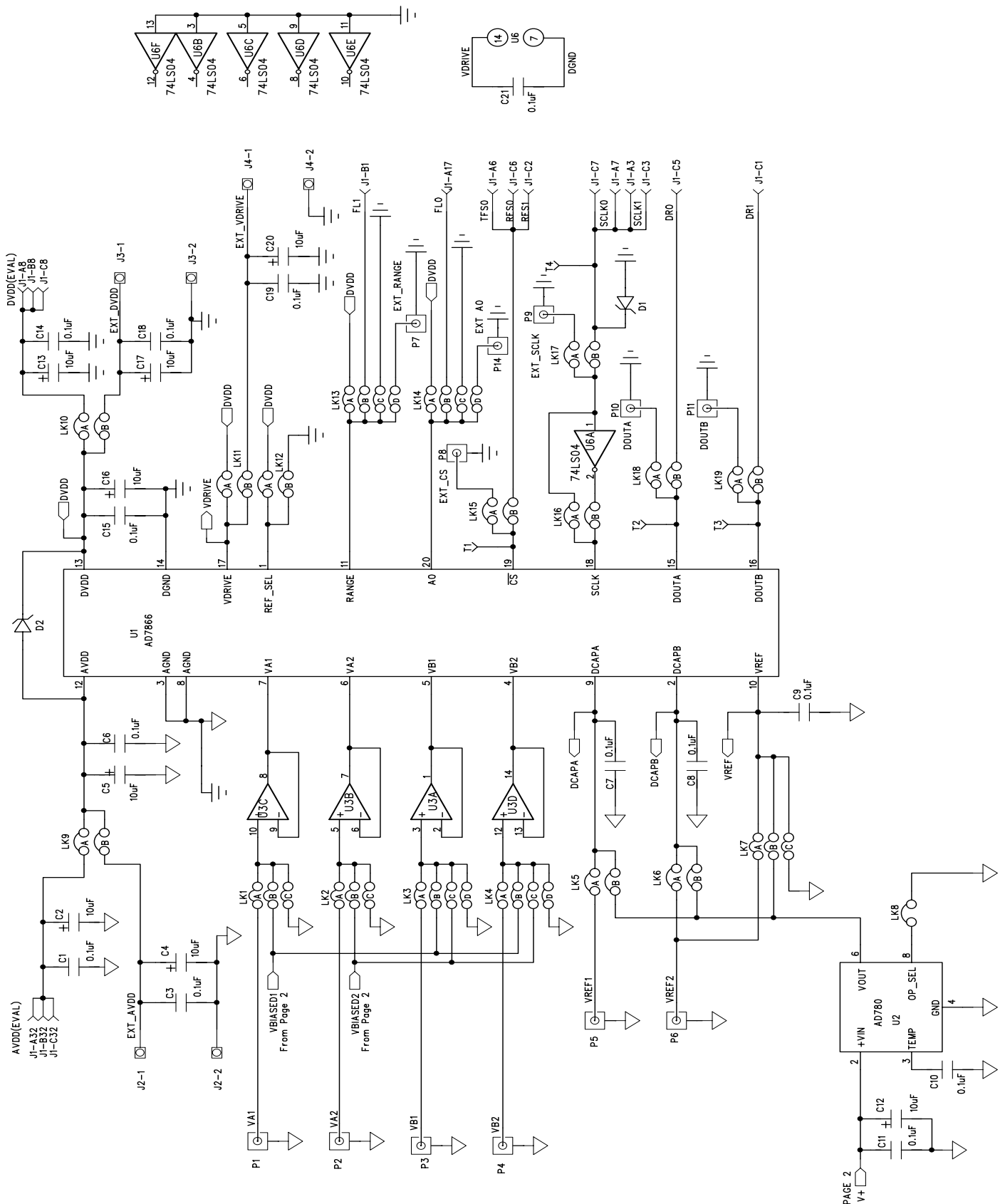


Figure 5a. AD7866 Evaluation Board Circuit Diagram - Page 1

# EVAL-AD7866CB

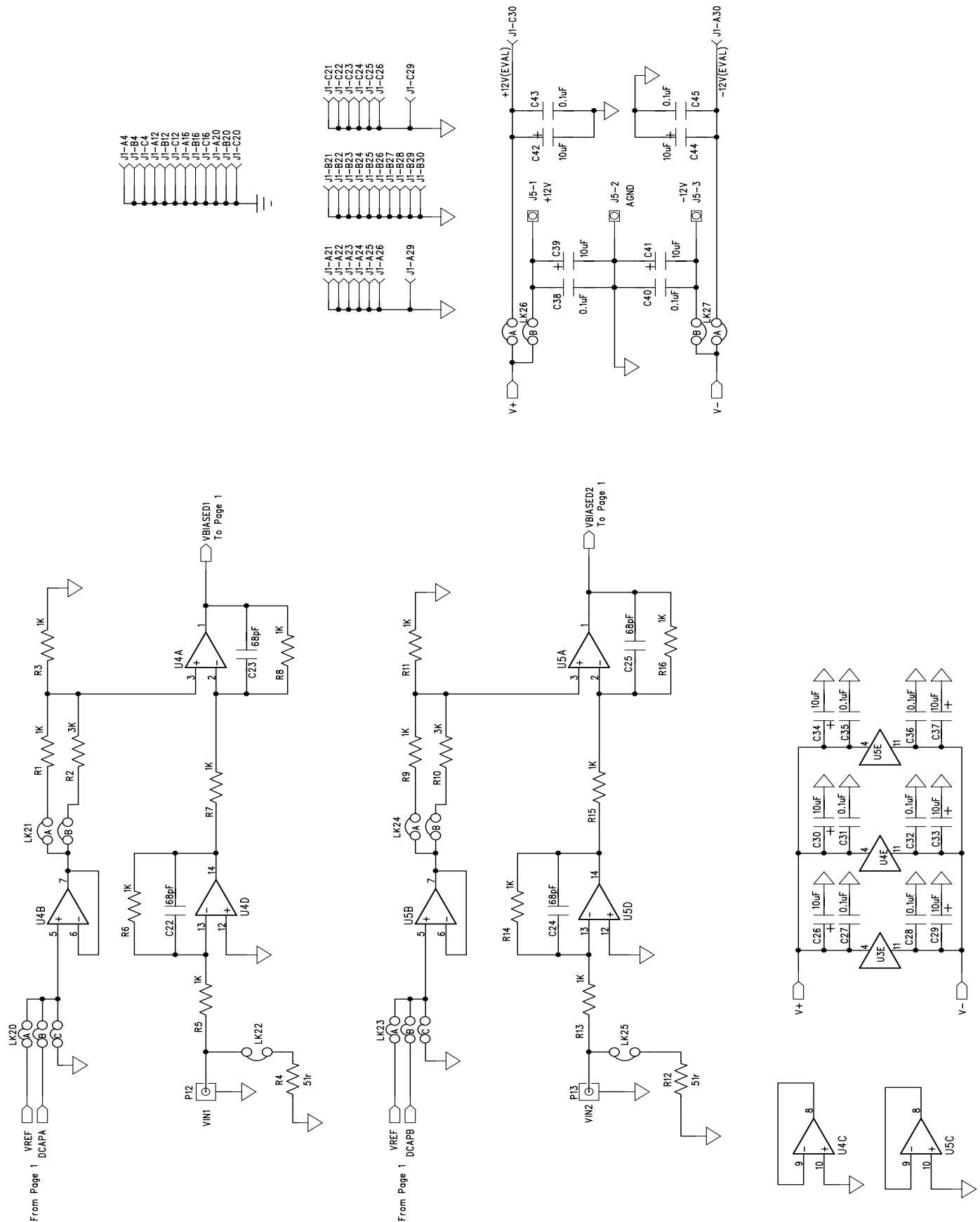


Figure 5b. AD7866 Evaluation Board Circuit Diagram - Page 2

Table V. AD7866 Evaluation Board Bill Of Materials

Qty	Part Type	Reference Designator	Manuf/Disti	Order Number
1	AD7866ARU	U1	ADI	AD7866ARU
1	AD780AN	U2	ADI	AD780AN
3	AD713JN	U3-5	ADI	AD713JN
1	DM74LS04N	U6	Fairchild	FEC 373-450
23	0.1uF 50 V X7R (0805 size)	C1 C3 C6-11 C14-15 C18-19 C21 C27 C28 C31-32 C35-36 C38 C40 C43 C45	AVX	FEC 499-687
