

# **BUF18830EVM User Guide and Software Tutorial**

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This user's guide describes the characteristics, operation, and use of the BUF18830EVM evaluation board. It discusses how to set up and configure the software and hardware, and reviews various aspects of the program operation. Throughout this document, the terms *evaluation board*, *evaluation module*, and *EVM* are synonymous with the BUF18830EVM. This document also includes information regarding operating procedures and input/output connections, an electrical schematic, printed circuit board (PCB) layout drawings, and a parts list for the EVM.

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## 1 Overview

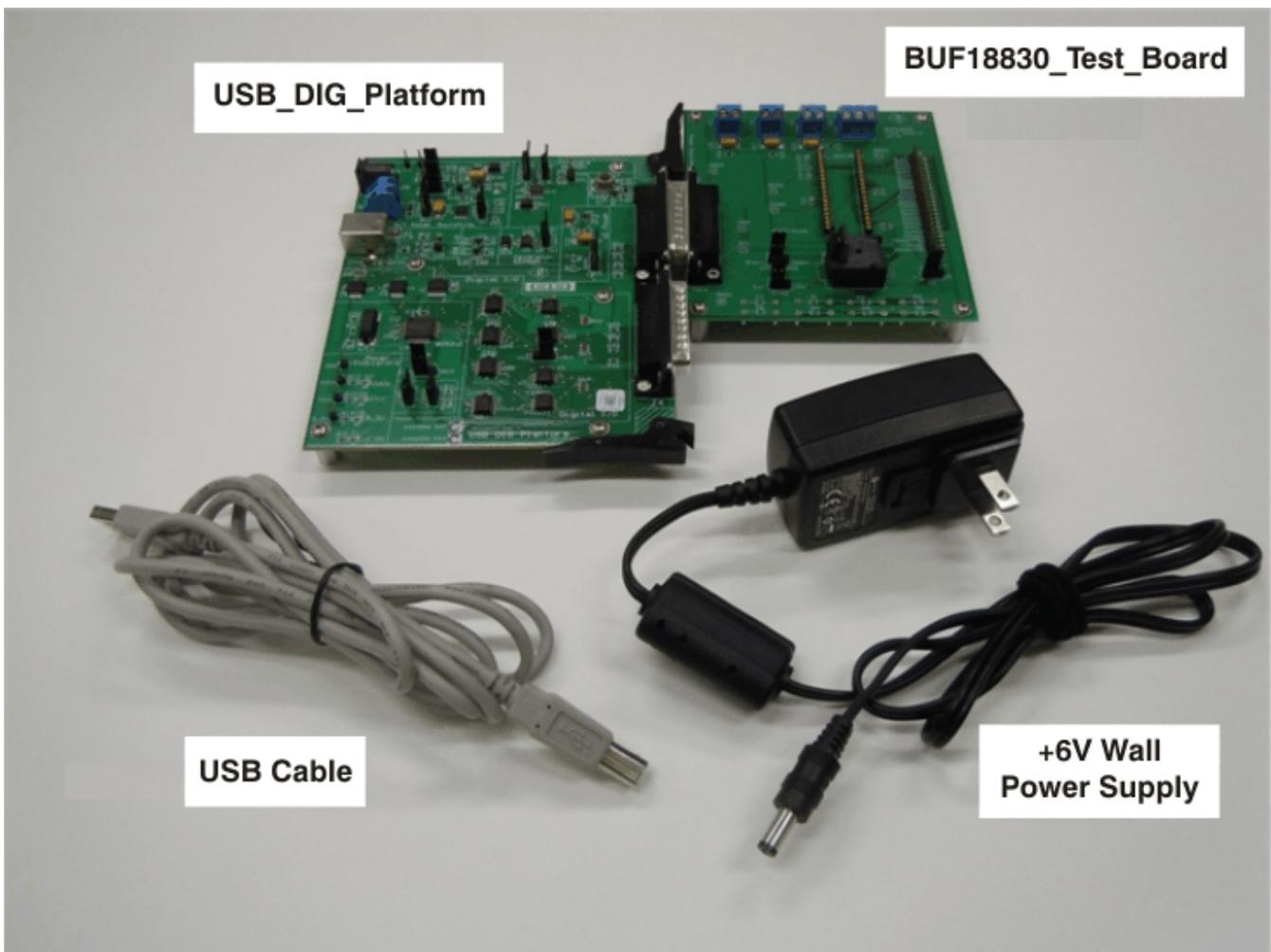
The [BUF18830](#) is a programmable gamma-voltage generator and  $V_{COM}$  calibrator. This device offers 18 programmable gamma channels and two programmable  $V_{COM}$  channels, making it ideal for 10-bit source TFT-LCD reference drivers. The BUF18830EVM is a platform for evaluating the performance of the BUF18830 under various signal, reference, and supply conditions. This document gives a general overview of the BUF18830EVM, and provides a general description of the features and functions to be considered while using this evaluation module.

### 1.1 BUF18830EVM Kit Contents

Table 1 summarizes the contents of the BUF18830EVM kit. Figure 1 shows all of the included hardware. Contact the [Texas Instruments Product Information Center](#) nearest you if any component is missing. It is highly recommended that you also check the [BUF18830 product folder](#) on the TI web site at [www.ti.com](http://www.ti.com) to verify that you have the latest versions of the related software.

**Table 1. BUF18830EVM-USB Kit Contents**

Item	Quantity
BUF18830 PCB Test Board	1
USB_DIG_Platform PCB	1
USB Cable	1
+6V Power Supply	1
User's Guide CD-ROM	1



**Figure 1. Hardware Included with BUF18830EVM Kit**

## 1.2 Related Documentation from Texas Instruments

The following documents provide information regarding Texas Instruments' integrated circuits used in the assembly of the BUF18830EVM. This user's guide is available from the TI web site under literature number **SBOU103**. Any letter appended to the literature number corresponds to the document revision that is current at the time of the writing of this document. Newer revisions may be available from the [TI web site](#), or call the Texas Instruments' Literature Response Center at (800) 477-8924 or the Product Information Center at (972) 644-5580. When ordering, identify the document by both title and literature number.

### Related Documentation

Document	Literature Number
BUF18830 Product Data Sheet	<a href="#">SBOS524</a>
USB_DIG_Platform User Guide	<a href="#">SBOU058</a>

## 2 BUF18830EVM Hardware Setup

Figure 2 shows the system setup for the BUF18830EVM. The PC runs software that communicates with the USB\_DIG\_Platform. The USB\_DIG\_Platform generates the analog and digital signals used to communicate with the BUF18830. Connectors on the BUF18830 test board allow the user to connect to the system under test conditions and monitor the power, current, and voltage.

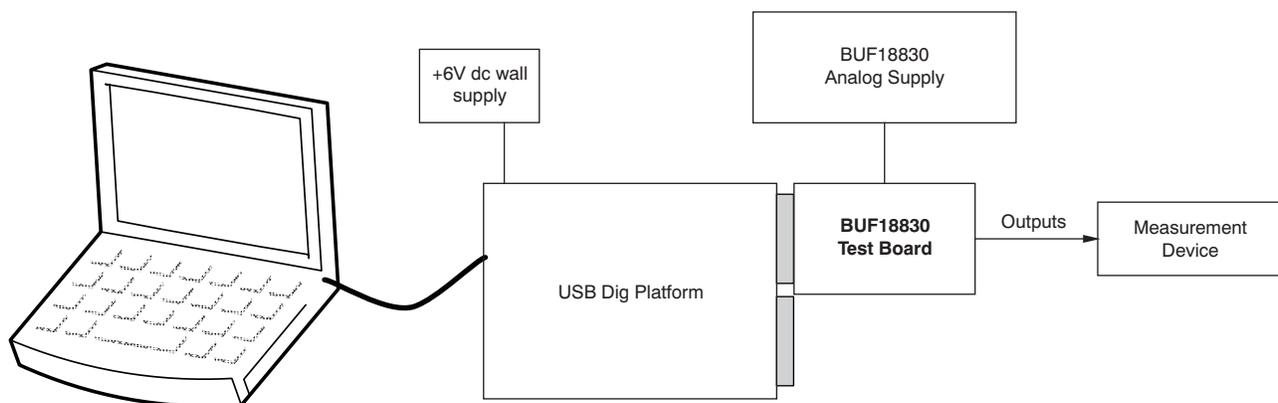
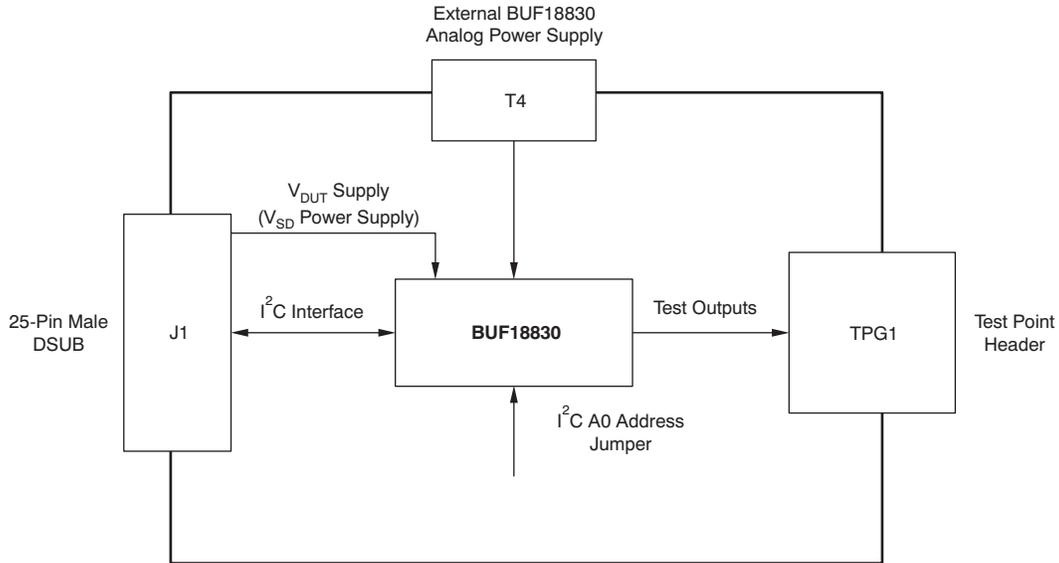


Figure 2. BUF18830EVM Hardware Setup

## 2.1 Theory of Operation for BUF18830 Hardware

A block diagram of the BUF18830 test board hardware setup is shown in Figure 3. The functionality of the PCB is such that it provides connections to the I<sup>2</sup>C™ interface and general-purpose inputs/outputs (GPIOs) on the USB\_DIG\_Platform board. It also provides connection points for external connections of the shunt voltage, bus voltage, and ground.



