Spec Sheet

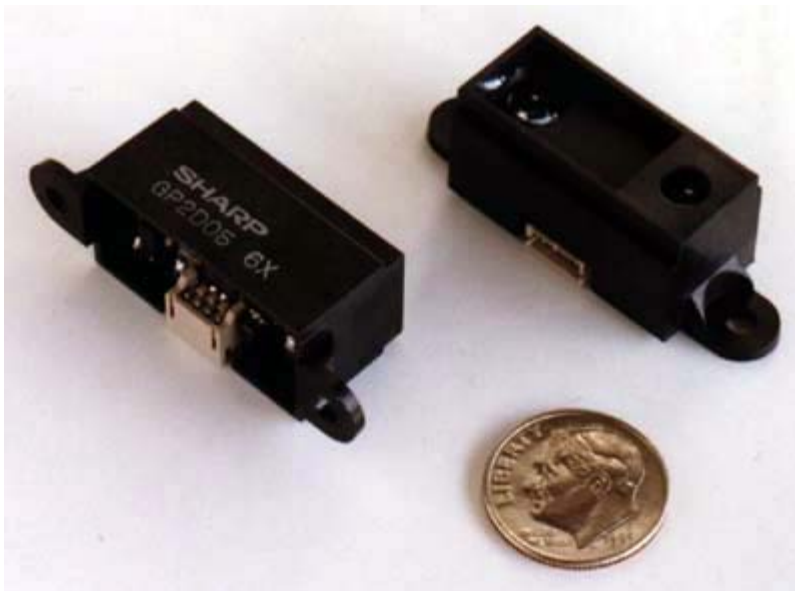### for the

Sharp GP2D02 Infrared Ranging Sensor

Section 1: General Description and How Used

Advantages over other sensing devices:

- Impervious to color and reflectivity of reflected object

- High precision distance measurement through output for direct connection to microcomputer

- Low dissipation current at OFF-state (Typically 0.3 uA).

- Capable of changing of distance measuring range through use of a lens

This sensor takes a distance reading when enabled and reports the distance as a byte-value cooresponding to the distance between 10cm (~4") to 80cm (~30"). The interface is 4-wire and requires a JST connector which is included with each detector. A JST connector stands for a Japan Solderless Terminal Connector; see http://www.acroname.com/robotics/parts/R9-JSTCON.html for pricing. Also included in the package is a diode required for interfacing the detector to TTL/CMOS logic. Controlling the detector is done by lowering the input line, waiting for ~70ms, and then clocking the detector 8 times to read out the distance measurement on the output line. Each package includes a booklet that describes plugging together the connector, interfacing the detector to logic and the protocol used to take measurements using the GP2D02.

Section 2: Specifications

Timing Limits

Fastest sampling interval: **70 ms**

65 ms specified by manufacturers as max rate.

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit	Remarks
Supply Voltage	V_{CC}	-0.3 to +10	V	
Input Terminal Voltage	V_{in}	-0.3 to +3	V	Open drain operation input
Output Terminal Voltage	BV_O	-0.3 to +10	V	
Operating Temperature	T_{opr}	-10 to +60	°C	
Storage Temperature	T_{stg}	-40 to +70	°C	

Operating Supply Voltage

Parameter	Rating	Unit
Operating Supply Voltage (V_{CC})	4.4 to 7	V

Electro-Optical Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Distance measuring range	delta L	[1], [3]	10	-	80	cm
Output Terminal Voltage	V_{OH}	Output Voltage at High, [1]	V_{CC}-0.3	-	-	V
Output Terminal Voltage	V_{OL}	Output Voltage at Low, [1]	-	-	0.3	V
Distance characteristics of output	D	L=80cm, [1]	-	75	-	DEC
Distance characteristics of output	delta D	Output change at L=80cm to 20cm, [1]	48	58	68	DEC
Average dissipation current	I_{cc}	L=20cm, [1], [2]	-	22	35	mA
Dissipation current at OFF-state	I_{off}	L=20cm, [1]	-	3	8	uA
Vin terminal current	I_{vin}	Vin = 0V	-	-170	-280	uA

L: Distance to reflected object
DEC: Decimal value of sensor output (8-bit serial)
[1] Reflected object: White paper (reflectivity: 90%)
[2] Average dissipation current measured on the conditions shown below.
[3] Vin terminal: Open drain drive input.
   Conditions: Vin terminal current at Vin OFF-state: -1uA
                 Vin terminal current at Vin ON-state: 0.3V

Section 3: Sources and Pricing

Complete package including detector, diode, connector, and booklet available from Acroname.

