Useful Sensors Inc
Tiny Code Reader Specification

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Revision History

Version	Notes	Date
A	Initial Draft	August 7th, 2023

Scope

This document applies to version 1.0 of the Tiny Code Reader module manufactured by Useful Sensors Inc.

Technology Specifications

Features

This module is designed to read QR codes from screens, paper, or e-ink displays, and transmit the encoded text information to a controlling microcontroller. It transmits this information over I2C, and has an LED that indicates the state of the scanning process.

Mechanical Information

Item	**Specification**	**Units**
Board Dimensions	0.75 x 0.64 x 0.42	Inches
Weight	40	grams
Mounting Screw	M2	

Ratings

Item	**Value**	**Unit**
Power Supply	3.3	Volts
Logic Voltage	3.3	Volts
Minimum Operating Temperature	-20.0	Celsius
Maximum Operating Temperature	80.0	Celsius
Maximum I2C Frequency	400	kilohertz
Maximum Current	40	milliamps

Pins

Pin	Name	Description
3.3v	Power	3.3 Volt power supply.
GND	Ground	Connection to ground.
SDA	Data	I2C pin for data transmission
SDC	Clock	I2C pin driven with clock from main controller.
INT	Interrupt	Not used on this module.

QR Code Specifications

QR Code is established as an ISO (ISO/IEC18004) standard. This module is designed to read comparatively small codes (40 characters or less) and expects codes with UTF-8 or ASCII binary encodings. There is a 254 byte hard limit on the code size that can be recognized, but accuracy will drop off with larger codes. All error correction levels are supported.

Environmental Specifications

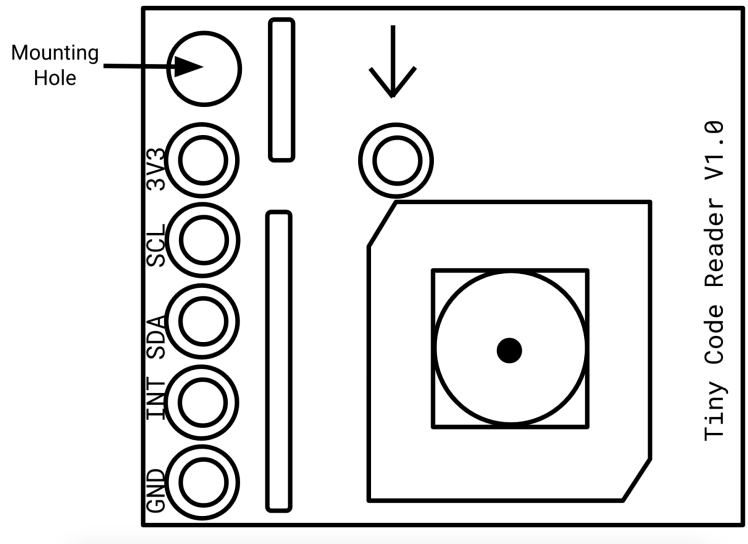
The module uses a CMOS image sensor and needs either visible light or near-infrared light to work. The recommended minimum lighting level is 100 lux, and a visible or near-IR LED (not included) will be needed to illuminate the scene if operation in dark areas is required. The image sensor focuses best 10cm to 15cm (4 inches to 6 inches) in front of the camera, with the code held perpendicular to the module. The module can be mounted in any orientation and the code recognition accuracy should be unaffected.