**Figure 3. BUF18830EVM Board Block Diagram**

## 2.2 Signal Definitions of J1 (25-Pin Male DSUB)

Table 2 lists the various signals connected to J1 on the BUF18830EVM test board.

**Table 2. Signal Definition of J1 (25-Pin Male DSUB) on BUF18830EVM Board**

Pin on J1	Signal	BUF18830 Pin
1	N/C	No connection
2	N/C	No connection
3	N/C	No connection
4	N/C	No connection
5	N/C	No connection
6	N/C	No connection
7	N/C	No connection
8	N/C	No connection
9	I2C_SCK	No connection
10	I2C_SDA2	No connection
11	N/C	No connection
12	I2C_SCK_ISO	I <sup>2</sup> C clock signal (SCL) channel 1; can be disconnected using a switch
13	I2C_SDA_ISO	I <sup>2</sup> C data signal (SDA) channel 1; can be disconnected using a switch
14	N/C	No connection
15	N/C	No connection
16	N/C	No connection
17	V <sub>DUT</sub>	Switched 3V/5V power. Note that when power is switched off, digital I/O is also switched off.
18	V <sub>CC</sub>	No connection
19	N/C	No connection
20	N/C	No connection
21	GND	Common ground connection
22	SPI_SCK	No connection
23	SPI_CS1	No connection
24	SPI_DOUT1	No connection
25	SPI_DIN1	No connection

### 2.2.1 Theory of Operation for USB\_DIG\_Platform

Figure 4 shows the block diagram for the USB\_DIG\_Platform. This platform is a general-purpose data acquisition system that is used on several different Texas Instruments evaluation modules. The details of its operation are included in a separate document, [SBOU058](#) (available for download at [www.ti.com](#)). The block diagram shown in Figure 4 gives a brief overview of the platform. The primary control device on the USB\_DIG\_Platform is the [TUSB3210](#).

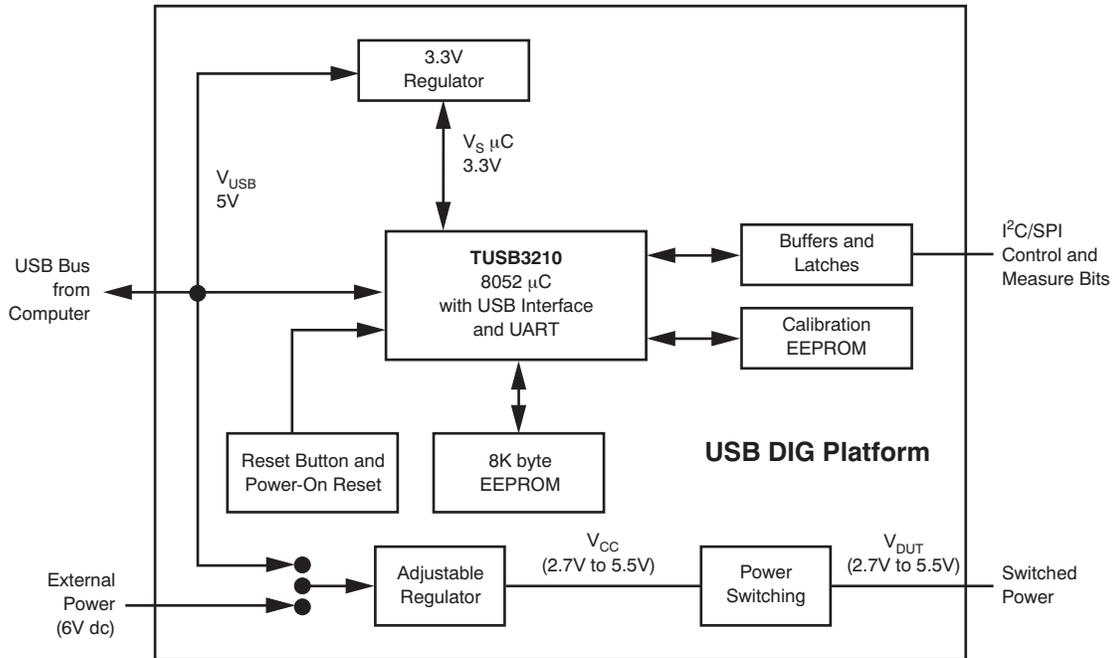


Figure 4. USB\_DIG\_Platform Block Diagram

## 3 BUF18830EVM Hardware Overview

The BUF18830EVM hardware overview involves connecting the two PCBs of the EVM together, applying power, connecting the USB cable, and setting the jumpers. This section presents the details of this procedure.

### 3.1 Electrostatic Discharge Warning

#### CAUTION

Many of the components on the BUF18830EVM are susceptible to damage by electrostatic discharge (ESD). Customers are advised to observe proper ESD handling precautions when unpacking and handling the EVM, including the use of a grounded wrist strap at an approved ESD workstation.

### 3.2 Typical Hardware Connections

To set up the BUF18830EVM hardware, connect the two PCBs of the EVM together (that is, the BUF18830 Test Board and USB\_DIG\_Platform board) via a 25-pin DSUB connector, and apply a power source. The external connections may be the real-world system that the BUF18830 will be incorporated into. Figure 5 illustrates the typical hardware connections.

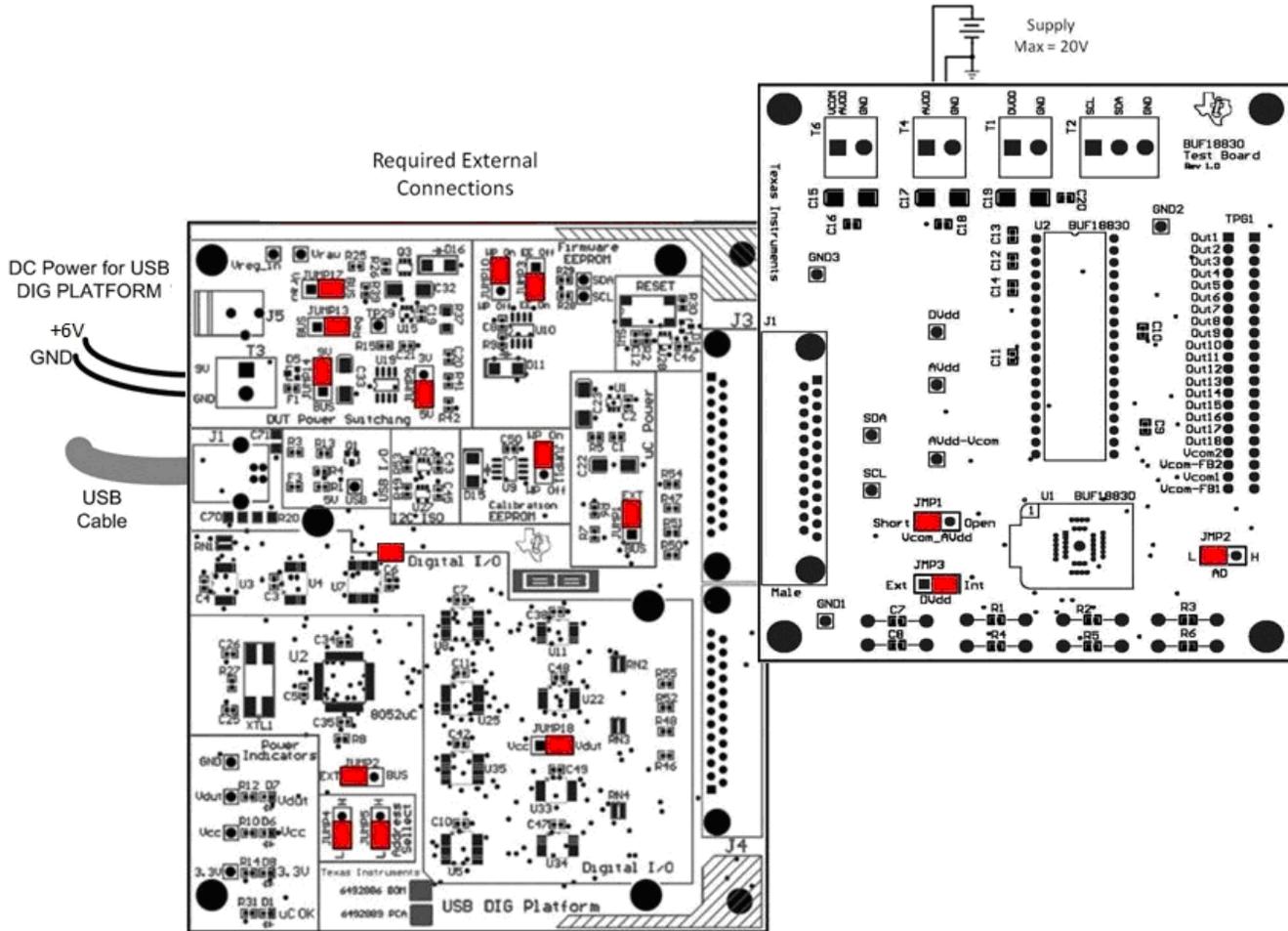


Figure 5. Typical Hardware Connections for BUF18830EVM

### 3.3 Connecting the Hardware

To connect the two PCBs of the BUF18830EVM together, gently push on both sides of the DSUB connectors (as shown in Figure 6). Note that the USB\_DIG\_Platform board has two DSUB connectors; either may be used. Make sure that the two connectors are completely pushed together; loose connections may cause intermittent operation.

