

1.1 Scope.

This specification covers the detail requirements for a complete single supply 8-bit resolution A/D converter with an instrumentation input amplifier, and complete microprocessor interface.

1.2 Part Number.

The complete part number per Table 1 of this specification is as follows:

Device	Part Number ¹
– 1	AD670S(X)/883B

NOTE

¹See paragraph 1.2.3 for package identifier.

1.2.3 Case Outline.

See Appendix 1 of General Specification ADI-M-1000: package outline:

(X)	Package	Description
D	D-20	20-Pin DIP
E	E-20A	20-Terminal LCC

1.3 Absolute Maximum Ratings. ($T_A = +25^\circ\text{C}$ unless otherwise noted)

V_{CC} to Ground	0V to +7.5V
Digital Inputs (Pins 11-15)	–0.5V to $V_{CC} + 0.5V$
Digital Outputs (Pins 1-9)	Momentary Short to V_{CD} or Ground
Analog Inputs (Pins 16-19)	–30V to +30V
Power Dissipation	450mW
Storage Temperature Range	–65°C to +150°C
Lead Temperature Range (Soldering to Specs)	+300°C

1.5 Thermal Characteristics.

Thermal Resistance $\theta_{JC} = 25^\circ\text{C}/\text{W}$
 $\theta_{JA} = 85^\circ\text{C}/\text{W}$

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Table 1.

Test	Symbol	Device	Design Limit @ +25°C	Sub Group 1	Sub Group 2, 3	Sub Group 9	Sub Group 10, 11	Test Condition ¹	Units
Relative Accuracy ²	RA	-1	1/2	1/2	1				+ LSB max
Differential Nonlinearity ³	DNL	-1	8	8	8				+ Bits max
Gain Error ²	A _E	-1	1.5	1.5	2.5				± LSB max
Unipolar Offset Error	O _E	-1	1	1	2			2.55V Input Range	± LSB max
Bipolar Zero Error	B _{POE}	-1	1	1	2			± 1.28V FS	± LSB max
Input Resistance	R _{IN}	-1	8	8	8			2.55V Input Range	kΩ min
			12	12	12			2.55V Input Range	kΩ max
Input Bias Current	I _B	-1	750	750	750			255mV Input Range	+ nA max
Input Offset Current	I _{OS}	-1	200	200	200				+ nA max
Absolute Input Signal Range ⁴	V _{ABS}	-1	0.34	0.34	0.15			255mV Input Range	- V min
			V _{CC} - 3.3	V _{CC} - 3.3	V _{CC} - 3.5			255mV Input Range	+ V max
			3.4	3.4	1.5			2.55V Input Range	- V min
			V _{CC}	V _{CC}	V _{CC}			2.55V Input Range	+ V max
Common-Mode Rejection ⁵	CMR	-1	1	1 ⁶	2 ⁷			255mV	± LSB max
Three-State Leakage Current	I _{OZ}	-1	40	40	40				± μA max
Power Supply Rejection Ratio	PSRR	-1	0.015	0.015	0.015			2.55V FS V _{CC} = +4.75V to +5.5V	± %FS/% max
Power Supply Current	I _{CC}	-1	45	45	45				+ mA max
Digital Input High Voltage	V _{IH}	-1	2.0	2.0	2.0				+ V min
Digital Input Low	V _{IL}	-1	0.8	0.8	0.7				+ V max
Digital Input High Current	I _{IH}	-1	100	100	100				+ μA max
Digital Input Low Current	I _{IL}	-1	100	100	100				- μA min
Digital Output Low Voltage	V _{OL}	-1	0.4	0.4	0.4			I _{OL} = -1.6mA	+ V max
Digital Output High Voltage	V _{OH}	-1	2.4	2.4	2.4			I _{OH} = 0.5mA	+ V min
Conversion Time	TC	-1	10			10	13		μs max
Write/Start Pulse Width	t _W	-1	300			300	300	See Note 6	ns min
Input Data Setup Time	t _{DS}	-1	200						ns min
Input Data Hold Time	t _{DH}	-1	10						ns min
Read/Write Setup Before Control	t _{RWC}	-1	0						ns min
Status Delay	t _{DC}	-1	700						ns max
Delay From Status to Data Read	t _{SD}	-1	250						ns max
Bus Access Time	t _{TD}	-1	250			250			ns max
Data Hold Time	t _{DH}	-1	25						ns max
Output Float Delay	t _{DT}	-1	150			150			ns max
Read Time	t _r	-1	250						ns min

NOTES

¹T_A = +25°C, V_S = +5V.

²Tested on both 2.56V full scale and ±1.28V full scale.

³Minimum resolution for which there are no missing codes.

⁴Input signal range is with respect to Power Ground (Pin 10).

