



T-51-10-12

ADC-EH8B

Fast, 8-Bit Analog-to-Digital Converters

FEATURES

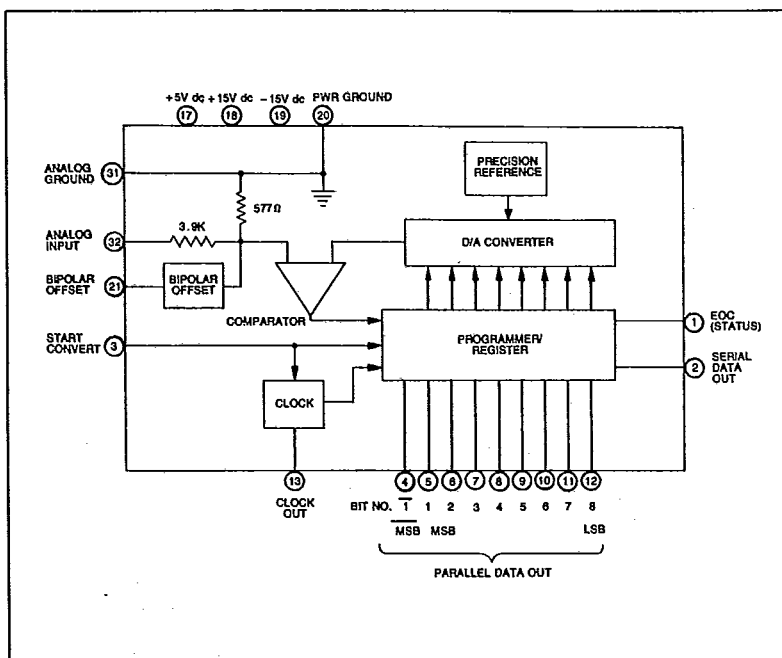
- 8-Bit resolution
- 4.0 and 2.0 microseconds conversion time
- Unipolar or bipolar operation
- Parallel and serial outputs
- Low cost

GENERAL DESCRIPTION

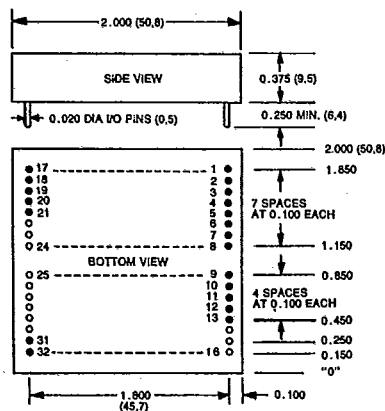
The model ADC-EH8B is a fast, 8-bit successive approximation type analog-to-digital converter in a compact 2 x 2 x 0.375 inch module. These converters are low cost devices with application in pulse code modulation systems and instrumentation and control systems requiring fast data conversion rates up to 500,000 per second. There are two models to choose from based on conversion speed: ADC-EH8B1 with a conversion time of 4.0 microseconds (250 kHz rate), and ADC-EH8B2 with a conversion time of 2.0 microseconds (500 kHz rate).

The high speed in a small size is made possible by the use of an MSI integrated circuit which provides all the necessary successive approximation logic, along with other new integrated circuit components. The analog input range is either unipolar 0 to +10V or bipolar -5V to +5V, determined by external pin connection. For unipolar operation no external adjustments are necessary; for bipolar operation only a bipolar offset adjustment must be made externally. Parallel output coding is straight binary for unipolar operation and offset binary or two's complement for bipolar operation. A serial output gives successive decision pulses in NRZ format with straight or offset binary coding. Other outputs are clock output for synchronization with serial data, and MSB output for two's complement coding.

Other specifications include full scale temperature coefficient of 50 ppm/°C maximum, long term stability of 0.05%/year, and linearity of ± 1/2 LSB. Power requirement is ± 15V dc and +5V dc.



MECHANICAL DIMENSIONS INCHES (MM)



INPUT/OUTPUT CONNECTIONS

PIN	FUNCTION
1	E.O.C. (STATUS)
2	SERIAL DATA OUTPUT
3	START CONVERT
4	BIT 1 OUT (MSB)
5	BIT 1 OUT (MSB)
6	BIT 2 OUT
7	BIT 3 OUT
8	BIT 4 OUT
9	BIT 5 OUT
10	BIT 6 OUT
11	BIT 7 OUT
12	BIT 8 OUT (LSB)
13	CLOCK OUT
17	+5V POWER IN
18	+15V POWER IN
19	-15V POWER IN
20	POWER GROUND
21	BIPOLAR OFFSET
31	ANALOG GROUND
32	ANALOG INPUT

T-51-10-12

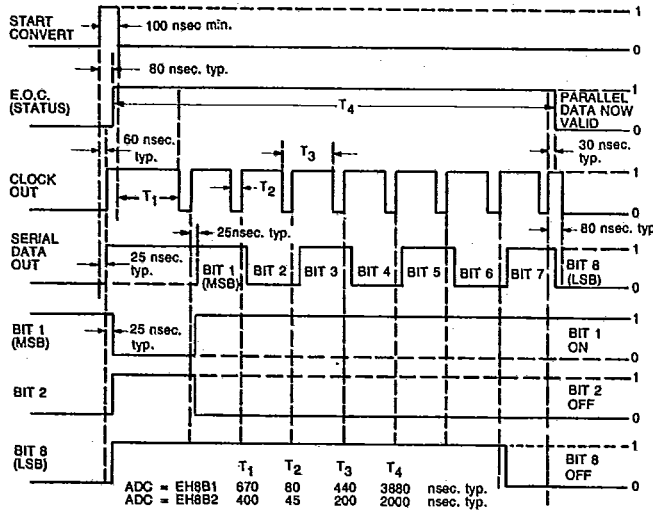
FUNCTIONAL SPECIFICATIONS

Typical at 25°C, ±15V and +5V supplies, unless otherwise indicated.