### 3.4 Connecting Power

After the two parts of the BUF18830EVM are conjoined, connect a +6V wall supply to the USB\_DIG\_Platform board, as Figure 6 shows. Always connect power before connecting the USB cable. If you connect the USB cable before connecting the power, the computer will attempt to communicate with an unpowered device that will not be able to respond.

In addition, the BUF18830EVM also requires an external power source. This source is not included with the kit. Its voltage may differ depending on your specific testing needs. The source will be used to provide dc supply voltage to the BUF18830 test board.

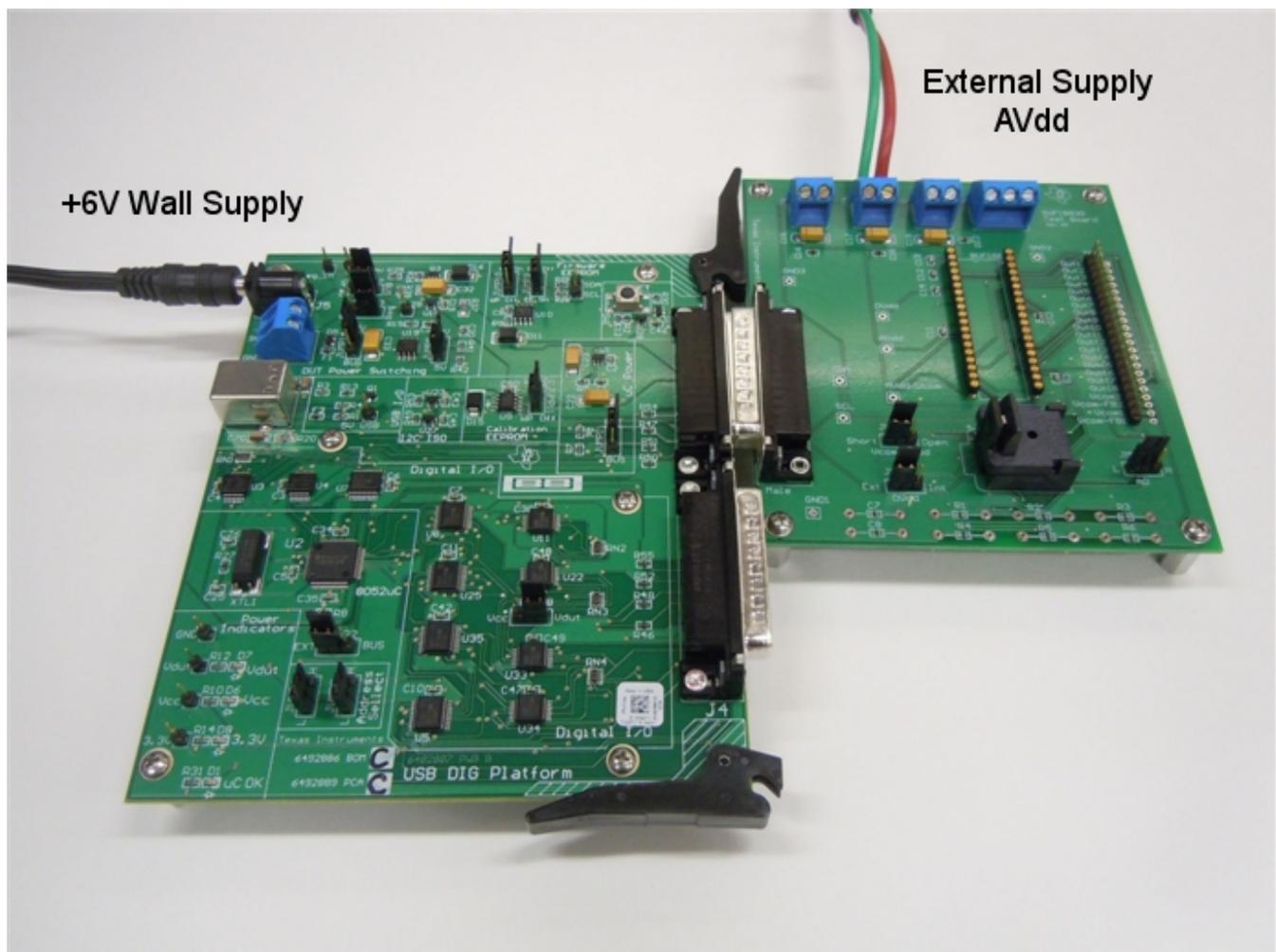
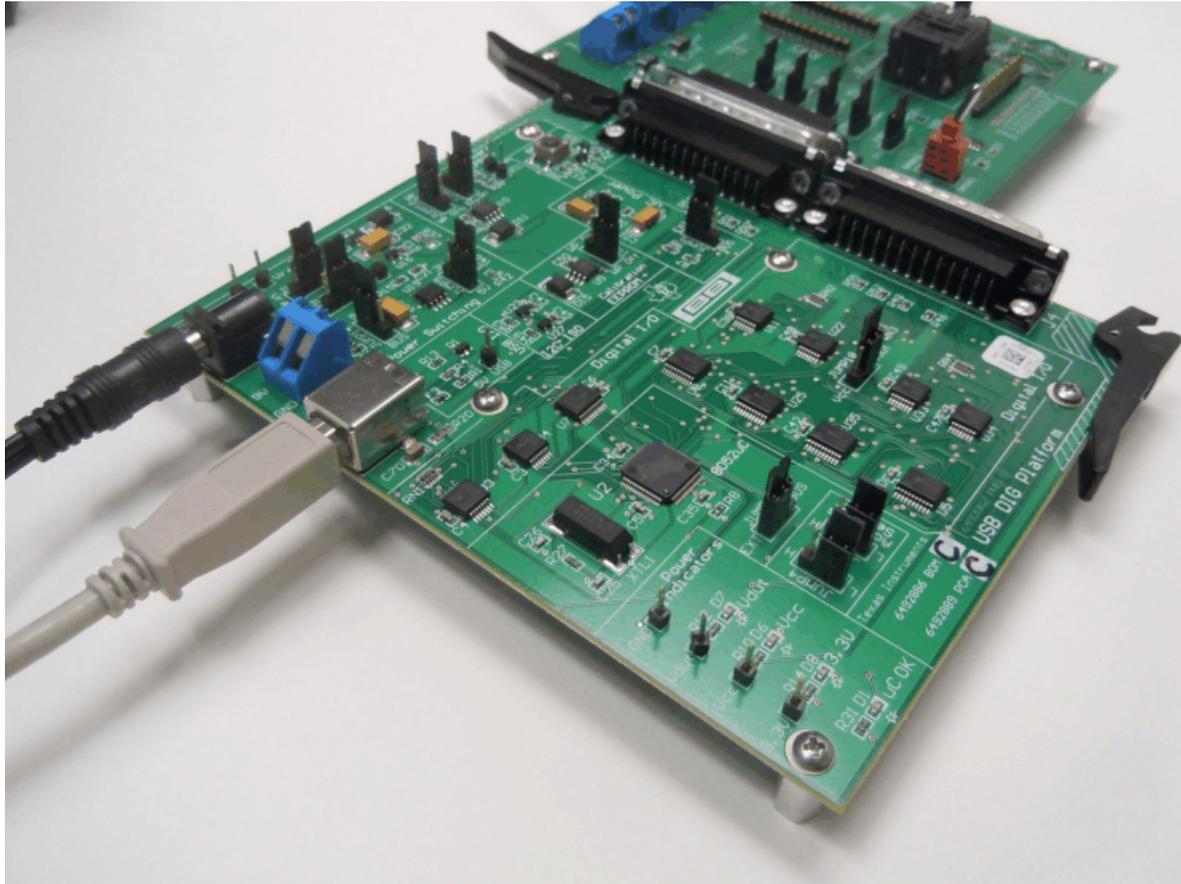


Figure 6. Connecting External Power to the EVM

### 3.5 Connecting the USB Cable to the BUF18830EVM

Once power is connected, the USB cable must be connected to the USB\_DIG\_Platform, as shown in [Figure 7](#). Note that the BUF18830EVM test board and the USB\_DIG\_Platform board must each be powered on before connecting the USB cable. Typically, the computer will respond with a *Found New Hardware, USB Device* pop-up dialog. The pop-up window typically changes to *Found New Hardware, USB Human Interface Device*. This pop-up indicates that the device is ready to be used. The USB\_DIG\_Platform uses the human interface device drivers that are part of the Microsoft® Windows® operating system.



**Figure 7. Connecting the USB Cable to the USB\_DIG\_Platform**

In some cases, the Windows *Add Hardware Wizard* may pop up. If this prompt appears, allow the system device manager to install the human interface drivers by clicking **Yes** when requested to install drivers. Windows will confirm installation of the drivers with the message shown in [Figure 8](#).



