MATRIX Line Tracer 10 CH

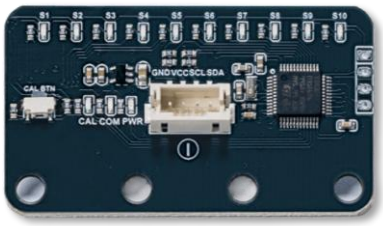
MS-018

1.Feature

· High Precision Light Sensors
· Smart Computing with STM32
· Fast Response with I2C
· Multiple Data Output

2. Application

· Robotics Competition
· Line Following Robots
· Automated Guided Vehicles (AGV)

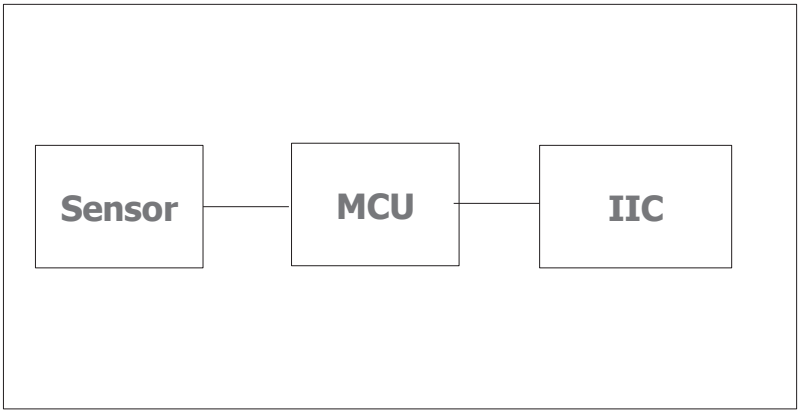


3. Introduction

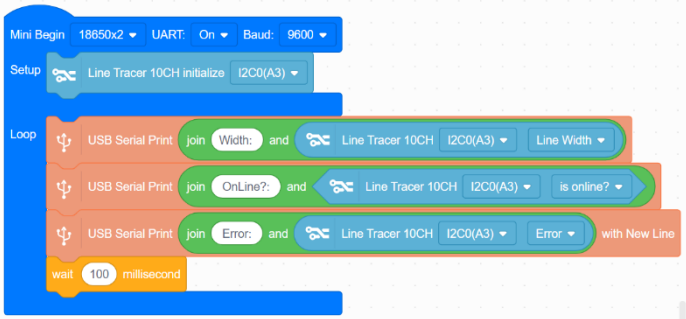
This module features 10 light sensors and a built-in STM32 chip. Unlike normal sensors, it calculates the line information automatically and sends the result to your robot.

This saves your robot's processing power and makes line tracking faster and smoother.

4. Block Diagram



4.Example Code of Block and C++



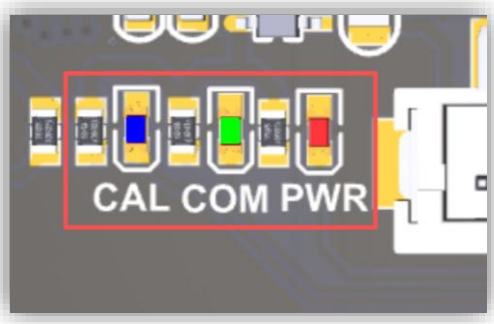

```cpp
#include "MatrixMiniR4.h"

void setup()
{
  MiniR4.begin();
  MiniR4.PWR.setBattCell(2);
  Serial.begin(9600);
  MiniR4.I2C0.MXLineTracer.begin();
}

void loop()
{
  Serial.print(String("Width: ") + String(MiniR4.I2C0.MXLineTracer.getLineWidth()));
  Serial.print(String(" OnLine?: ") + String(MiniR4.I2C0.MXLineTracer.isOnline()));
  Serial.println(String(" Error: ") + String(MiniR4.I2C0.MXLineTracer.getError()));
  delay(100);

}
```

· After download program into controller, open Serial Monitor to observe.

5. Indicator and Calibration Information

· Indicator Lights:

Status LED	Status	
PWR (Red)	Blinking	Working properly.
	Solid	**Malfunction**, power cycle device.
COM (Green)	Blinking	I2C Communication properly.
	Solid	**I2C hang up**, power cycle device.
CAL (BLUE)	Off	Calibration Mode End.
	Solid	Calibration Mode Start.



· Calibration Mode:

For Start/End the Calibration Mode:

1. Using program to Start/End.
2. Long Press the “CAL BTN” to Start/End.

How to Calibrate my sensor?

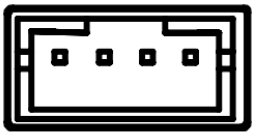
1. Start the Calibration mode.
2. Smoothly move the sensor between the black and white lines few times.
3. Stop the Calibration mode. The calibration data will be persistently stored in the sensor.

6. Hardware Spec and Information

Register Tabel (Summary) Default Device Address: 0x30			
Register	**Name**	**Data Type**	**Description**
0x00-0x09	Norm Value	uint8	Normalized light value of S1-S10
0x10	Line Width	uint8	Number of sensors on the line
0x13	Last Sensor	uint8	The last sensor to detect the line before it went missing.
0x15	Junction Type	uint8	0 = None, 1 = Left, 2 = Right, 3 = T or Cross, 4 = Unknown/None
0x20	Start Calib	-	Start Calibration Mode
0x21	End Calib	-	End Calibration Mode
0x30-0x39	Raw Value	uint8	Raw value of S1-S10
0xF0	FW Version	String	Sensor Firmware Version
0xF1	I2C Address Change	uint8	Change Device Address (0x30 ~ 0x37) *Recommended for professional users only

* As a high-speed unit, the current version sensor does not support I2C multiplexers and only supports connection to the native I2C channel. (Mini R4 native I2C channel is **Port A3 (I2C0)**)

Electrical Characteristics				
Parameter	**Min**	**Typ**	**Max**	**Units**
Supply Voltage (VCC)	3	3.3	5	V
Working Current	25	35	50	mA
Detection Range	4	-	12	mm
I2C operating speed	100	-	400	KHz



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JST PH2.0

Pinout-I2C			
NO.	**Name**	**I/O**	**Description**
1	SDA	I/O	Serial data line.
2	SCL	I	Serial clock line.
3	VCC	O	Supply voltage.
4	GND	-	Supply ground.