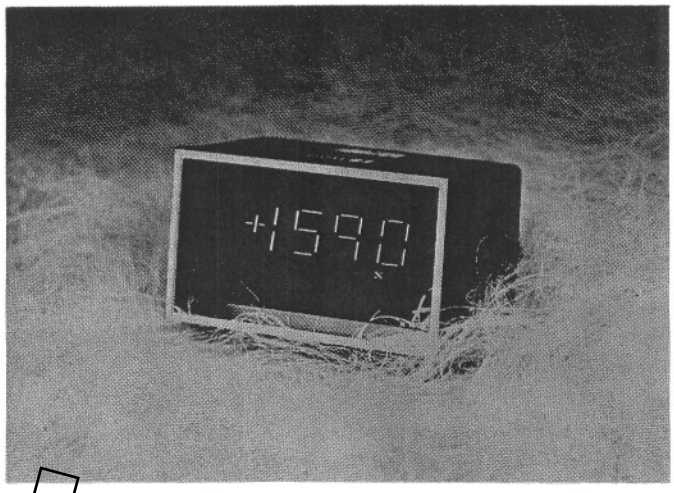
ANALOG DEVICES

3½ Digit Panel Meter For OEM Applications

AD2001

PRELIMINARY TECHNICAL DATA

OBSOLETE



FEATURES
- Low Cost: $89 in 100's
- Small Size: 1.8" H x 3.1" W x 1.5" D
- Maximum Error: 0.05% ±1 Digit
- Bright Sharp Display
- High Reliability

APPLICATIONS
- Instrumentation with Numerical Readout in Engineering Units
- General Purpose Instrumentation with Auto Ranged Gain & Decimal Point Settling
- Voltage & Current Measurement

GENERAL DESCRIPTION

The AD2001 is a 3½ digit panel meter designed for original equipment requiring high performance at a low price. The maximum error of the AD2001 is 0.05% of reading ±1 digit with a temperature coefficient of ±50ppm/°C. An unusual A/D converter approach—ANALOK™—yields a minimum component and high accuracy design. ANALOK™ allows the unit to operate from a single 5VDC power source and is the key to the AD2001's small size and low cost.

DISPLAY FEATURES

The AD2001 display uses incandescent RCA Numitron display tubes which provide a bright, sharp, easily readable display over a wide range of ambient light. These tubes are rated at 100,000 hours. To assure reliability, every AD2001 is burned in for 7 days prior to shipment. Other standard features of the display are: automatic polarity, programmable decimal points, automatic zero, full scale ±199.9mV and automatic overload indication. The display rate is 5 readings per second, with rates of 1 reading per second or lower available.

DESIGN EFFICIENCY FOR THE OEM

The AD2001 is not only a nearly direct replacement for the most common size of panel meters (whose errors specifications are usually of the 1–2% class), but it is considerably smaller than the 5½" to 7½" width typical of the most accurate and expensive analog meters.

The front bezel design of the AD2001 allows easy installation and removal, and its light weight allows the unit to be used in hinged panel equipment. The complete unit is housed in an aluminum case which provides structural strength, optimum heat dissipation, and shielding from external noise. Overvoltage protection is also provided.

The AD2001 logic levels are compatible with DTL & TTL integrated circuits. The AD2001 can operate from the user's 5VDC system supply—eliminating the shielding, decoupling, etc. normally needed when the AC line must be routed near signal leads. Separate DC inputs to the converter and display, allow the OEM designer to minimize effects of display transients on conversion accuracy, economize regulated power and, by use of an external circuit, to blank the display.

DATA PROCESSING EQUIPMENT INTERFACING

The AD2001 provides an excellent economy digital panel meter for display purposes. The ANALOK™ circuit also provides BCD outputs, polarity sign, overrange, and overload signals which can be used under restricted conditions for data processing equipment interfacing.

The logic "one" on the overload output line can be generated by either an actual "overload" (>199.9mV) at the input or an input polarity change. It is recommended that in data processing interface applications the data logger or computer equipment be programmed to ignore the BCD output data whenever the logic "1" appears on the overload line. In specific applications where the use of the above procedure is not desired, the circuit shown in Figure 1 may be used to generate a "Polarity Error" flag.

MULTIPLEXING SYSTEMS

The ANALOK™ circuit permits the AD2001 to read or hold a measurement under external command. This feature permits the meter to be used in multiplexing applications where a measurement time of 250ms between input changes can be accepted. Up to 4 such signals can be multiplexed per second.

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SPECIFICATIONS (typical @ +25°C and +5V unless otherwise noted)

MODEL AD2001

DISPLAY OUTPUT
- Display consists of four RCA Numitrons (7 segment incandescent readout tubes) for data digits plus 100% overrange and ± polarity indication.
- Overload — 3 data digits read "0's" and the overrange "1" continuously flashes when reading exceeds full scale.
- Decimal Points — Selectable at input connector.

