Out of the box

Description: The Hitachi HM55B Compass Module is a low cost, dual axis magnetic field sensor that can give your next electronic or robotic project a sense of direction. It is capable of detecting microtesla ($\mu T$) variations in magnetic field strength. North/south and east/west sensing axes make it easy for the BASIC Stamp® microcontroller to resolve and display direction in a 360° format, with magnetic north at 0°, northeast at 45°, east at 90°, south at 180°, and so on.

Getting Started: Build the circuit on your BASIC Stamp carrier board from the schematic shown below. Either hand enter the example program (see other side) into your BASIC Stamp Editor, or open it after downloading it from the product page listed in Additional Resources. Run the program and verify that the compass module gives you an angle measurement that corresponds to the direction it is pointing. If you are comparing the compass module’s readings to a magnetic compass, use the magnetic compass to align a non-metallic object to the direction you want to test. Then, set the magnetic compass well away from the object before testing the compass module against it.

For Best Results: Go to the Hitachi HM55B Compass Module product page, and download the Hitachi HM55B Compass Module Documentation.pdf. Operate on flat surface, away from magnetic field disturbances such as large metal objects, motors, coils, magnets, power cords and programming cables.

Precautions: Do not operate or store near strong magnetic fields created by bar magnets, electromagnets, or electric motors.

A sense of direction opens up a variety of BASIC Stamp project and product possibilities. Here are just a few examples:

- Mobile robot direction sensor
- Weathervane indicator for remote weather stations
- Audible compass for the vision impaired
- Handheld electronic compass
- Automotive electronic compass

While this package insert provides an example circuit and test program, there are lots more online resources listed in the Additional Resources section.

Features:

- Compact and breadboard-friendly package
- Easy to control and read with SHIFTOUT and SHIFTIN
- Sensitive to microtesla ($\mu T$) variations in magnetic fields
- Dual axes simplifies direction determination
- Built-in resistor protection for data pins
- 6-Bit (64–direction) or better resolution after calibration
- Only 30 to 40 ms between start measurement and data-ready

Additional Resources

Check out the Hitachi HM55B Compass Module product page for complete product documentation, example programs, the Hitachi® HM55B datasheet, and more:
Example BASIC Stamp Source Code

; TestHm55bCompass.bs2 - This Hitachi HM55B Compass Module test program displays x (N/S) and y (W/E) axis measurements along with the direction the Compass Module is pointing, measured in degrees clockwise from north.

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; {$STAMP BS2}
; {$PBASIC 2.5}

-----[ Pins/Constants/Variables ]----------------------------------------

'DinOut PIN 6 ' P6 transceives to/from Din/Dout
Crk PIN 5 ' P5 sends pulses to HM55B's Clk
En PIN 4 ' P4 controls HM55B's /EN(ABLE)

Reset CON %0000 ' Reset command for HM55B
Measure CON $1000 ' Start measurement command
Report CON $1100 ' Get status/axis values command
Ready CON $1100 ' 11 -> Done, 00 -> no errors
NegMask CON $1111100000000000 ' For 11-bit negative to 16-bits

x VAR Word ' x-axis data
y VAR Word ' y-axis data
status VAR Nib ' Status flags
angle VAR Word ' Store angle measurement

-----[ Main Routine ]--------------------------------------------

DO ' Main loop

GOSUB Compass_Get_Axes

angle = x ATN -y ' Convert x and y to brads
angle = angle */ 360 ' Convert brads to degrees

DEBUG HOME,
"x-axis N(-S) = ",SDEC x,
CIREOL, CR, "y-axis W(-E) = ",
SDEC y, CIREOL, CR, CR, "angle = ",
DEC angle, " Degrees", CIREOL

PAUSE 150 ' Debug delay for slower PCs

LOOP ' Repeat main loop

-----[ Subroutines ]--------------------------------------------

Compass_Get_Axes: ' Compass module subroutine

HIGH En: LOW En
SHIFTOUT DinDout,clk,MSBFIRST,[Reset\4]

HIGH En: LOW En
SHIFTOUT DinDout,clk,MSBFIRST,[Measure\4]
status = 0

DO ' Status flag checking loop

HIGH En: LOW En
SHIFTOUT DinDout,clk,MSBFIRST,[Report\4]
SHIFTIN DinDout,clk,MSBPOST,[Status\4]
Get Status

LOOP UNTIL status = Ready
SHIFTIN DinDout,clk,MSBPOST,[\x\1\1,\y\11]
HIGH En

IF (y.BIT10 = 1) THEN y = y | NegMask
IF (x.BIT10 = 1) THEN x = x | NegMask

RETURN

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