I2C Communication

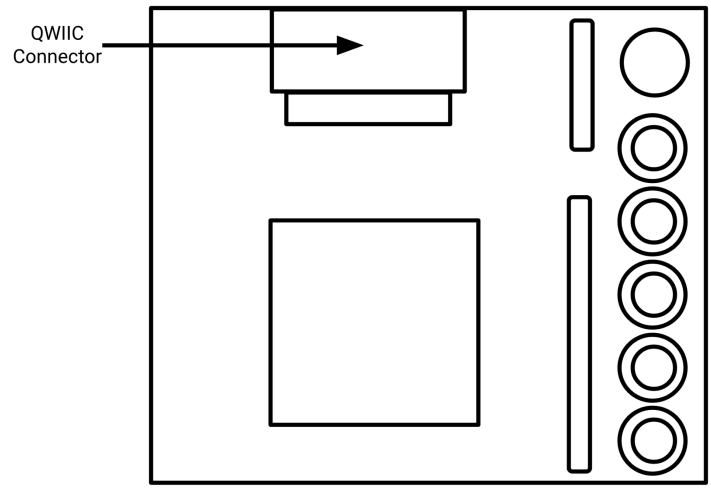
The I2C address of the module is 12 in decimal (0x0C in hex), and cannot be changed. All reads will return a data structure 256 bytes in length, starting with a 16-bit integer containing the length of any code message data, or zero if no code has been detected in the last frame. If this is non-zero, the next bytes up to that length contain the message bytes which should be decoded as UTF-8. Any remaining bytes up to the 256 byte payload length should be zero-ed, but it's best practice to not rely on that and zero-terminate yourself after the content bytes, or copy just the valid substring in environments that don't use zero-termination for string length.
Writing to the module with an initial byte of 1 and a second byte of zero will disable the LED. Writing a second byte of 1 will enable it.

Hardware Diagrams

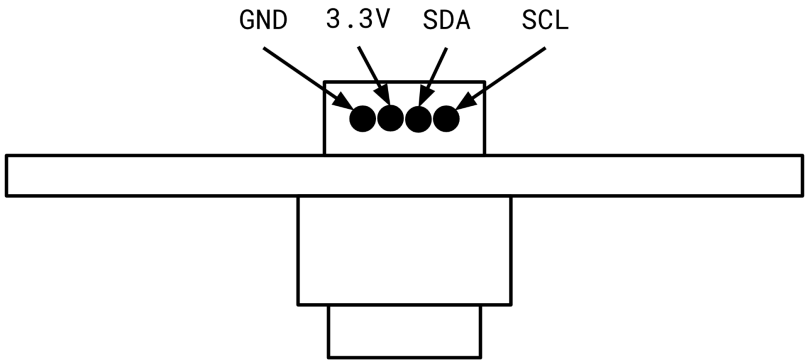
Front



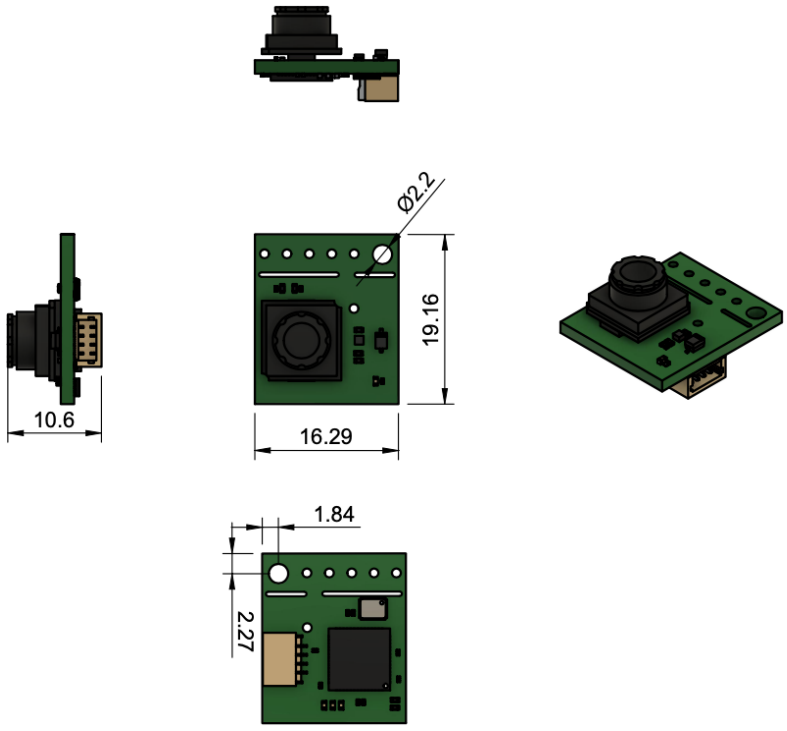
Back



Top



Dimensions



Certifications

FCC and CE certifications for this module are available at usfl.ink/tcr_certs.

Further Documentation

See the official developer guide at usfl.ink/tcr_dev for more programming information.