**Figure 8. Confirmation of USB\_DIG\_Platform Driver Installation**

### 3.6 BUF18830EVM Default Jumper Settings

Figure 9 shows the default jumper configuration for the BUF18830EVM. In general, the jumper settings of the USB\_DIG\_Platform will not need to be changed. You may want to change some of the jumpers on the BUF18830EVM board to match your specific configuration. For example, you may wish to set a specific I<sup>2</sup>C address.

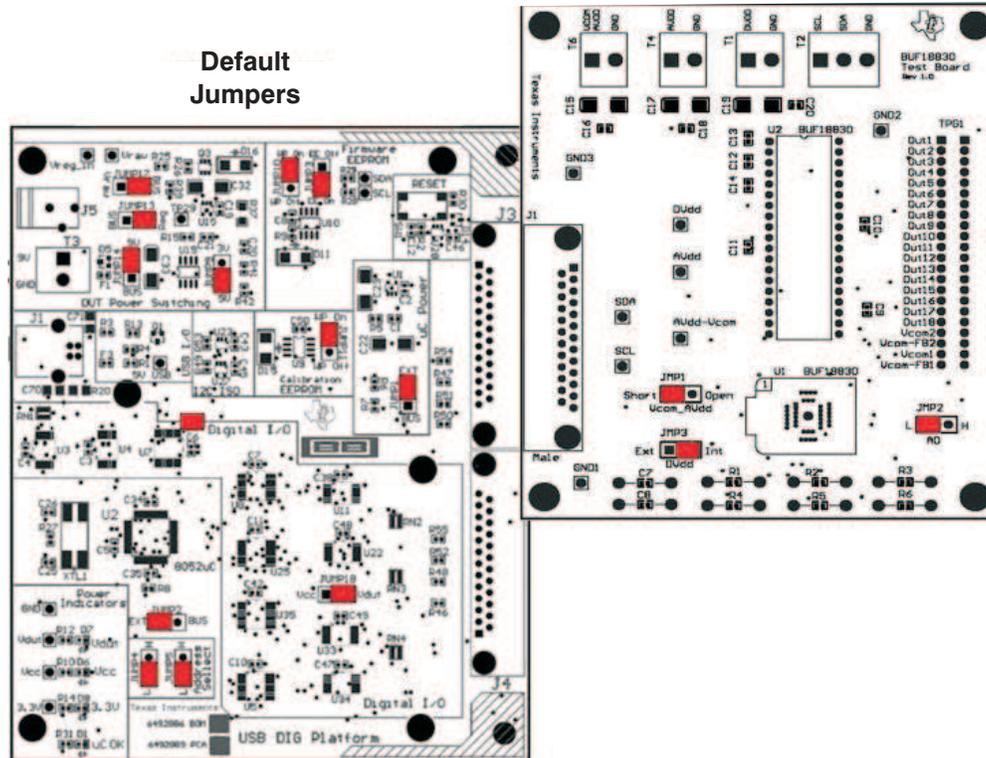


Figure 9. BUF18830EVM Default Jumper Settings

Table 3 summarizes the function of the BUF18830EVM board jumpers. For most applications, Jumpers 1 through 5 are all set to the default positions.

**Table 3. BUF18830EVM Test Board Jumper Functions**

Jumper	Default	Purpose
JMP1	Short	This jumper shorts $V_{COM}$ and $AV_{DD}$ to each other. In the Open position, terminal T6 can be used to set the $V_{COM}$ using an external power source.
JMP2	L	This jumper selects the I <sup>2</sup> C A0 address selection. Two separate I <sup>2</sup> C addresses can be selected, depending upon whether JMP1 is set to high or low.
JMP3	INT	This jumper selects whether the $DV_{DD}$ pin on the BUF18830 is connected to the $V_{DUT}$ signal generated from the USB_DIG_Platform or whether the digital supply pin is connected to terminal T1, allowing for an external supply to power the digital circuitry. The default INT position connects the $DV_{DD}$ pin to the $V_{DUT}$ control signal.

Table 4 summarizes the function of the USB\_DIG\_Platform jumpers. For most applications, the default jumper position should be used. A separate document ([SBOU058](#)) gives details regarding the operation and design of the USB\_DIG\_Platform.

**Table 4. USB\_DIG\_Platform Jumper Functions**

Jumper	Default	Purpose
JUMP1	EXT	This jumper selects external power or bus power. External power is applied on J5 or T3 (9V dc). Bus power is 5V from the USB bus. External power is typically used because the USB Bus power is noisy.
JUMP2	EXT	Same as JUMP1.
JUMP3	EE ON	This jumper determines where the TUSB3210 will load the USB_DIG_Platform firmware upon power-up or reset. The <i>EE Off</i> position is used for development for development or firmware update.
JUMP4, JUMP5	L, L	This jumper sets the address for the USB board. The only reason to change from the default setting is if multiple boards are being used.
JUMP9	5V	This jumper selects the voltage of the device under test supply ( $V_{DUT} = 5V$ or $3V$ ). This jumper is typically the only jumper that is changed for most applications.
JUMP10	WP ON	This write protects the firmware EEPROM.
JUMP11	WP ON	This write protects the calibration EEPROM.
JUMP13	REG	Uses the regulator output to generate the $V_{DUT}$ supply. The USB bus can be used as the $V_{DUT}$ supply.
JUMP14	9V	Uses the external power (9V as opposed to the bus).
JUMP17	BUS	While in the BUS position $V_{DUT}$ operation is normal. While in the $V_{RAW}$ position the $V_{DUT}$ supply is connected to an external source. This configuration allows for any value of $V_{DUT}$ between 3V and 5V. <sup>(1)</sup>
JUMP18	$V_{DUT}$	Connects the pull-up on GPIO to the $V_{DUT}$ supply or the $V_{CC}$ supply.

<sup>(1)</sup> **CAUTION:** Adjusting outside of this range will damage the EVM.

### 3.7 BUF18830EVM Features

This section describes some of the hardware features present on the BUF18830EVM test board.

#### 3.7.1 JMP1: $V_{COM}$ Supply Control Setting

Jumper JMP1 selects where the BUF18830  $V_{COM}$  supply pin is connected. If JMP1 is set to the SHORT position, the  $V_{COM}$  supply pin is connected to the  $AV_{DD}$  pin.

When JMP1 is set in the OPEN position, an external supply connected to terminal T6 can be used to provide the  $V_{COM}$  supply voltage for the BUF18830.

#### 3.7.2 JMP2: I<sup>2</sup>C Address Hardware Setting

Jumper JMP2 is used to set the hardware setting for the A0 I<sup>2</sup>C address pin on the BUF18830. Using JMP2, the A0 address can be set to either a logic '1' or a logic '0' to allow for two unique I<sup>2</sup>C addresses. See [Section 5.2.1](#) on how to configure the BUF18830EVM software to match the JMP2 hardware setting.

#### 3.7.3 JMP3: $DV_{DD}$ Control Setting

Jumper JMP3 selects where the BUF18830 digital supply pin is connected. If JMP3 is set in the INT position, the  $DV_{DD}$  pin is connected to the switchable  $V_{DUT}$  signal generated from the USB\_DIG\_Platform. This voltage can be set to either +3.3V or +5V depending on how JUMP9 on the USB\_DIG\_Platform is set. While JMP3 is set to the INT position, the  **$DV_{DD}$  Power** button on the BUF18830 software is able to control whether the  $V_{DUT}$  supply voltage is turned on or off.

When JMP3 is set in the EXT position, an external supply connected to terminal T1 can be used to provide the digital supply voltage for the BUF18830.

#### 3.7.4 BUF18830 Device Placement

The BUF18830EVM allows the user two separate locations on the board where the BUF18830 test device can be installed.

The U1 location on the BUF18830 test board is a 38-pin QFN test socket that allows the user to evaluate and program many devices very quickly. One drawback to this socket is that there are no connections to the BUF18830 PowerPAD™. Because of this drawback, while in this socket, the BUF18830 cannot operate at its full output capability as a result of thermal dissipation limitations.

The U2 location allows for a BUF18830 device that is soldered down on a DIP adapter board to be installed on the BUF18830 test board. The output capability of the BUF18830 that is soldered on this adapter board can be fully evaluated. The PowerPAD of this soldered BUF18830 unit is connected correctly, and allows the device to dissipate the necessary power while being evaluated.

#### CAUTION

Only one location should be populated at a time. The use of both locations simultaneously will damage one or both of the devices being tested.

#### 3.7.5 Terminal Strip TPG1

Terminal strip TPG1 provides the individual output signals on a single row of headers as well as a row of vias. This footprint provides the user with multiple options regarding how to interface the output signals of the BUF18830 with the available display panel. Users can develop a custom cable to connect the headers to their respective panels directly, or to solder directly to the individual vias.

### 3.7.6 Resistors R1 to R6 for Vcom1/Vcom2

The BUF18830EVM test board ships with components R1 through R6 unpopulated; however, it is essential that resistors R1 and R2 are populated in order for Vcom1 to function properly. Furthermore, resistors R4 and R5 must be populated in order for Vcom2 to function properly.

For Vcom1, R4 is used to improve the stability of the feedback as well as to limit the amount of current delivered to the Vcom1 output. Typical values for R4 range from 10Ω to 51Ω. R4 can also generate an active feedback signal that is forwarded to Vcom-FB1 through resistor R6. Resistors R5 and R6 are used together to adjust the gain of the feedback, where the gain is equal to the value of R5/R6. Higher gain results in faster Vcom1 voltage regulation, but produces additional noise and power dissipation; the gain should be adjusted accordingly to your circuit needs.

