ANALOG DEVICES

Low Cost, 3 1/2 Digit Logic Powered DPM with LED Displays

AD2021

OBSOLETE

FEATURES

"Second Generation" MOS-LSI Design
Large 0.5" (13mm) LED Displays
+5VDC Logic Powered
±1.999V, ±199.9mV or ±19.99V Full Scale Ranges
Limited Differential Input
Low Power Consumption: 2.0 Watts
Small Size, Industry Standard Case Design

APPLICATIONS

General Purpose Logic Powered DPM Applications
Portable Applications Requiring Low Power Consumption



GENERAL DESCRIPTION

The AD2021 is a low cost, 3½ digit, +5V dc logic powered digital panel meter with large LED displays. While designed for general purpose DPM applications, the small size, light weight and low power consumption of the AD2021 make it an ideal digital readout for modern, compact instrument designs.

THE BENEFITS OF "SECOND GENERATION" DESIGN

The AD2021 is designed around MOS-LSI (Metal-Oxide-Semiconductor, Large Scale Integration) integrated circuits, which greatly reduce the number of components, and thereby the size, and reduce power consumption to 2.0 watts. Both the lower power consumption and fewer interconnections between components promise greatly increased reliability, and the circuit design maintains the performance and features of earlier DPMs. Large 0.5 inch (13mm) LED displays offer the visual appeal of gas discharge displays with the ruggedness and lifetime of all solid state devices.

EXCELLENT PERFORMANCE AND EASY APPLICATION

The AD2021 measures input voltage over a full scale range of ±1.999V dc or ±199.9mV dc ("S" option) with an accuracy of ±0.05% reading ±0.025% full scale ±1 digit. Using the "limited differential" input first used on Analog Devices' AD2010, the AD2021 prevents ground loop problems and provides 35 to 50dB of common mode rejection at common mode voltages up to ±200mV. Normal mode rejection is 40dB at 50Hz to 60Hz.

BCD data outputs are provided in a bit parallel, character serial format compatible to CMOS logic systems. For those applications requiring parallel BCD data, schemes for making the serial to parallel conversion are available. Controls to hold readings, select decimal points and blank the display are provided.

DESIGNED AND BUILT FOR RELIABILITY

The AD2021 is packaged in Analog Devices' logic powered DPM case size, only 1.25 inches (32mm) deep. The small size of this DPM makes it easy to accommodate in any instrument

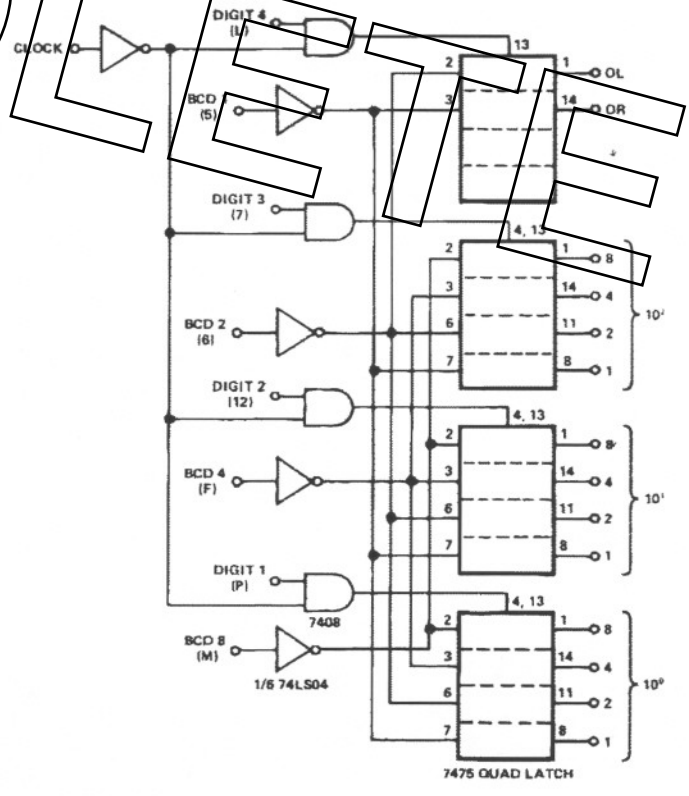


Figure 1. AD2021 Bit Parallel Character Serial to Full Parallel Data Conversion. AD2021 Pin Connections Are Shown in Parentheses.

For detailed information, contact factory.

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AD2021 — SPECIFICATIONS (typical at +25°C and nominal power supply voltage)

design, and since several other manufacturers now use the same panel cutout for logic powered DPMs, this industry standardization allows mechanical second sourcing. In addition, the AD2021 uses the same pin connections as the AD2010 (except in BCD outputs, of course) as a convenience to allow updating designs to take advantage of the second generation design and larger display of the AD2021. Each AD2021 receives a full one week failure free burn-in before shipment.