INPUTS	
Analog Input Range	0V to +10V Full-Scale or ±5V Full-Scale
Input Impedance	4.45K ohms ±50 ohms
Input Overvoltage	±20V (no damage)
Start Conversion	2V minimum to 5.5V maximum positive pulse with duration of 100 nanoseconds minimum. Rise and fall times <50 nanoseconds. Logic "1" resets converter. Logic "0" initiates conversion. Loading: 1 TTL load
OUTPUTS	
Parallel Output Data	8 parallel lines of data held until next conversion command. V out ("0") ≤ +0.4V V out ("1") ≥ +2.4V Each output capable of driving up to 4 TTL loads.
Coding, Unipolar Operation	Straight Binary, positive true.
Bipolar Operation	Offset Binary, positive true.
Serial Output Data	NRZ successive decision pulse output generated during conversion, with MSB first. Straight binary or offset binary coding. Loading: 4 TTL loads.
End of Conversion (EOC)	Conversion Status Signal. V out ("0") ≤ 0.4V indicates conversion time completed. V out ("1") ≥ +2.4V during reset and conversion periods. Loading: 4 TTL loads.
Clock Output	Internal clock pulse train of negative going pulses from +5V to 0V gated on during conversion time. Loading: 6 TTL loads.

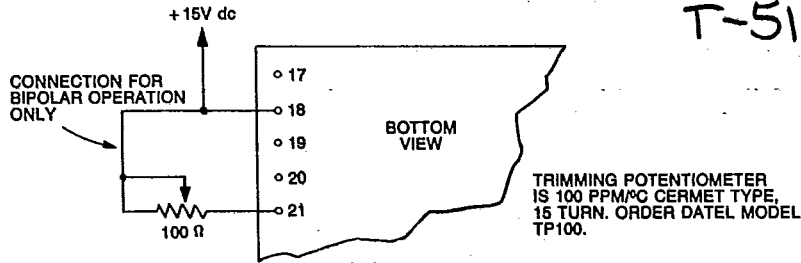
PERFORMANCE	
Resolution	8 Bits (1 part in 256)
Linearity Error	± 1/2 LSB maximum.
Differential Nonlinearity	± 1/2 LSB maximum.
Temp. Coeff. of Gain	± 50 ppm/°C maximum.
Temp. Coeff. of Zero, Unipolar	± 100 μV/°C maximum.
Temp. Coeff. of Offset, Bipolar	± 35 ppm of FS/°C maximum.
Long Term Stability	± 0.05%/year
Power Supply Rejection	± 0.02% of Full-Scale/% supply, maximum.
Conversion Time	4.0 microseconds maximum, ADC-EH8B1 2.0 microseconds maximum, ADC-EH8B2
POWER REQUIREMENTS	
Power Supply Voltage	± 15V dc ± 0.5V at 25 mA maximum. +5V dc ± 0.25V at 125 mA maximum.
PHYSICAL/ENVIRONMENTAL	
Operating Temp. Range	0°C to +70°C
Storage Temp. Range	-55°C to +85°C
Relative Humidity	Up to 100% non-condensing
Case Size	2 x 2 x 0.375 inches (50,8 x 50,8 x 9,5 mm)
Case Material	Black diallyl phthalate per MIL-M-14
Pins	0.020" round, gold plated, 0.250" long minimum.
Weight	2 ounces maximum (57 grams)

Output: 10101010



TIMING DIAGRAM FOR ADC-EH8B

ADC-EH8B CALIBRATION



UNIPOLAR OPERATION

1. UNIPOLAR — No adjustments are necessary and 100Ω trimming pot is not used. Full scale and zero are internally set to better than 1/2 LSB. Pin 21 is left open.

BIPOLAR OPERATION

2. BIPOLAR — Connect pin 18 (+15 V dc) to pin 21 through a 100Ω trimming potentiometer as shown. Connect a precision voltage source to pin 32 and set the input voltage to +1/2 LSB or +0.020V. Adjust the trimming potentiometer so that the output code flickers equally between 1000 0000 and 1000 0001.

OUTPUT CODING

UNIPOLAR (0 TO +10V)

SCALE	INPUT VOLTAGE	STRAIGHT BINARY
+FS - 1 LSB	+9.96V	1111 1111
+3/4 FS	+8.75V	1110 0000
+1/2 FS	+7.50V	1100 0000
+1/4 FS	+5.00V	1000 0000
0	+2.50V	0100 0000
-1/4 FS	+0.04V	0000 0001
-1 LSB	0.00V	0000 0000

BIPOLAR (-5V TO +5V)

SCALE	INPUT VOLTAGE	OFFSET BIN	2'S COMPLEMENT
+FS - 1 LSB	+4.96V	1111 1111	0111 1111
+3/4 FS	+3.75V	1110 0000	0110 0000
+1/2 FS	+2.50V	1100 0000	0100 0000
0	0.00V	1000 0000	0000 0000
-1/2 FS	-2.50V	0100 0000	1100 0000
-3/4 FS	-3.75V	0010 0000	1010 0000
-FS + 1 LSB	-4.96V	0000 0001	1000 0001
-FS	-5.00V	0000 0000	1000 0000

ORDERING INFORMATION

ADC-EH8B

CONVERSION TIME

- 1 = 4.0 Microseconds
- 2 = 2.0 Microseconds

ACCESSORIES
Part Number

Description

DILS-2
TP100

Mating Sockets: (2 per module)
Trimming Potentiometers