



☰ Reference Designs ✕

- ○ **Important Notice for Maxim Integrated Design Information and Resources**

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SYSTEM BOARD 7283

MAXREFDES177# IO-Link Universal Analog IO

 Active in Production.

Overview

The MAXREFDES177# is a complete, IO-Link[®] universal analog input-output (IO) reference design that has a MAX22515 IO-Link transceiver with integrated protection. It demonstrates a fully software-configurable analog IO module using the MAX22000 industrial configurable analog IO device. The analog (field) side is fully isolated from the IO-Link side with the MAX14483 digital data isolator and an isolated power supply derived from the L+ (24V) supply from the IO-Link master connection.

The MAXREFDES177#, built in an industrial form factor, uses an industry-standard M12 connector with a 4-wire IO-Link cable. The analog (field) side uses a 4-way PCB terminal block. The complete reference design fits on a 61mm x 25mm printed circuit board (PCB).

The configurable modes include analog voltage input ($\pm 10V$), analog current input ($\pm 20mA$), analog voltage output ($\pm 10V$), and analog current output ($\pm 20mA$) across the AIO and GND terminals. The MAXREFDES177# sets the linear range at 105% and full-scale range at 125% of the nominal range. The accuracy is as good as 0.1% over a $\pm 50^{\circ}C$ temperature variation. The other two terminals can be configured to measure temperature using a standard device such as a PT100 or PT1000 RTD. These terminals interface to the integrated Programmable Gain Amplifier (PGA) in the MAX22000 at inputs AI5 and AI6.

An Atmel ATSAM low-power microcontroller interfaces between the MAX22000 industrial configurable analog device and MAX22515 IO-Link device transceiver. The MAX22515 features integrated surge protection for robust communication in a very small PCB area without requiring external protection

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components such as TVS diodes. The MAX22515 is available in a tiny 20-bump wafer level package (WLP), allowing the MAXREFDES177# to have a small footprint. The design is reverse-polarity protected using the integrated active reverse-polarity protection of the MAX22515. The MAX22515 has two integrated LDO regulators (3.3V and 5V). The 3.3V LDO generates the 3.3V supply for other circuitry, reducing the number of required external components and saving space. The MAX22515 also features low on-resistance drivers (C/Q and DO/DI) to reduce power dissipation, allowing this reference design to consume minimal power with very low thermal dissipation.

This IO-Link device utilizes the Technologie Management Gruppe Technologie und Engineering (TMG TE) IO-Link device stack to communicate to any IO-Link version 1.1-compliant master. The board contains a male M12 connector to connect to a compliant IO-Link master using a standard M12 cable. Connecting the MAXREFDES177# to a USB IO-link master, such as the MAXREFDES165#, with the associated software allows for easy evaluation.

The design files, firmware, and software are available in the Design Resources tab. The board is also available for purchase.

Features

- IEC 61131-9 Compliant
- TMG TE IO-Link Stack
- IO-Link Version 1.1 Compliant
- Universal Analog IO
- Integrated Galvanic Isolation

Applications

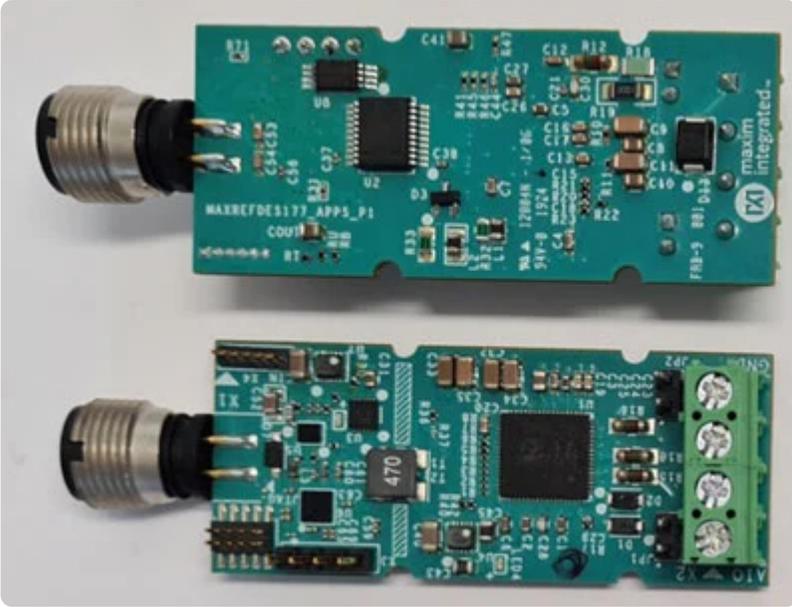
- Industrial Automation
- Analog Input Output Modules
- PLC and DCS Systems
- Smart Sensors and Actuators

MAXREFDES177# System Board



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