For Vcom2, R1 is used to improve the stability of the feedback as well as limit the amount of current delivered to the Vcom1 output. Typical values for R1 range from 10Ω to 51Ω. R1 can also generate an active feedback signal that is forwarded to Vcom-FB2 through resistor R3. Resistors R2 and R3 are used together to adjust the gain of the feedback, where the gain is equal to the value of R2/R3. Higher gain results in faster Vcom2 voltage regulation, but produces additional noise and power dissipation; the gain should be adjusted accordingly to your circuit needs.

## 4 BUF18830EVM Software

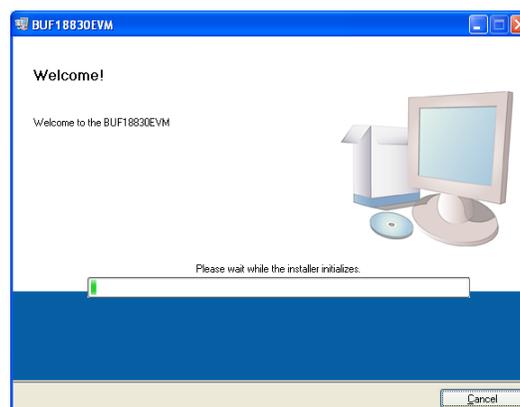
### 4.1 Hardware Requirements

The BUF18830EVM software has been tested on Microsoft® Windows® XP, Vista, and Windows 7 operating systems (OS) with United States and European regional settings.

### 4.2 Software Installation

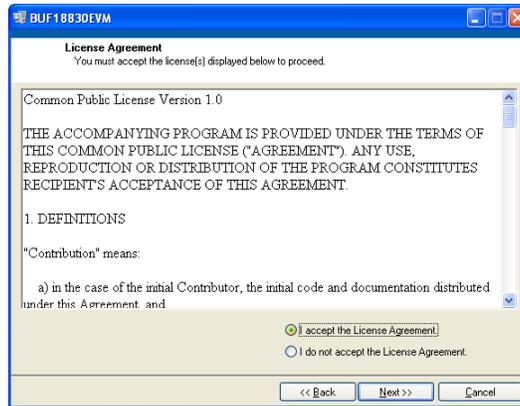
The BUF18830EVM software is included on the CD that is shipped with the EVM kit. It is also available through the [BUF18830EVM product folder](#) on the TI web site. To install the software to a computer, insert the disc into an available CD-ROM drive. Navigate to the drive contents and open the BUF18830EVM software folder. Locate the compressed file (*BUF18830EVM.zip*) and open it using WinZIP® or a similar file compression program; extract the BUF18830EVM files into a specific BUF18830EVM folder (for example, *C:\BUF18830EVM*) on your hard drive.

Once the files are extracted, navigate to the BUF18830EVM folder you created on the hard drive. Locate the *setup.exe* file and execute it to start the installation. The BUF18830 software installer file then begins the installation process as shown in [Figure 10](#).

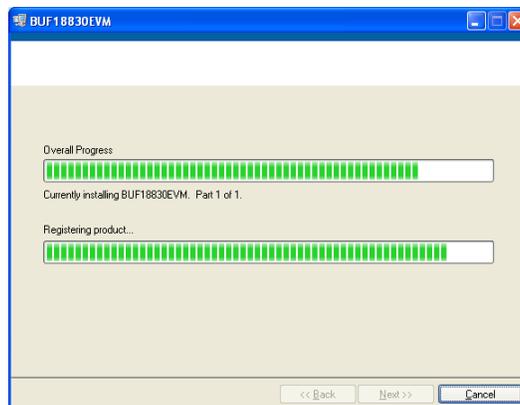


**Figure 10. BUF18830EVM Software Installation**

After the installation process initializes, the user is given the choice of selecting the directory in which to install the program; the default location is *C:\Program Files\BUF18830\* and *C:\Program Files\National Instruments\*. Following this option, two license agreements are presented that must be accepted, as shown in [Figure 11](#). After accepting the Texas Instruments and National Instruments license agreements, the progress bar opens and shows the installation of the software, as [Figure 12](#) illustrates. Once the installation process is completed, click **Finish**.



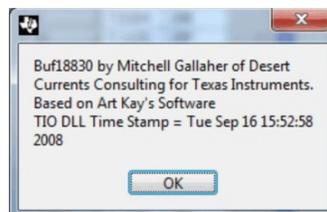
**Figure 11. BUF18830EVM License Agreements**



**Figure 12. BUF18830EVM Software Installation Progress**

### 4.3 Software Description and Set-Up

The BUF18830EVM software allows the user to read and write to all registers in the BUF18830 gamma correction buffer. Furthermore, it allows programming of the OTP register on the BUF18830. The software also permits the user to select either I<sup>2</sup>C address. Press the **About** button, as shown in [Figure 13](#), to verify that you have the latest version of the software.



**Figure 13. BUF18830EVM Software About Button**

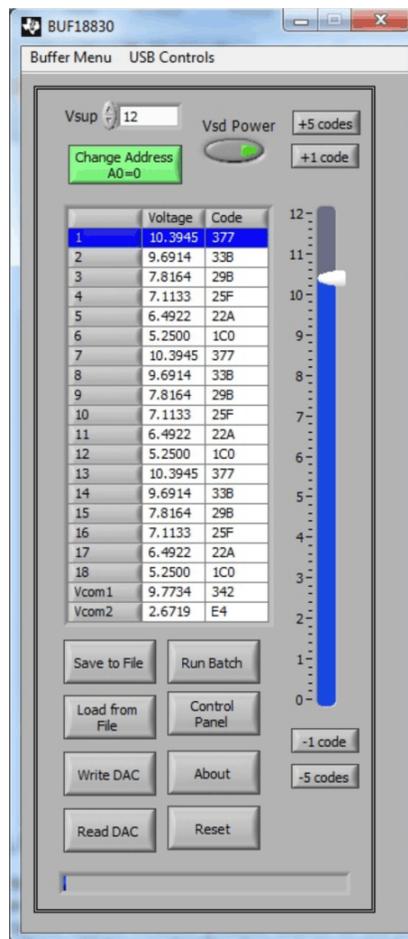
## 5 BUF18830EVM Software Overview

This section discusses how to use the BUF18830EVM software.

### 5.1 Starting the BUF18830EVM Software

The BUF18830 software can be operated through the Windows *Start* menu. From *Start*, select *All Programs*; then select the *BUF18830EVM* program.

Figure 14 illustrates how the software should appear if the BUF18830EVM is functioning properly.



**Figure 14. BUF18830EVM Software Interface**

Figure 15 shows an error that pops up if the computer cannot communicate with the EVM. If you receive this error, first check to see that the USB cable is properly connected on both ends. This error can also occur if you connect the USB cable before the USB\_DIG\_Platform power source. Another possible source for this error is a problem with your PC USB Human Interface Device driver. Make sure that the device is recognized when the USB cable is plugged in; recognition is indicated by a Windows-generated confirmation sound.



**Figure 15. BUF18830EVM Software: Communication Error with the USB\_DIG\_Platform**

## 5.2 Using the BUF18830 Software

### 5.2.1 I<sup>2</sup>C Address Selection

As mentioned previously in the *BUF18830EVM-USB Features* section (see [Section 3.7](#)), jumper JMP2 is used to set the I<sup>2</sup>C address pin of the BUF18830. [Figure 16](#) shows how the hardware and software must both be set to allow for communication between the BUF18830EVM and the software. Without jumper JMP2 and the software address button configured correctly, the software will not be able to communicate with the BUF18830 device.

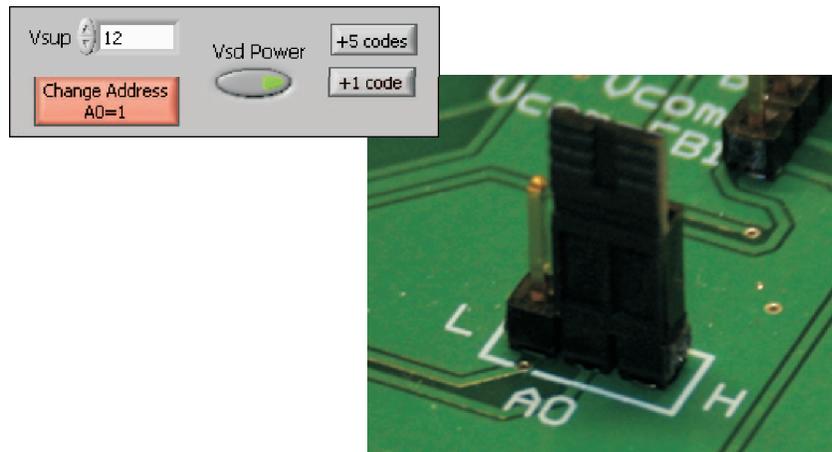


Figure 16. JMP2 Setting For Logic '1'

When JMP2 and the software are set as [Figure 17](#) shows, the second I<sup>2</sup>C address can be configured.

