

# ***ADS8344EVM***

## *User's Guide*

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## **EVM WARNINGS AND RESTRICTIONS**

It is important to operate this EVM with a maximum input voltage of 5 V.

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 60°C. The EVM is designed to operate properly with certain components above 60°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.

Mailing Address:

Texas Instruments  
Post Office Box 655303  
Dallas, Texas 75265

## Preface

# Read This First

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### ***About This Manual***

This users guide describes the characteristics, operation, and use of the ADS8344EVM 16-bit serial analog-to-digital converter evaluation board. A complete circuit description as well as schematic diagram and bill of materials is included.

### ***How to Use This Manual***

This document contains the following chapters:

- ☐ Chapter 1 – EVM Overview
- ☐ Chapter 2 – EVM Bill of Materials and Schematic

### ***Related Documentation From Texas Instruments***

To obtain a copy of any of the following TI documents, call the Texas Instruments Literature Response Center at (800) 477–8924 or the Product Information Center (PIC) at (972) 644–5580. When ordering, please identify this booklet by its title and literature number. Updated documents can also be obtained through our website at [www.ti.com](http://www.ti.com).

| <b>Data Sheets</b> | <b>Literature Number:</b> |
|--------------------|---------------------------|
| ADS8344            | SBAS139C                  |
| OPA627             | PDS998H                   |
| REF02              | SBVS003A                  |

### ***FCC Warning***

This equipment is intended for use in a laboratory test environment only. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

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# EVM Overview

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The ADS8344EVM is an 8-channel, 16-bit analog-to-digital converter board based on the ADS8344 ADC. Typical power dissipation is 10 mW at a 100 kHz throughput rate and a 5-V supply. The device uses a synchronous serial interface that is buffered on the EVM.

The EVM also incorporates a stable voltage reference and operational amplifier, configured as a buffer to ensure a low-noise voltage to the ADC.

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## 1.1 Features

- ☐ Full-featured evaluation board for the ADS8344 100-kHz, 16-Bit, 8-channel analog-to-digital converter
- ☐ Onboard reference
- ☐ Signal conditioning available

## 1.2 Analog Interface

For maximum flexibility, the ADS8344EVM is designed for easy interfacing to multiple analog sources. The amplifier is arranged in a noninverting configuration.

Samtec part numbers SSW-110-22-F-D-VS-K and TSM-110-01-T-DV-P provide a convenient ten-pin dual row header/socket combination at P1. This header/socket provides access to the analog input pins of the ADS8344. Consult Samtec at [www.samtec.com](http://www.samtec.com) or 1-800-SAMTEC-9 for a variety of mating connector options.

*Table 1–1. Header/Socket Combination*

| Pin Number | Signal   | Description                                                     |
|------------|----------|-----------------------------------------------------------------|
| P1.2       | CH0      | Channel 0 input, can be direct from connector or through op amp |
| P1.4       | CH1      | Channel 1 input, direct from P1 connector                       |
| P1.6       | CH2      | Channel 2 input, direct from P1 connector                       |
| P1.8       | CH3      | Channel 3 input, direct from P1 connector                       |
| P1.10      | CH4      | Channel 4 input, direct from P1 connector                       |
| P1.12      | CH5      | Channel 5 input, direct from P1 connector                       |
| P1.14      | CH6      | Channel 6 input, direct from P1 connector                       |
| P1.16      | CH7      | Channel 7 input, direct from P1 connector                       |
| P1.18      | Reserved |                                                                 |
| P1.20      | REF+     | External reference input                                        |

The appropriate jumpers are configured to enable the input for channel 0 to be derived from the onboard dual-supply op-amp.

Table 1–2. Jumper Configuration

| Reference Designator | Description                                           | Factor Set Condition  |      |
|----------------------|-------------------------------------------------------|-----------------------|------|
|                      |                                                       | 1–2                   | 2–3  |
| W1                   | Enables reference offset for single-supply amplifiers | Not installed         | N/A  |
| W3                   | Input source for channel 0                            | Onboard amplifier, U1 | P1.2 |

### 1.3 Digital Interface

The ADS8344EVM is designed for easy interfacing to multiple platforms. Samtec part numbers SSW–110–22–F–D–VS–K and TSM–110–01–T–DV–P provide a convenient 10-pin dual row header/socket combination at P2. This header/socket provides access to the digital control and serial data pins of the ADS8344. Consult Samtec at [www.samtec.com](http://www.samtec.com) or 1–800–SAMTEC–9 for a variety of mating connector options.

Table 1–3. ADS8344EVM Interface

| Pin Number | Signal   | Description                                                                   |
|------------|----------|-------------------------------------------------------------------------------|
| J2.1       | CS       | Chip select—Active low signal, enables data transfer and device configuration |
| J2.3       | SCLK     | Serial clock                                                                  |
| J2.5       | Reserved |                                                                               |
| J2.7       | Reserved |                                                                               |
| J2.9       | Reserved |                                                                               |
| J2.11      | SDI      | Serial data in                                                                |
| J2.13      | SDO      | Serial data out                                                               |
| J2.15      | BUSY     | Indicates internal state of ADC                                               |
| J2.17      | Reserved |                                                                               |
| J2.19      | Reserved |                                                                               |

### 1.4 Power Supplies

The ADS8344EVM board can accept three power supplies.