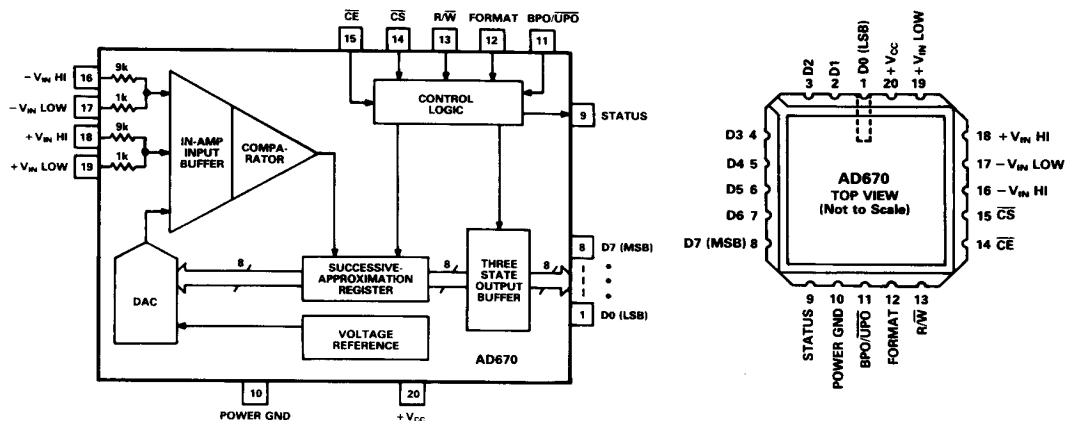
⁵Digital output code will not change by more than 1LSB with full scale applied to the differential inputs over the input signal range.

⁶Timing per Figures 1, 2 or 3.

⁷V_{CM} = 0 to -0.34V; V_{CM} = 0 to V_{CC} - 3.6V.

⁸V_{CM} = 0 to -0.15V; V_{CM} = 0 to V_{CC} - 3.8V.

3.2.1 Functional Block Diagrams and Terminal Assignments.

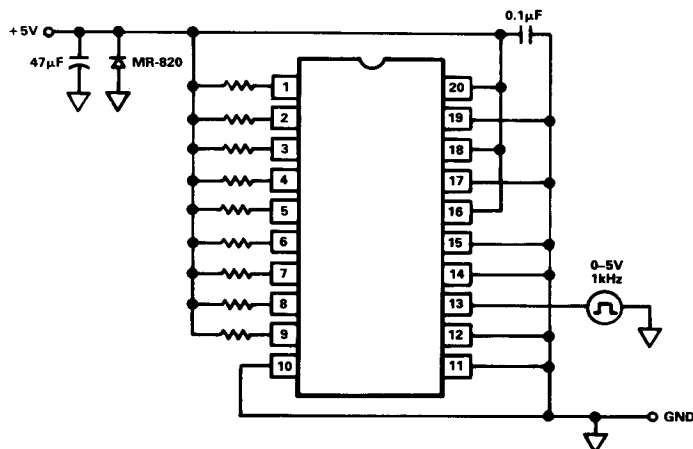


3.2.4 Microcircuit Technology Group.

This microcircuit is covered by technology group (57).

4.2.1 Life Test/Burn-In Circuit.

Steady state life test is per MIL-STD-883 Method 1005. Burn-in is per MIL-STD-883 Method 1015 test condition (B).



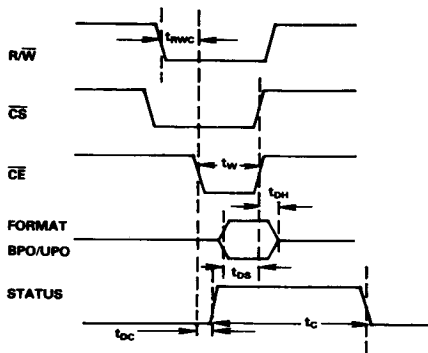


Figure 1. Convert Timing

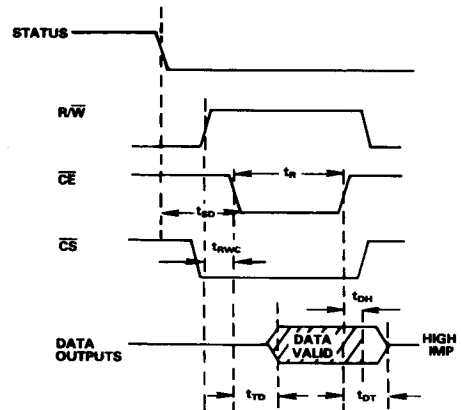


Figure 2. Read Timing

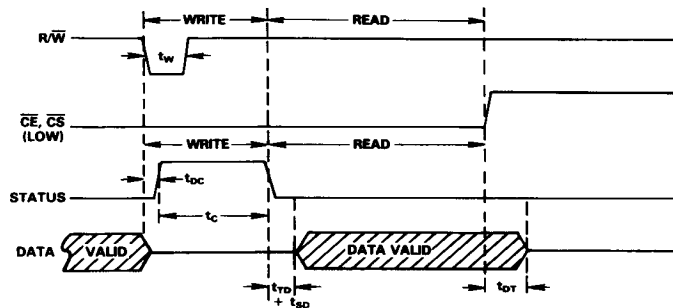


Figure 3. Stand-Alone Timing

Table 2. AD670 Control Signal Truth Table

R/W	CS	CE	OPERATION
0	0	0	WRITE/CONVERT
1	0	0	READ
X	X	1	NONE
X	1	X	NONE

Table 3. Differential Input Signal Range

Mode	Range	Min	Max	Unit
Unipolar	LOW	0	255	mV
Unipolar	HIGH	0	2.55	V
Bipolar	LOW	-128	127	mV
Bipolar	HIGH	-1.28	1.27	V