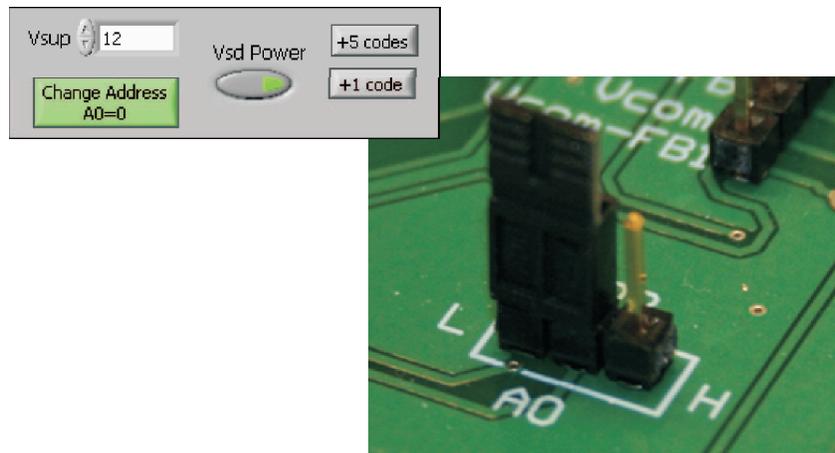
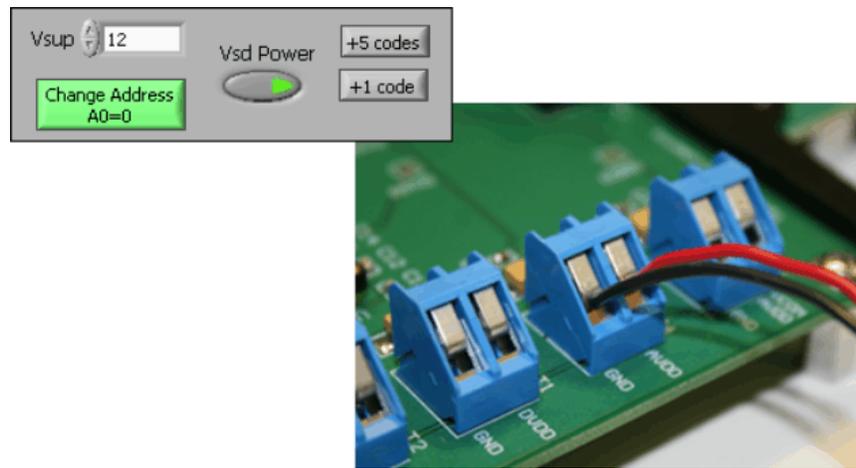


Figure 17. JMP2 Setting for Logic '0'

### 5.2.2 Measuring the Power Supply

You must measure the power supply ( $V_s$ ) with respect to the GND on the BUF18830EVM test board and enter it in the  $V_{SUP}$  field located in the top section of the software interface, as shown in [Figure 18](#).



**Figure 18. Measuring and Entering Power-Supply Voltage**

The voltage out of each DAC is calculated according to the  $V_s$  value entered. The calculation is performed according to [Equation 1](#).

$$V_{\text{DAC\_CHANNEL}} = \frac{V_s \times \text{Code\_in\_decimal}}{1024} \quad (1)$$

For example, changing the value in the channel 6 cell immediately changes the output of channel 6 to 0.996V.

**Example:** Channel 6: Code 44 (hexadecimal) = 68 (decimal)

$$V_{\text{DAC\_CHANNEL}} = \frac{15V \times 68}{1024} = 0.996V$$

### 5.2.3 Read DAC Button

By pressing the **Read DAC** button in the BUF18830EVM software, all of the BUF18830 DAC/ $V_{\text{COM}}$  registers are read to obtain the respective current register contents. Once the read procedure is complete, all of the corresponding text boxes are updated to show the current values present in the DAC/ $V_{\text{COM}}$  registers.

### 5.2.4 Write DAC Button

The method used to write the values in the DAC/V<sub>COM</sub> registers is based on whether or not the Auto Write feature is enabled. The BUF18830 has two methods of writing information into the DAC/V<sub>COM</sub> registers. The first method allows for the output voltage to change immediately after the writing to the DAC register. In the BUF18830EVM software, this mode is configured by enabling the Auto Write feature found in the *Buffer* dropdown menu. In this mode, as an individual channel is written to, the output voltage changes as soon as the user moves to a different text box in the software. The second method of writing to the DAC/V<sub>COM</sub> registers allows for the user to write multiple channels and then have all of the output voltages change at the same time, rather than each channel voltage changing as soon as it is written to.

Disabling the Auto Write feature in the software allows the user to enter all of the values desired for all of the channels and then press the **Write DAC** button to change all of the output voltage of all of the channels at one time. When the Auto Write feature is enabled, no change occurs to the output voltages when the **Write DAC** button is pressed. No change occurs because after the text box for a given channel has been updated, as soon as another item in the software is clicked, the Auto Write feature automatically performs a write command to the updated channel that then updates the output voltage. When in the Auto Write enabled mode, the **Write DAC** button cannot be pressed with different data in the corresponding channel text boxes than the values already stored in the DAC/V<sub>COM</sub> register; thus, no change occurs. [Figure 19](#) shows the location in the Buffer Menu showing the Auto Write feature enabled. Clicking on the Auto Write feature again enables/disables the feature, depending on its current state.



Figure 19. Auto Write Feature Enabled

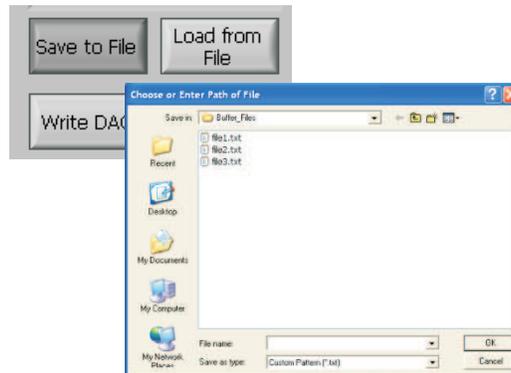
### 5.2.5 Reset Button

Pressing the **Reset** button in the BUF18830EVM software performs two functions. The first function is to call a General-Call Reset for the BUF18830. The status of the DAC/V<sub>COM</sub> registers after this General-Call Reset default to 1000000000, or mid-supply. The second function performed after the Reset button is pressed is that a Read DAC call is made to update the corresponding channel text boxes to the current value for each channel.

### 5.2.6 Save to File Button

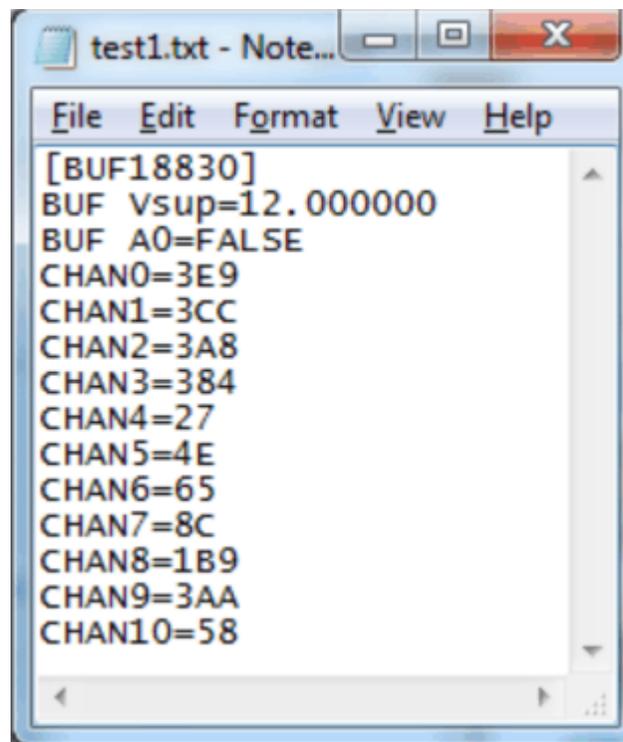
The register configurations of the BUF18830 DACs are displayed in both analog voltage and in hexadecimal (see [Figure 14](#)). The DAC codes (that is, gamma voltages) can be saved into a text file by using the **Save to File** button.

Pressing the **Save to File** button opens a file-save dialog box similar to that shown in [Figure 20](#). Pressing the folder icon creates a new folder on your PC. It is a good idea to create a directory exclusively for BUF18830 DAC code (that is, gamma voltage) files. Enter a unique file name in the *File name* field to store your BUF18830 register information. Press the **OK** button to save the file.



**Figure 20. Save to File Dialog Box Button and Window**

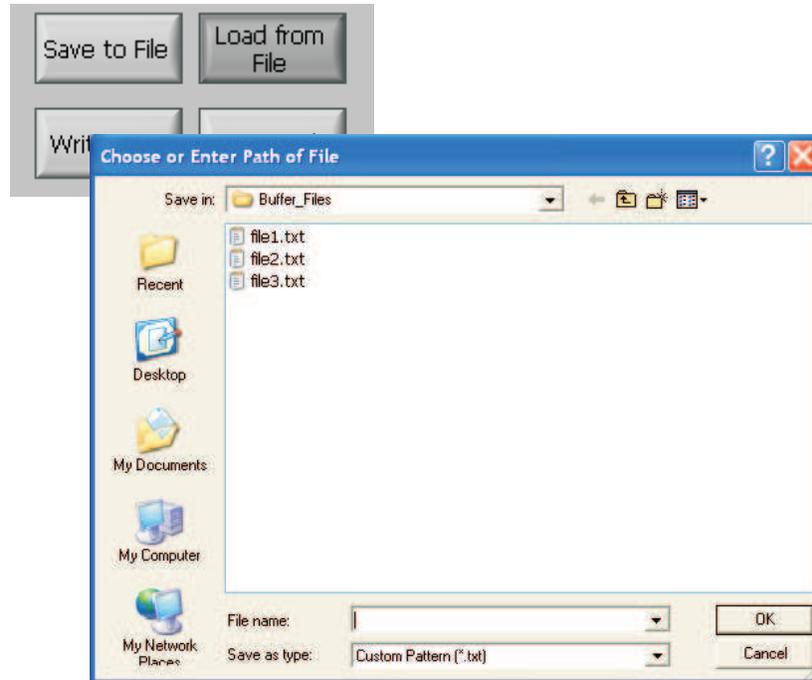
Saved BUF18830 DAC codes (gamma voltages) exist in a text file that can be opened in a text editor, as [Figure 21](#) illustrates.