ACCURACY
- Maximum error — 0.05% of reading ±1 digit
- Resolution — 0.1mV
- Temperature Range — 0°C to +60°C operating
- Temperature Coefficient — ±50ppm/°C

SPEED
- External Trigger — up to 20 conversions per second
- Internal Conversion — 5 conversions per second (factory adjustable)
- Hold and Read On Command
- Measurement Time (including settling time to 0.05%) — 250ms

COMPUTER SIGNALS

	In	Out
• DTL/TTL Compatible Logic "0"	<0.8V	<0.4V
Logic "1"	>2.0V	>2.4V

- Inputs
  External Trigger — Operation in the "External Trigger" mode requires that the "External Hold" input (Pin D) be grounded. An External Trigger pulse (logic "1" to logic "0") is required. Maximum pulse width is 10ms. Minimum pulse width is 1ms.
  External Hold — When this input is grounded or held at 0.8V max, the last conversion is held and displayed. For a new conversion under internal control this input must be open or at 5V.
- Outputs
  3 BCD Digits (8421), Positive Logic
  Overrange — Logic "1" indicates an overrange
  Overload — Logic "1" indicates an overload condition
  Polarity — Logic "0" with positive polarity input
  Conversion Gate — Logic "1" when conversion is complete, logic "0" during conversion. If unit is overloaded the output will remain a logic "0" during alternate conversions.

INPUT
- Full Scale Range — 0 to ±199.9 millivolts, automatic zero, polarity.
- Bias Current — 1.5nA
- Impedance — 100MΩ
- Over Voltage Protection — 100 times full scale sustained without damage
- Decimal Points (3) — Selectable by grounding or logic "0"

POWER
- +5VDC ±5% — 1000mA, 5 Watts max
- Separate DC Inputs — regulated ±5% — 200mA (Converter)
  unregulated — 800mA (Display)

WARM UP
- Essentially none to specified accuracy

ADJUSTMENTS
- Range potentiometer for reference adjustment. Recalibration recommended after six months.

WEIGHT — 5 oz. (140gm)

CONNECTOR RECOMMENDATION
- 30 Pin 0.156 spacing Viking No. 2 Vk 15D/1-2
- Optional — specify AC 1501 $3.50 each

PRICE — 1-9 — $135
100+ — $89

Specifications subject to change without notice.

DIGITAL PANEL METER
PIN CONNECTIONS

PIN FUNCTION	PIN REF		PIN FUNCTION
– Ext. Trigger	1	A	Overrange
(800)	2	B	(100)
			Key
(400)	3	C	(200)
D.P.I.XXX	4	D	External Hold
Overload	5	E	Polarity
(40)	6	F	(80)
(20)	7	H	(10)
(Spare)	8	J	Grd
,,	9	K	Conv. Gate
,,	10	L	(8)
,,	11	M	(1)
(4)	12	N	+5V Conv.
E_{IN}	13	P	(2)
E_{IN} Common	14	R	+5V Disp.
DP 1X.XX	15	S	D.P. 1XX.X

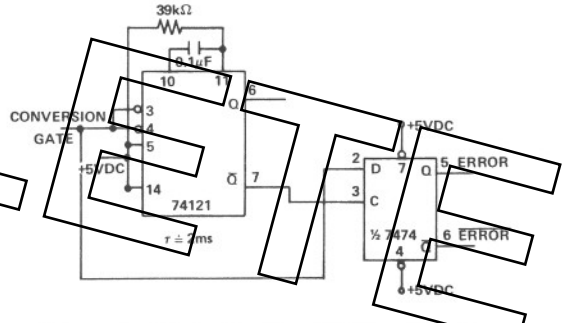
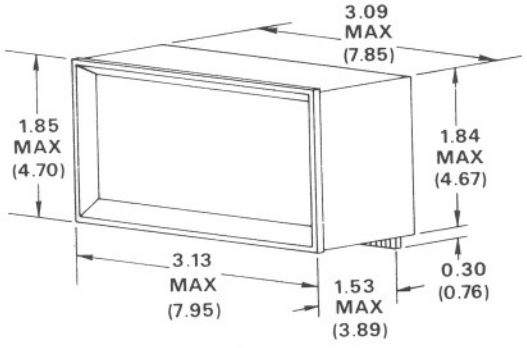
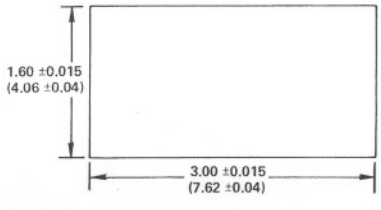


Figure 1. "Polarity Error" Flag Circuit

OVERALL DIMENSIONS
Dimensions shown in inches and (cm).



RECOMMENDED PANEL CUT OUT



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