- ☐ A dual  $\pm 12$  V dc supply for the dual-supply op-amps and also to power the voltage reference.
- ☐ A single 2.7-V to 5-V dc supply for the ADC and the digital interface.

Table 1–4. ADS8344EVM Power Supply

| Reference Designator | Description                    | Factor Set Condition |                            |
|----------------------|--------------------------------|----------------------|----------------------------|
|                      |                                | 1–2                  | 2–3                        |
| W2                   | Negative supply for amplifiers | –12 V, via J3.4      | AGND                       |
| W4                   | Positive supply for amplifiers | 12 V, via J3.2       | V <sub>CC</sub> , via J3.1 |

## 1.5 Reference Voltage

The ADS8344EVM can be configured to use its onboard reference, or external reference source, via W5.

*Table 1–5. ADS8344EVM Onboard Reference*

| Reference Designator | Description                              | Factor Set Condition |               |
|----------------------|------------------------------------------|----------------------|---------------|
|                      |                                          | 1–2                  | 2–3           |
| W5                   | Reference is derived from onboard source | Installed            | Not installed |
|                      | Reference is derived from P1.20          | Not installed        | Installed     |

## 1.6 EVM Operation

Apply the appropriate current limited (500 mA maximum) dc sources to J3 prior to connecting the analog input signals and digital control signals. The digital control signals can be applied directly to P2, or the ADS8344EVM can be connected to a DSP interface board.

A number of interface options are available for this style of EVM. Consult the product folder for a complete list of DSP interface cards and optional analog interface modules. If the interface options listed are not suitable, contact the PIC for the latest information.

## EVM Bill of Materials and Schematic

The following table contains a complete bill of materials for the ADS8344 EVM. The schematic diagram is also provided for reference. Contact the product information center or e-mail [dataconvapps@list.ti.com](mailto:dataconvapps@list.ti.com) for questions regarding this EVM.

Table 2–1. EVM Bill of Materials

| Ref Des                                     | Description                                                 | Vendor               | Part Number         |
|---------------------------------------------|-------------------------------------------------------------|----------------------|---------------------|
| R10 R12 R19                                 | 1/16 W 5% 0-R chip resistor                                 | Panasonic            | ERJ-3GEY0R00V       |
| R2, R3, R4, R5, R6, R7, R8, R9, R11         | 1/16 W 5% 33-R chip resistor                                | Panasonic            | ERJ-3GEYJ330V       |
| R13 R14 R15 R16                             | 1/16 W 1% 100-R chip resistor                               | Panasonic            | ERJ-3GEYJ101V       |
| R17                                         | 1/16 W 1% chip resistor                                     | Panasonic            | ERJ-3GEYJ102V       |
| C24                                         | 10-pF, 50-V ceramic chip capacitor, $\pm 0.5$ pF, NPO       | Panasonic            | ECJ-2VC1H100D       |
| C10, C13, C17, C19, C22, C23, C26, C28, C30 | 0.1- $\mu$ F, -25-V ceramic chip capacitor, +80% –20%, Y5V  | Panasonic            | ECJ-1VF1E104Z       |
| C29                                         | 0.1- $\mu$ F, 50-V ceramic chip capacitor, $\pm 10\%$ , X7R | Panasonic            | ECJ-2YB1H104K       |
| C1, C9, C14, C16                            | 10- $\mu$ F, 16-V VS series electrolytic                    | Panasonic            | ECE-V1CA100SR       |
| C12, C15, C18                               | 10- $\mu$ F, Low profile tantalum capacitor                 | Panasonic            | ECS-T1CX106R        |
| C21, C25, C27                               | Not used                                                    |                      |                     |
| C2, C3, C4, C5, C6, C7, C8, C11             | 47-nF, 16-V ceramic capacitor, 80% –20%                     | Murata               | GRM39Y5V473Z016AD   |
| FB1, FB2, FB3                               | Ferrite bead inductor                                       | Fair-Rite            | 2744044447          |
| U1                                          | Precision single amplifier                                  | Texas Instruments    | OPA627AU            |
| U2                                          | ADS8344                                                     | Texas Instruments    | ADS8344EB           |
| U3                                          | REF 02 5-V voltage regulator                                | Texas Instruments    | REF02BU             |
| U5                                          | Precision single amplifier                                  | Texas Instruments    | OPA132AU            |
| U6, U7                                      | Single IC buffer driver with open drain o/p                 | Texas Instruments    | SN74LVC1G07DBVR     |
| N/A                                         | ADS8344EVM PWB                                              | Texas Instruments    | 6434957             |
| AGND1, DGND1                                | Miniature test point terminal                               | Keystone Electronics | 5000                |
| P1, P2                                      | 20 Pin SMT plug                                             | Samtec               | SSW-110-22-F-D-VS-K |
| J1, J2                                      | 20 pin SMT socket                                           | Samtec               | TSM-110-01-T-DV-P   |
| W1                                          | 2 Position jumper, 0.1" spacing                             | Samtec               | TSW-102-07-L-S      |
| W2, W3, W4, W5, W6                          | 3 Position Jumper, 0.1" spacing                             | Samtec               | TSW-103-07-L-S      |
| J3                                          | 4-terminal screw connector                                  | Lumberg              | KRMZ4               |