**Figure 21. File Format of Saved Data**

### 5.2.7 Load From File Button

The BUF18830EVM software is also able to load data saved from previous evaluations. A saved register configuration can be loaded into the BUF18830 using the **Load From File** button, as shown in [Figure 22](#). The program remembers where you saved the last register configuration. Simply select the desired configuration and press *Open*.



**Figure 22. Load From File Button and Window**

### 5.2.8 Changing the DAC/ $V_{COM}$ Analog Voltage

The voltage of any of the DAC or  $V_{COM}$  channels can be adjusted in several ways. First, you can change the voltage by entering the desired voltage directly in the voltage text box. In order to be able to manually type the voltage into the text box, you must first click on the cell to be edited. Click a second time and the cell turns from blue to black, and allows the user to type the updated voltage in the cell. The hexadecimal DAC codes can be entered in the *Code* column in the same manner.

Another method of changing the voltage of a DAC or  $V_{COM}$  channel is through the use of the slider on the main software window. There is only a single slider that is used for all channels. In order to use the slider to adjust the voltage of a particular channel, that channel must first be selected. To select a channel, click on either the channel number, voltage, or code of a particular channel. The entire channel row highlights in blue to show the user that the channel is selected. Adjusting the slider bar then only updates the highlighted channel.

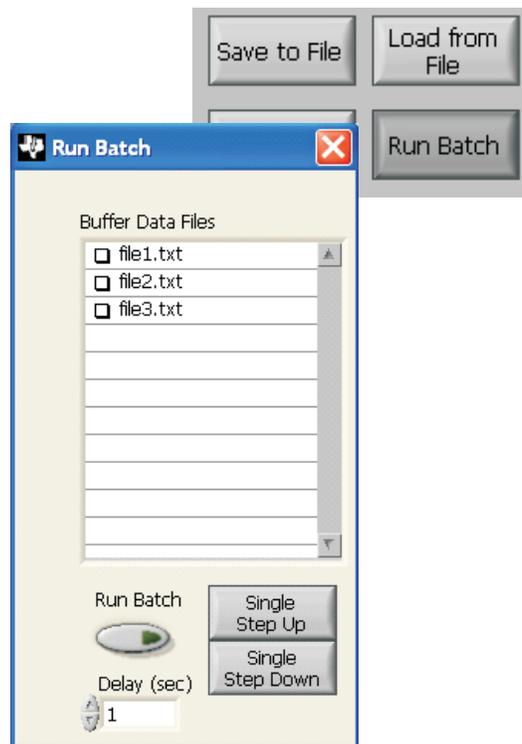
The final method to change DAC/ $V_{COM}$  voltages is through the  **$\pm 1$  Code** and  **$\pm 5$  Code** buttons on the main software window. These buttons allow for fine and coarse adjustments, respectively, to the highlighted channel, giving the user the ability to quickly step the channel output up or down as needed without having to manually enter the changes in the *Code* column.

### 5.2.9 Run Batch Button

The **Run Batch** button (as highlighted in [Figure 23](#)) enables the user to configure the BUF18830 to cycle through different register configurations in a continuous loop. When connected to the end application, this feature can be used to cycle through different gamma settings to determine what the optimal settings must be for a given application.

When the **Run Batch** button is pressed, a new dialog box displays as [Figure 23](#) shows. The delay time is the amount of time allowed between loading new configurations into the BUF18830 DUT.

Use the **Single Step Up** and **Single Step Down** buttons to step through the selected files manually. The currently-selected file name is displayed in the lower left corner area of the dialog box. Double-click on the file names to select them. Once a series of filenames have been selected, the check box turns dark. Double-click on a filename again to unselect it from the batch run.



**Figure 23. Run Batch Dialog Button and Window**

### 5.2.10 Control Panel Button

Pressing the **Control Panel** button brings up a display panel that allows you to adjust each channel using a set of graphical sliders, as shown in [Figure 24](#). Simply drag the slider to adjust the desired channel output. The DAC code and corresponding output value of each channel change automatically. This function is similar to the slider present on the primary BUF18830EVM software window that changes based on the channel that highlighted (as discussed in the [above section](#)).

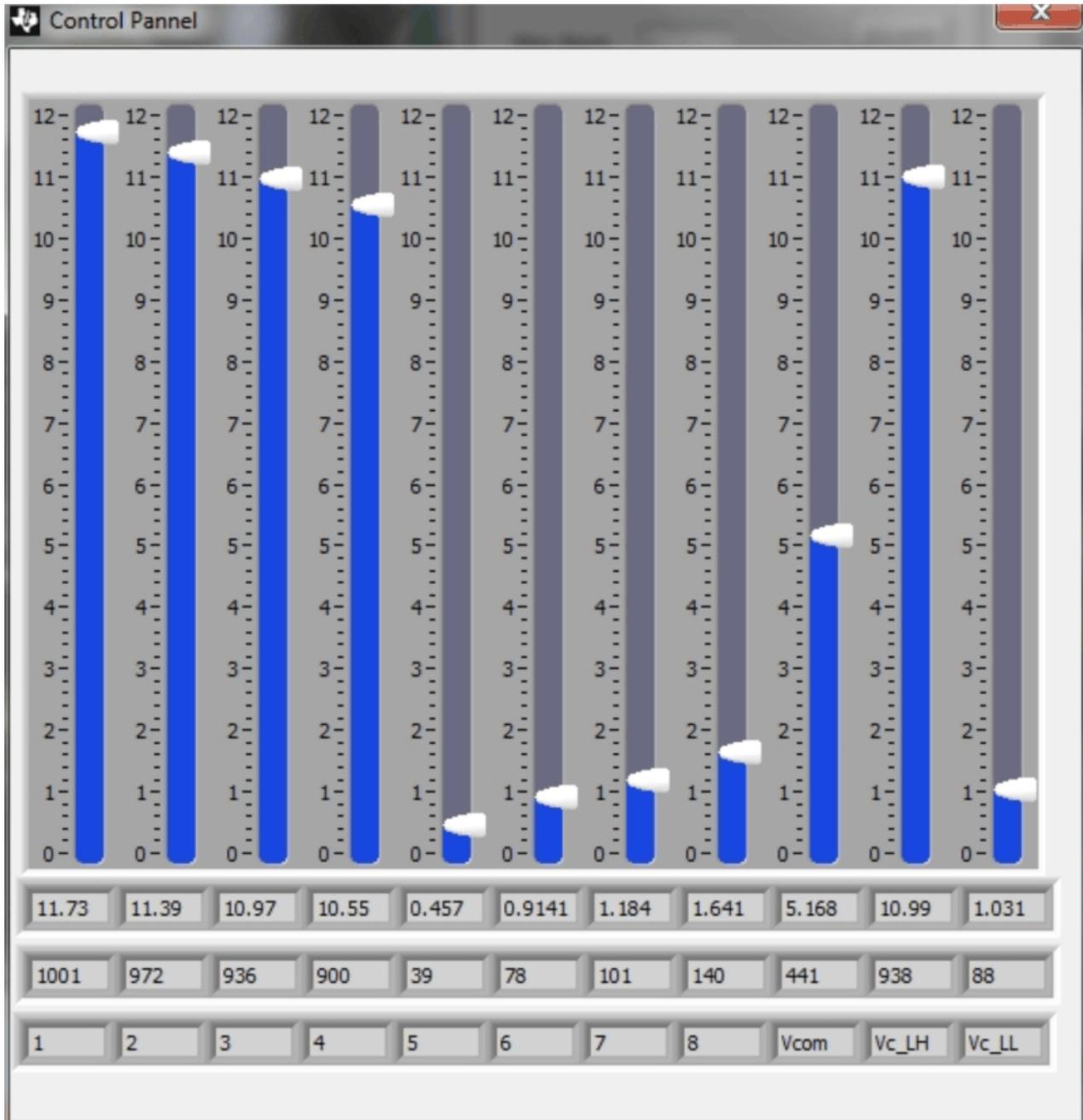


Figure 24. Control Panel Button and Window

## 6 BUF18830EVM Documentation

This section contains the complete bill of materials and schematic diagram for the BUF18830EVM. Documentation information for the USB\_DIG\_Platform can be found in the USB\_DIG\_Platform User's Guide, [SBOU058](#), available at the TI web site at <http://www.ti.com>.

### 6.1 Schematic

Figure 25 shows the schematic for the BUF18830EVM.