18	10uF 16V Tant. TAJ-B Size	C2 C4-5 C12-13 C16-17 C20 C26 C29-30 C33-34 C37 C39 C41-42 C44	Multicomp	FEC 498-737
4	68pF 50 V NPO	C22-25	BC Components	FEC 722-066
12	1K $\Omega$ $\pm$ 1% (0805 Size)	R1 R3 R5-9 R11 R13-16	Multicomp	FEC 911-859
2	3K $\Omega$ $\pm$ 1% (0805 Size)	R2 R10	Multicomp	FEC 771-399
2	51 $\Omega$ $\pm$ 1% (0805 Size)	R4 R12	Multicomp	FEC 771-181
2	SD103C Schottky Diode	D1		SD103C
1	96 Pin 90° DIN41612 Plug	J1	Siemens	FEC 269-931
3	2 pin terminal block	J2-4	Lumberg	FEC 151-785
1	3 pin terminal block	J5	Lumberg	FEC 151-786
5	3-Way jumper (2x3)	LK1-2 LK7 LK20 LK23	Harwin	FEC 511-780
4	4-Way jumper (2x4)	LK3-4 LK13-14	Harwin	FEC 511-791
15	2-Way jumper (2x2)	LK5-6 LK9-12 LK15-19 LK21 LK24 LK26-27	Harwin	FEC 148-535
3	1-Way jumper (2x1)	LK8 LK22 LK25	Harwin	FEC 511-705
24	Shorting Link	LK1 - LK27	Berg	FEC 528-456
14	Gold 50 $\Omega$ SMB Jack	P1-14	M/ACOM	FEC 310-682
4	Testpoint	T1-T4	W HUGHES	FEC 240-333
64	Ultralow Profile Sockets	U2 U3 U4 U5 U6	Harwin	FEC 519-959
4	Stick-on Feet	Each Corner	3M	FEC 148-922

