

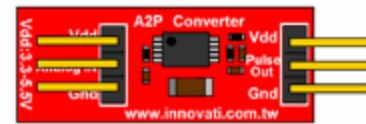
IRF6 --- Infrared Range Finder

Overview

IRF6 is an infrared range finder module consisting of a TCRT5000 reflective optical sensor board, which emits infrared light to detect the reflective infrared intensity and an Analog-to-Pulse (A2P) Converter board. The A2P Converter board converts the analog output of TCRT5000 board into pulse width. By measuring the pulse width, the analog readings can be obtained with the PulseIn command. The analog output can also be read directly with the command GetADC command from the I/O Extender module. The recommended detection range is 0.2mm~60mm.



TCRT5000 Board



Analog to Pulse (A2P) Converter

Applications

- Short distance range finding
- Autonomous robot line following
- Proximity detection for collision
- Contactless switch
- Gray level detection
- Photo encoder

Features

- Recommended detection range 0.2~60mm
- Input voltage 5V
- Compact size for tight space

Connection

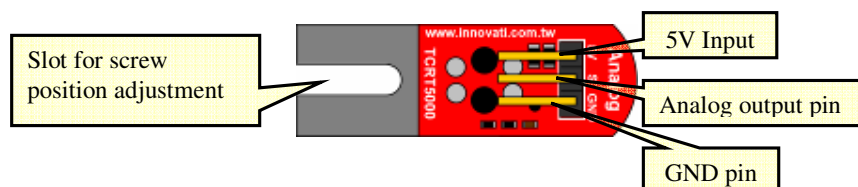


Figure 1 TCRT5000 Board Description



Figure 2 A2P Board Description



Figure 3 TCRT5000 Board connection for analog output

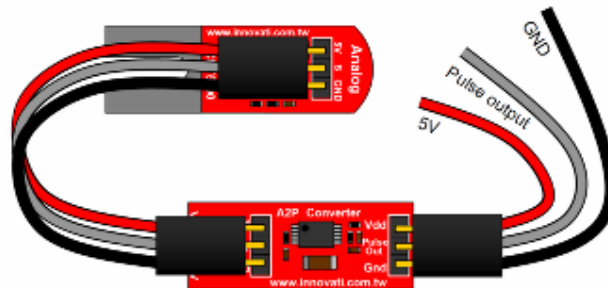


Figure 4 Connecting TCRT5000 Board to A2P for pulse output

Specification

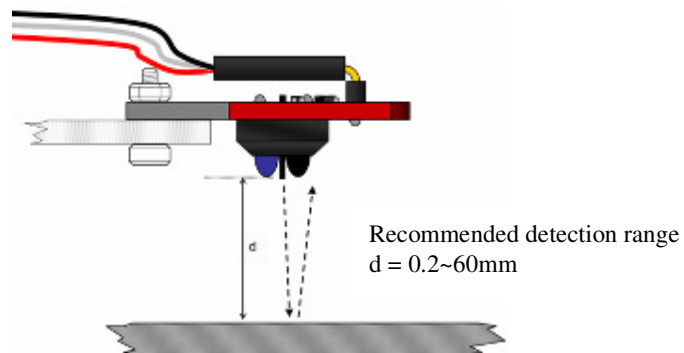


Figure 5 Detection Range

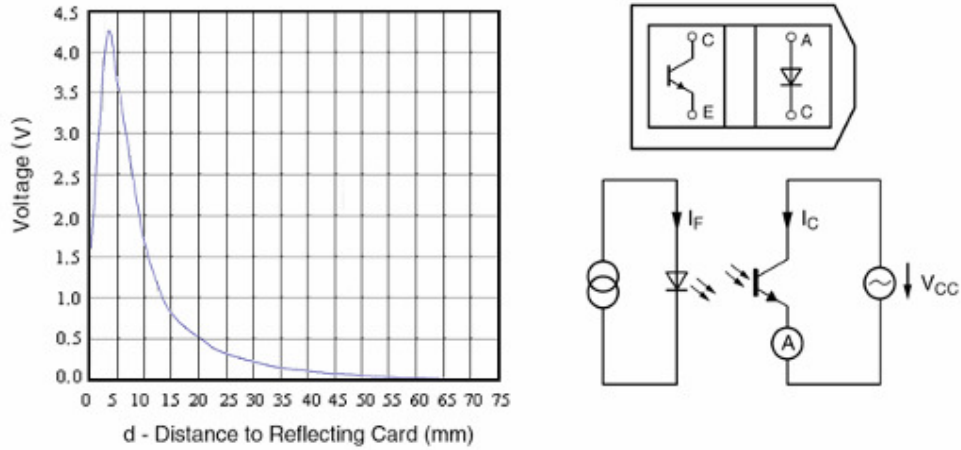


Figure 6 TCRT5000 Voltage vs. Distance Characteristic Curve

Circuit Diagram

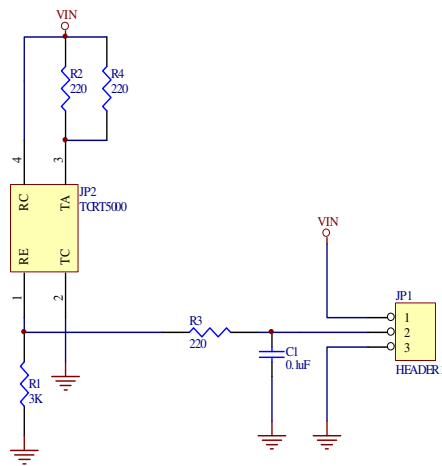


Figure 7 TCRT5000 Board Circuit Diagram

A2P Pulse Duty

Instead of connecting the analog output to an AD converter to get the TCRT5000 analog voltage value, use the A2P Converter module to measure the pulse width directly. The pulse is emitted every 10ms (1ms=1/1000 sec). The low pulse width represents the analog voltage value. Its width varies from 0 to 4096 us (1us=1/1000 ms) with 2us resolution.