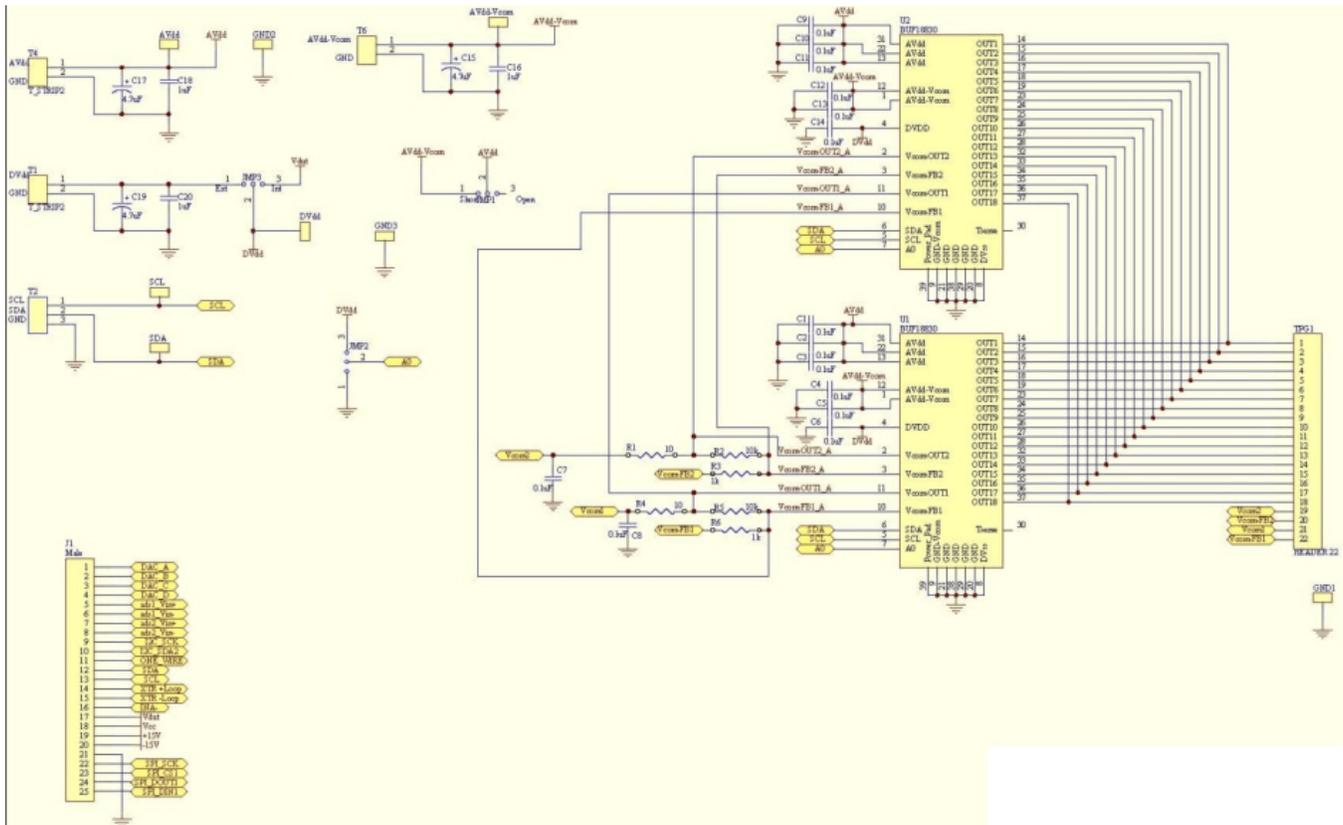


Figure 25. BUF18830EVM Schematic

## 6.2 PCB Layouts

Figure 26 shows the PCB component layout of the BUF18830EVM test board.

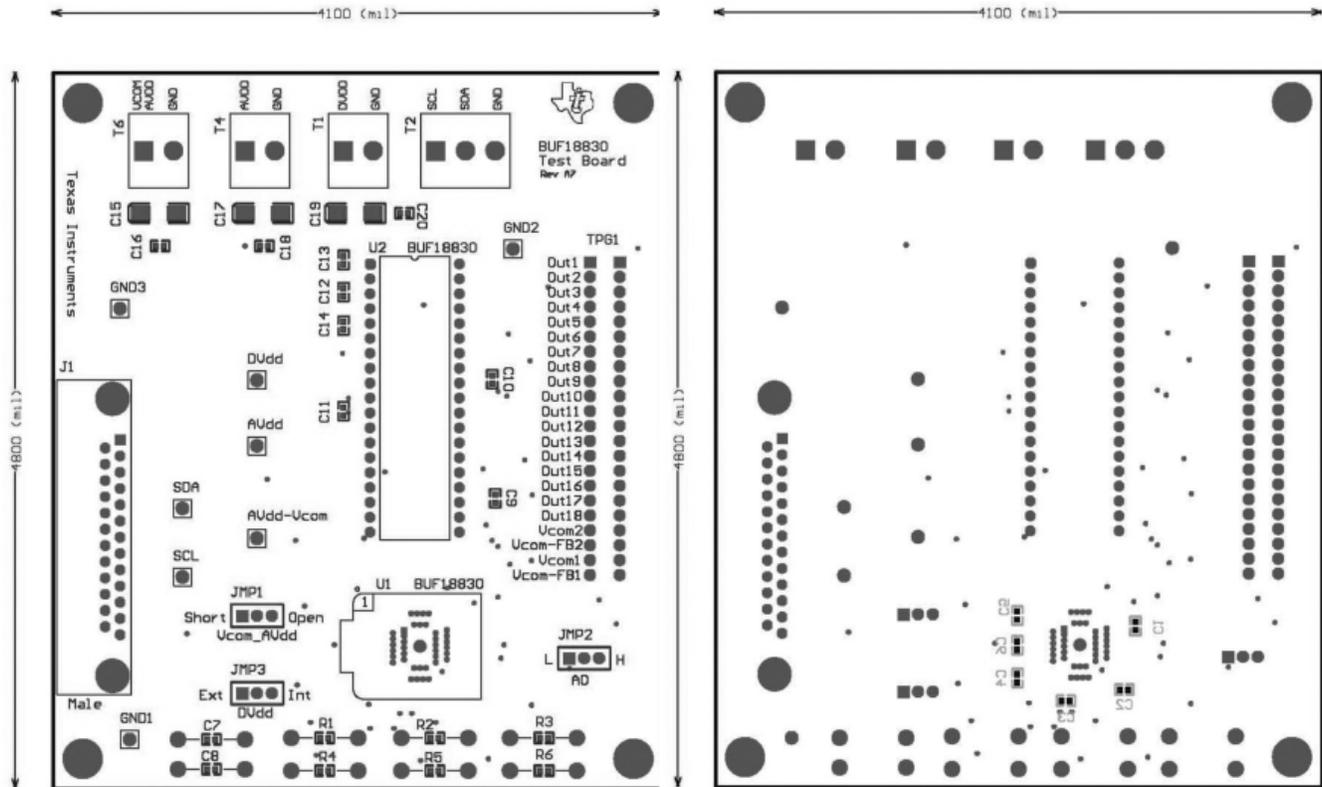


Figure 26. BUF18830EVM PCB Component Layout

### 6.3 Bill of Materials

Table 5 lists the bill of materials for the BUF18830EVM.

**Table 5. Bill of Materials**

Item No	Count	Value	RefDes	Description	Mfr	Part Number
1	2	10Ω	R1, R4	Resistor, 10Ω 1/16W .5% 0603 SMD	Susumu Co Ltd	RR0816Q-100-D
2	2	10kΩ	R2, R5	Resistor, 10.0kΩ 1/16W .5% 0603 SMD	Susumu Co Ltd	RR0816P-2493-D-39D
3	2	1kΩ	R3, R6	Resistor, 1.0kΩ 1/16W .5% 0603 SMD	Susumu Co Ltd	RR0816P-102-D
4	14	0.1μF	C1-C14	Capacitor, .10μF 25V Ceramic Y5V 0603	Kemet	C0603C104Z3VACTU
5	3	4.7μF	C15, C17,C19	Capacitor, Tantalum 4.7μF 35V 10% SMD	Vishay/Sprague	293D475X9035C2TE3
6	3	1μF	C16, C18, C20	Capacitor, Ceramic 1μF 25V Y5V 0603	Murata Electronics North America	GRM188F51E105ZA12D
7	1		U1	Socket, TSSOP 38-Pin ZIF	ENPLAS	OTS-38(28)-0.65-01
8	2		U2	Connector, RCPT .100" 19-Position Gold T/H, **See Assembly Drawing, **See Note 4	Samtec Inc	SS-119-G-2
9	1	DSUB25 M	J1	Connector, D-SUB PLUG R/A 25-Position 30GOLD (with threaded inserts and board locks)	AMP/Tyco Electronics	5747842-4
10	3		T1, T4, T6	Terminal Block, 5MM 2-Position	On-Shore Technology Inc	ED300/2
11	1		T2	Terminal Block, 5MM 3-Position	On-Shore Technology Inc	ED300/3
12	1	Strip cut to size (length is 22 pos.)	TPG1	Connector, Header 22-Position .100" SGL Gold **See Note 2	Samtec	TSW-122-07-G-S
13	8	TP cut to size (length is 1 pos.)	Test Points, All	Connector, Header 1-Position .100" SGL Gold **See Note 2	Samtec	TSW-101-07-G-S
14	4	Standoff	None	Standoffs, Hex , 4-40 Threaded, 0.500" length, 0.250" OD, Aluminum Iridite Finish	Keystone	2203
15	4	Screw	None	Screw Machine Phillips 4-40 x 1/4 SS	B & F Fastener Supply	PMSSS 440 0025 PH
16	3	Strip cut to size (length is 3 pos.)	JMP1-JMP3	Connector, Header 3-Position .100" SGL Gold **See Note 2	Samtec	TSW-103-07-G-S
17	3	Jumper	JMP1-JMP3	Shunt LP w/Handle 2-Position 30AU	AMP/Tyco Electronics	881545-2

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## EVM Warnings and Restrictions

It is important to operate this EVM within the input voltage range of 9V (min) to 20V (max) and the output voltage range of 9V (min) to 20V (max).

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

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

During normal operation, some circuit components may have case temperatures greater than +25°C. The EVM is designed to operate properly with certain components above +25°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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