# EVAL-AD7866CB

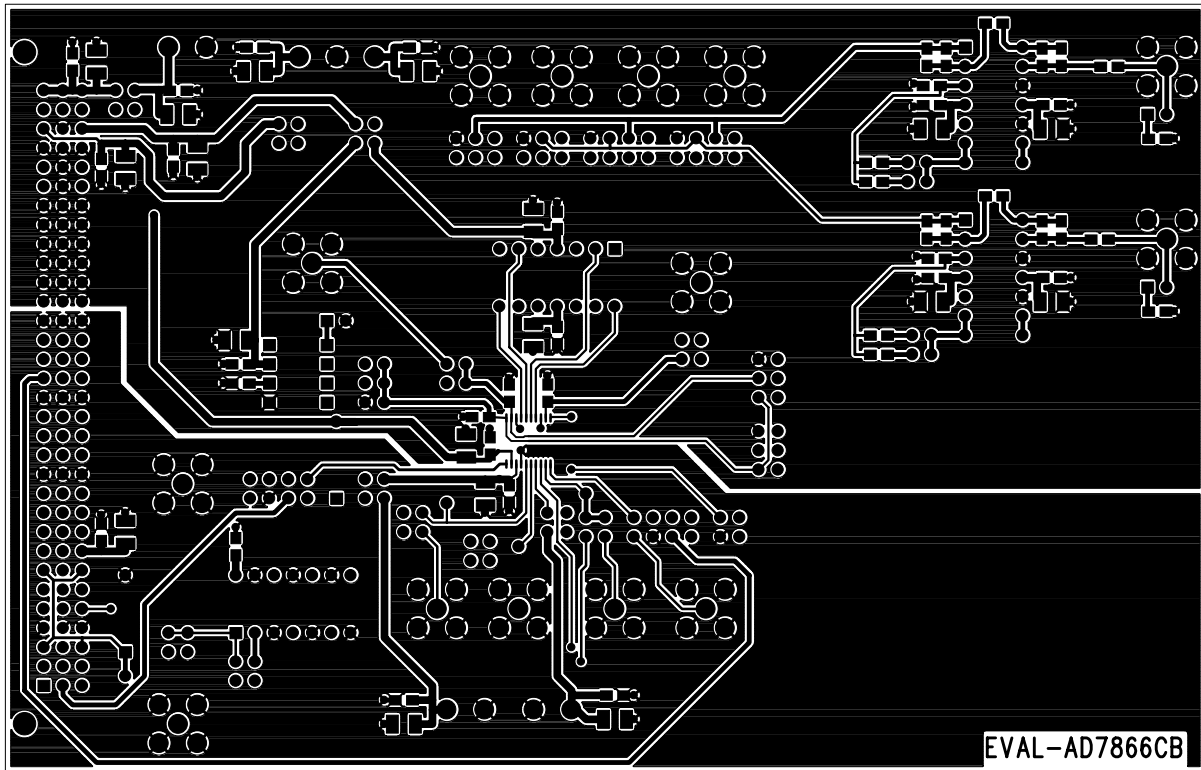


Figure 6. Component Side Artwork

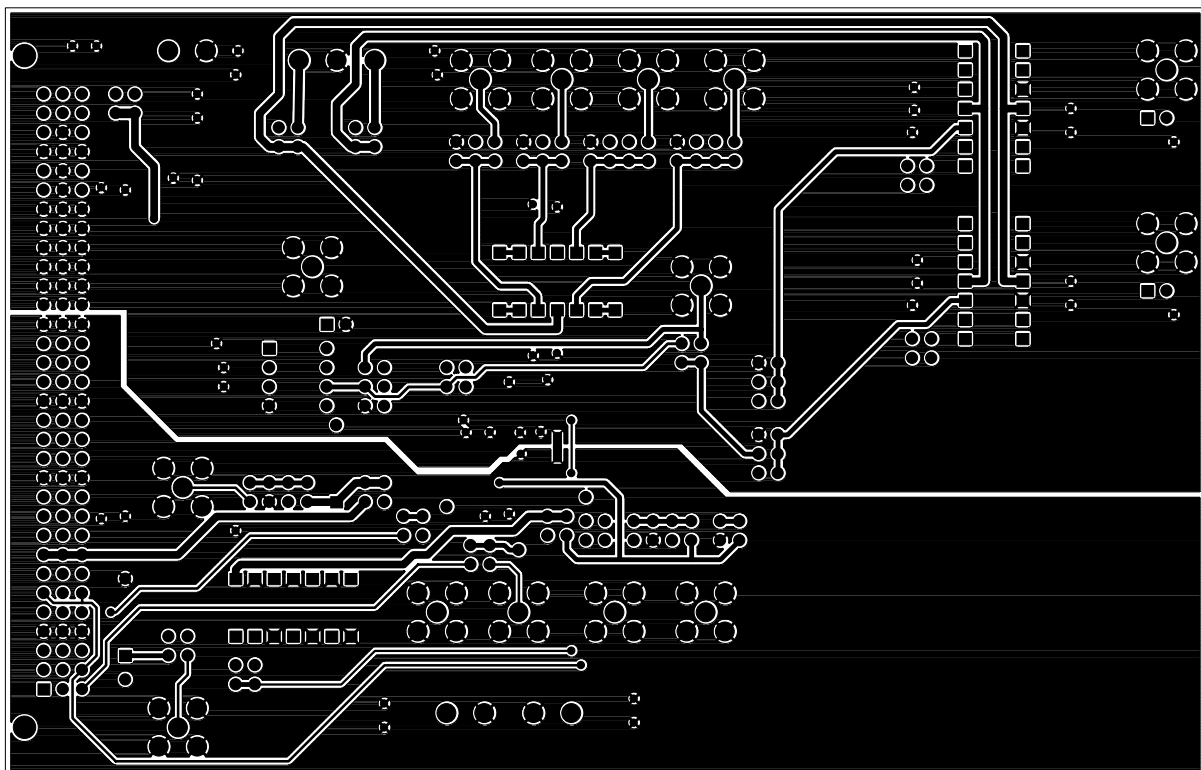