Acroname

> **Price: $21.00 each**
> **Part Number: R19-IR02**

Section 4: Interfacing and Code

Sharp GP2D02 Interface to a BasicX Dev. Board

In this example, the Sharp GP2D02 detector provides 8-bit range detection and is interfaced to the BasicX Developer Board made by NedMedia, Inc. The controller continually polls the detector and sends the range reported by the detector as text out the RS-232 connection at 19200 baud. You could use a terminal program like Z-Term on the Mac or HyperTerminal on the PC to view this output, or you can interface the microcontroller with a standard VB interface using a MSComm object.

Circuit Schematic
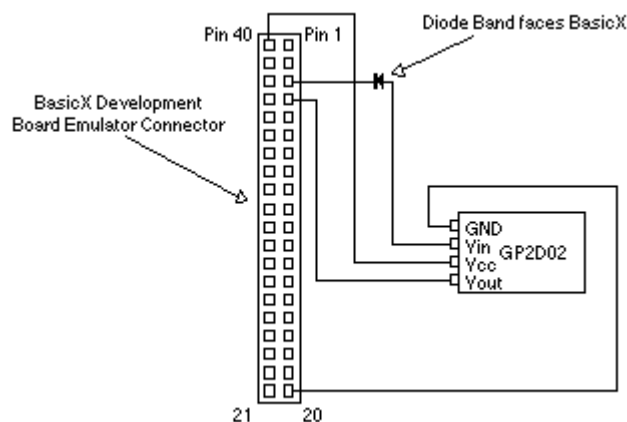
The above schematic uses the development board for the BasicX chip. The chip has the exact same pinout as the Development Board so you could build the same circuit using just the BasicX chip. The BasicX chip needs only a crystal and power to function.

This circuit uses an interface diode to prevent the HIGH logic level of the PIC's output at RB1 to exceed the 3.3 volts allowed by the GP2D02 detector. This diode is included with and described in the instructions of the R19-IR02 package.

Source Code Example

```
' Demo program for the Sharp GP2D02 IR Range finding module
' By Chris Harriman NetMedia, Inc. 1999
' VCC Connected to +5 OR pin 40 on Development Board
' Gnd to Gnd or pin 20 on development Board
' Vin Connected to BasicX pin 3 through a 1N4148 diode
' Vout Connected to BasicX pin 4
' Data is sent out via BasicX Com2 on Development boards serial-
' connector at 19200,n,8,1

dim icom2(1 to 10) as byte
dim ocom2(1 to 30) as byte
dim data as byte


sub main()
        call putpin(21,0)
        call openqueue(ocom2,30)
        call openqueue(icom2,10)
        call opencom(2,clng(19200),icom2,ocom2)
        call putpin(3,1)
        call sleep(30)
        do
                all putpin(3,0)
                if getpin(4) = 1 then
                        call read
                        call inttostring(data,10)
                        call putqueuestr(ocom2,chr(13) & chr(10))
                        call putpin(3,1)
                        call sleep(30)
                else
                end if
        loop
end sub

sub read()
        dim bit as byte
        dim z as integer
        data = 0
        bit = 128
        for z = 1 to 8
                call putpin(3,1)
                call putpin(3,0)
                if getpin(4) = 1 then
                        data = data or bit
                end if
                bit = bit \ 2
```

```
        next
        call putpin(3,1)
end sub

function hexconv(byval b as byte) as byte
        if b > 9 then
                hexconv = b + 55
        else
                hexconv = b + &h30
        end if
end function

sub inttostring(byval i as byte, byval base as byte)
        dim x(1 to 9) as byte
        dim v as byte
        dim j as integer
        j = 0
        v = i
        do
                j = j + 1
                x(j) = hexconv(cbyte(abs(v mod base)))
                v = v \ base
                if v = 0 then
                        exit do
                end if
        loop
        for j = j to 1 step -1
                call putqueue(ocom2,x(j),1)
        next
end sub
```