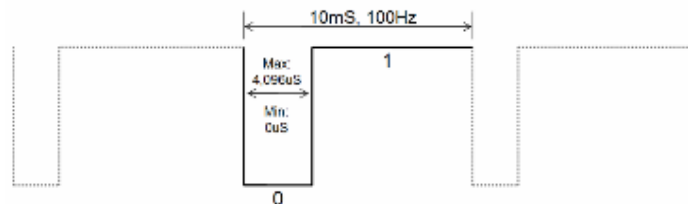


Figure 8 A2P Pulse Duty

The conversion formula is:

$$\text{Width} = V_i(\text{analog input}) / V_{dd} \times 4096 \text{ (us)}$$

Assuming the analog voltage output from TCRT5000 is 3V and the supplied voltage is 5V.
Applying the above formula:

$$3 / 5 \times 4096 = 2457.6 \approx 2458 \text{ (us)}$$

the low pulse width will be 2458us.

Dimensions

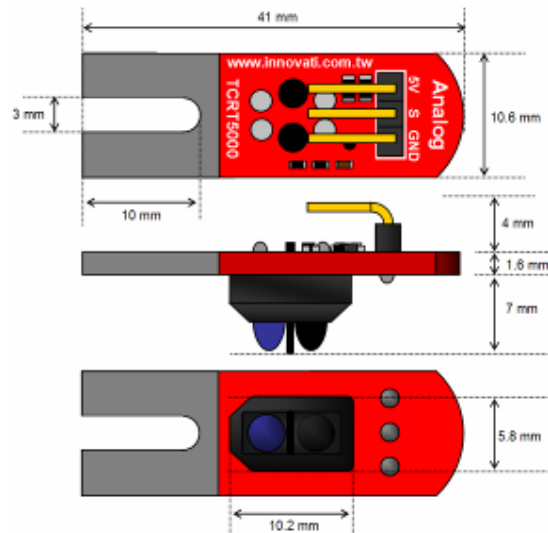


Figure 9 TCRT5000 Board Dimensions

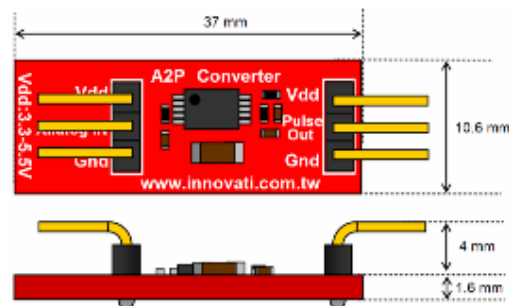


Figure 10 A2P Board Dimensions

Example Program

Example I

Use PULSEIN command to read TCRT5000 analog output data through A2P module.
Connect the TCRT5000 board to A2P board. Then connect the Pulse Output pin of A2P to

BASIC Commander® pin 0 to measure the pulse width.

```
Sub main()
Dim temp As Word
  Do
    Pulsein 0,0,temp           'measure pulse width
    Debug "Input Signal =", Temp,CR 'display pulse width
    Pause 100                 'wait 100ms
  Loop                       'infinite loop
End Sub
```

Example II

Use GETADC command of I/O Extender to measure TCRT5000 analog output directly. Set the DIP switch of the I/O Extender module to 0 and connect it to the BASIC Commander®. Then connect the Analog Output pin of TCRT5000 board to I/O Extender pin PA0.

```
Peripheral MyIO As IOExtenderA @ 0 'declare module ID as 0
Sub main()
Dim temp As Word
  MyIO.SetADC 1 'start pin PA0 AD conversion
  Do
    MyIO.GetADC 0,temp 'read AD value
    Debug "Input Signal =", Temp,CR 'display AD value
    Pause 100 'wait 100ms
  Loop 'infinite loop
End Sub
```