DISPLAY OUTPUT
- Light emitting diode, planar seven segment display readouts, 0.5″ (13mm) high for three data digits, 100% overrange and negative polarity indication. Overload indicated by flashing display, polarity remains valid.
- Decimal points selectable at input connector.
- Display blanking on three data digits (does not affect overrange digit, polarity sign of decimal points).

ANALOG INPUT
- Configuration: bipolar, limited differential
- Full Scale Range: ±1.999V or ±199.9mV ("S" option) ±19.99V ("V" option)
- Automatic Polarity
- Auto Zero
- Input Impedance: 100MΩ (1MΩ – "V" option)
- Bias Current: 50pA
- Overvoltage Protection: ±50V dc, sustained

ACCURACY
- ±0.05% reading ±0.025% full scale ±1 digit[1]
- Resolution: 1mV, 10mV ("V" option) or 100μV ("S" option)
- Temperature Range[2]: 0 to +50°C operating; -25°C to +85°C storage
- Temperature Coefficient: Gain: 50ppm/°C
  Zero: auto zero
- Warm-Up Time to Rated Accuracy: less than one minute
- Settling Time to Rated Accuracy: 0.4 second

NORMAL MODE REJECTION
- 40dB at 50–60Hz

COMMON MODE REJECTION
- AD2021: 35dB (dc –10kHz)
- AD2021/S: 50dB (dc –10kHz)
- AD2021/V: 15dB (dc –10kHz)

COMMON MODE VOLTAGE
- ±200mV

CONVERSION RATE
- 5 conversions per second
- Hold and read on command

CONTROL INPUTS
- Display Blanking: (TTL, DTL compatible, 2 TTL loads). Logic "0" or grounding blanks the three data digits only, not the decimal points, overrange digit (if on) and polarity sign. Logic "1" or open circuit for normal operation. Display blanking has no effect on output data and the display reading is valid immediately upon removal of a blanking signal.
- Hold: (CMOS, DTL, TTL compatible, 1LP TTL load). Logic "0" or grounding causes the DPM to cease conversions and display the data from the last conversion. Logic "1" or open circuit for normal operation. After the "Hold" input is removed, one to two conversions are needed before the reading is valid.
- Decimal Points: Grounding or Logic "0" will illuminate the desired decimal point. External drive circuitry must sink 35mA peak at a 25% duty cycle when the decimal points are illuminated.

DATA OUTPUTS (See Application Section for details on data outputs)
- BCD Data Outputs: (CMOS, LP TTL or LP Schottky compatible), bit parallel, character serial format.
- Digit Strobe Outputs: (CMOS, DTL, TTL compatible, one TTL load). Logic "1" on any of these lines indicates the output data is valid for that digit.
- Polarity Output: (CMOS, TTL, DTL compatible, one TTL load). Logic "1" indicates positive polarity input, logic "0" indicates negative polarity.
- Status: (CMOS or LP TTL compatible). When this signal is at Logic "1", the output data is valid.
- Clock: (CMOS, DTL, TTL compatible, one TTL load). The clock signal is brought out to facilitate conversion from character serial to parallel data.
- INTERFACING DATA OUTPUTS. The BCD data outputs are in a bit parallel, character serial format. There are four BCD bit outputs (1, 2, 4, 8) and four digit outputs (10^0, 10^1, 10^2, 10^3). The BCD digits are gated onto the output lines sequentially, and the BCD bits are valid for the digit whose digit line is high. The data is valid except when being updated which occurs within 2 milliseconds after the status line goes low.

REFERENCE OUTPUT
- A 6.4V ±5% analog reference output is made available. This reference should be buffered and filtered if use in external circuitry is desired.

POWER INPUT
- +5V dc ±5%, 1.45 watts

CALIBRATION ADJUSTMENTS (See Application Section for calibration instructions)
- Gain
- Zero
- Recommended recalibration interval: six months

SIZE
- 3″W x 1.8″H x 1.33″D (76 x 46 x 34mm)
- 1.90″ (48mm) overall depth to rear of card edge connector.
- Panel cutout required: 3.175″ x 1.810″ (80.65 x 45.97mm).

WEIGHT
- 4 ounces, (115 grams)

OPTIONS — ORDERING GUIDE
- Input Voltage Range: AD2021 — 1.999V dc Full Scale
  AD2021/S — 199.9mV dc Full Scale
  AD2021/V — 19.99V dc Full Scale

CONNECTOR
- 30 pin, 0.156″ spacing card edge connector. Viking 2VK15D/1-2 or equivalent.
- Optional: Order AC1501

NOTES
[1] Guaranteed at 25°C and nominal supply voltage
[2] Guaranteed

Specifications subject to change without notice.

OBSOLETE