

TSL1401-DB Linescan Imaging Daughterboard

The TAOS TSL1401R-EVM/Parallax TSL1401-DB (#28317) linescan imaging daughterboard provides one-dimensional sight to almost any microcontroller. It is designed for plug-in compatibility with Parallax's BS2pe Motherboard but can be used with other BASIC Stamps, the Parallax Propeller, PICs, and AVRs, to name just a few. It is a platform suitable not only for evaluating TAOS's TSL1401R imaging chip, but also for incorporation into OEM products, as well as hobbyist, robotic, and educational platforms.



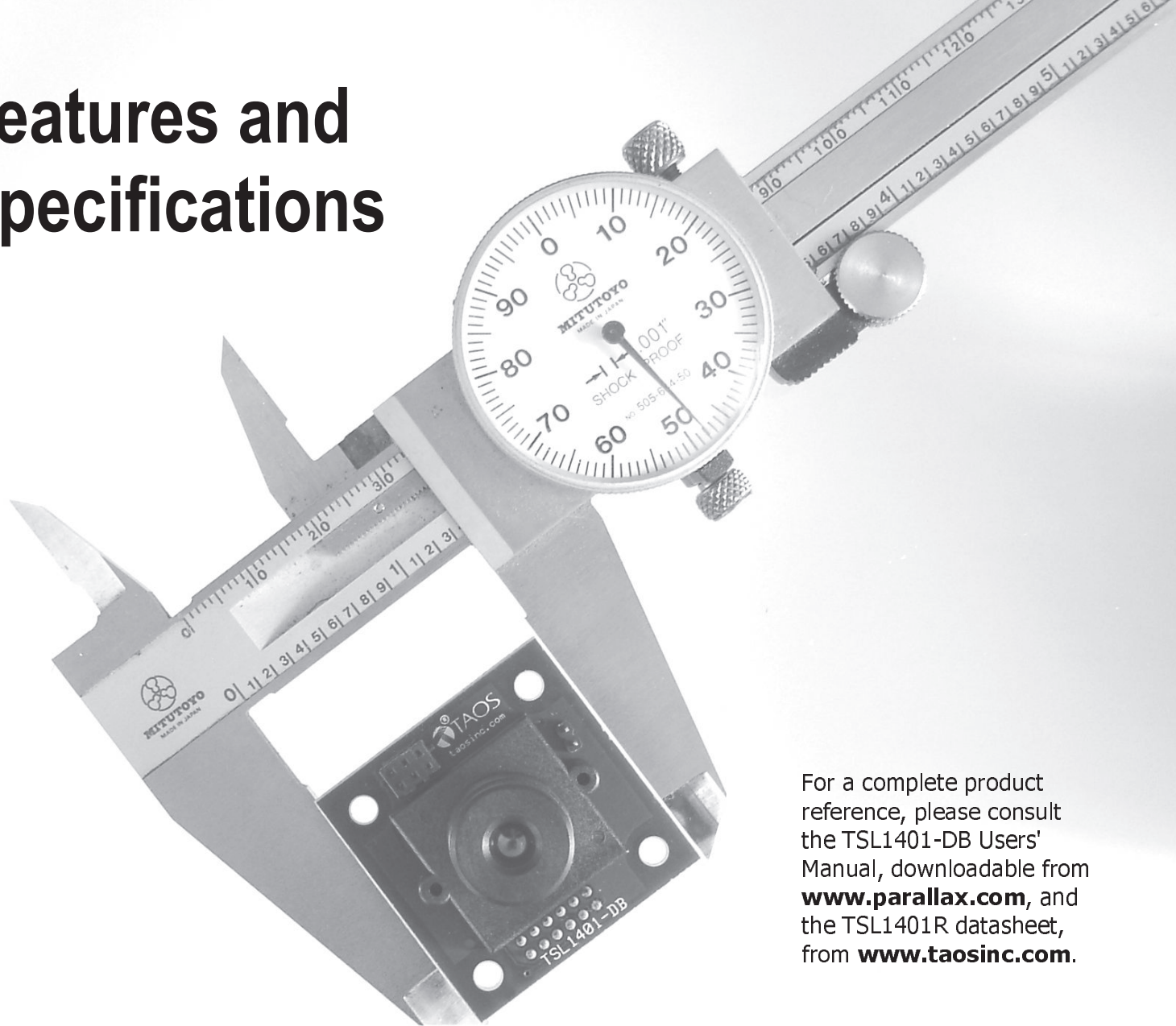
The TSL1401-DB includes the TAOS TSL1401R 128-pixel sensor chip, a 7.9mm focal length imaging lens, and control electronics to aid in capturing images for evaluation. It produces a clocked analog data output, whose voltage levels correspond to the light intensity at each pixel. By means of an analog-to-digital converter (or even a simple digital logic threshold), image data are easily transferred to a microcontroller to detect objects, edges, gaps, holes, liquid levels, textures, emissive sources, simple barcodes, and other visible features. Combining it with the BS2pe Motherboard and a suitable output device, one can construct a complete inspection system in a very compact form factor.

Central to the TSL1401-DB's ease of use is the 50-page manual and its accompanying software and firmware, all of which can be downloaded for free. The AVR coprocessor firmware for the BS2pe Motherboard, for example, provides a completely scriptable imaging frontend that captures images in the background and locates features, while the BASIC Stamp is busy with other tasks. Also included is a programming template and examples for both the Motherboard and the BASIC Stamp 2.

As an aid to seeing what the camera sees in real time, both for setting up and alignment and for trying various detection strategies, a PC-hosted monitor program provides both an oscilloscope view of the pixels, as well as a sweeping view of multiple scans laid side-by-side. It also includes user-selectable measurement tools for locating edges, counting pixels, computing extrema and averages, and the like. This program is designed to be used with the BASIC Stamp 2pe Motherboard and automatically uploads the PBASIC code necessary for communication.

Future add-ons for the TSL1401-DB's topside mezzanine connector include the LightSync-DBM for synchronizing to fluorescent lighting, and the Strobe-DBM, which will provide LED front-lighting.

Features and Specifications



For a complete product reference, please consult the TSL1401-DB Users' Manual, downloadable from www.parallax.com, and the TSL1401R datasheet, from www.taosinc.com.

Dimensions

1.35" (34.3mm) square x 1.2"
(30.5mm) deep, with lens.

Operating Voltage and Current

Vdd = 3.3V to 5.0V
Idd < 5mA

Signals

Pixel clock input (CLK): CMOS
Start scan input (SI): CMOS
Analog output (AO): 0V - Vdd
Optional trigger input: CMOS
Optional for Mezzanine (CMOS):
SCL input, SDA I/O, Strobe input,
Strobe output (open-drain)

Connector

Main: 12-pin Hirose DF11 (M)
Mezzanine: 6-pin Hirose DF11 (F)

Lens

Focal length: 7.9mm
Aperture: f2.4
Elements: 1 plastic asphere, 1 glass
+ IR-cut filter
Field of view: 53°
Focus: 25mm - infinity
Thread: 12mm x 0.5mm

Exposure Time

267µs to 68ms (BS2pe Moba)
2.03ms to 68ms (BS2)

Resolution

Analog: 128 pixels
Binary (interpolated): 255 pixels

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