Figure 7. Solder Side Artwork

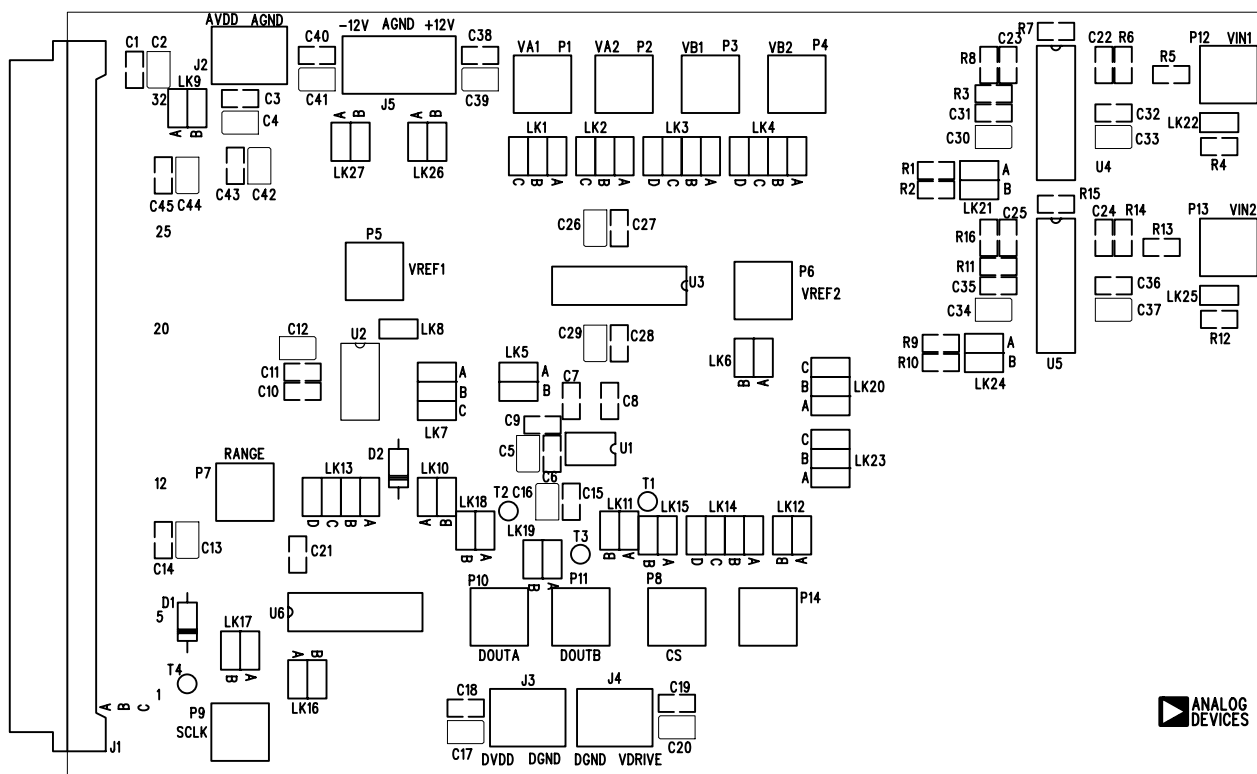


Figure 8. AD7866 Evaluation Board Component Placement Drawing.

EVAL-AD7866CB