PN: SS-HDC2010#I2C   SKU: ITBP-6005

s-Sense by itbrainpower.net

HDC2010 I2C sensor breakout

Equipped with **HDC2010** - low power and high accuracy integrated humidity and temperature sensor. HDC2010 provides measurement capabilities for a wide range of environmental monitoring applications and IoT such as smart thermostats, smart home assistants and wearables. The HDC2010 can also be used to provide critical temperature and humidity data for cold chain transportation and storage of perishable goods like food and pharmaceuticals.

HDC2010 breakout features:
- *I2C interface**, 3.3-5V auto* [default, the I2C reference voltage follows the power in voltage],
- *I2C reference voltage* option via solder jumper [Eg.: power at *5V and I2C at 3.3V*; *power and I2C at 2.2V*],
- *alternative sensor I2C addresses* via solder jumpers,
- power in with voltages between 3.3-5V [default],
- big soldering pads on 2.54 mm [0.1"] pitch for standard row header / connector,
- very light and slim - 13x27mm, around 2grams,
- compatible with Arduino [all 3.3V and 5V], xyz-mIoT shields, Raspberry PI [all versions] and other SBC / MCU Arduino [Beagle Bone, Teensy, ...]
- Arduino C, Raspberry PI [Python] software support.

HDC2010 sensor features:
- relative humidity range 0% - 100%
- humidity accuracy +-2% (factory calibrated)
- temperature from -40C to +125C (functional) and -40C to +80C (operational)
- typical temperature accuracy +-0.2C (factory calibrated)
- embedded heating element to burn away condensation

HDC2010 datasheet: https://itbrainpower.net/downloadables/hdc2010.pdf

Designed and manufactured in EU by R&D Software Solutions.

HDC2010* breakout

temperature and humidity - environmental sensor

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* HDC2010 digital sensor provided by Texas Instruments

** Additional signal is available on PCB bottom:
- HDC2010 INTERRUPT signal it is available on PAD9.

HDC2010 breakout :: INTERFACES, PADS and SOLDER JUMPERS

I2C and POWERING INTERFACE

In the left edge of the top PCB side, top to bottom:

1. Vin - POWER IN 3.3V / 5V (default) *
2. 3V3 - <u>Vdd</u> - LDO output (default) / LDO bypass IN **
3. SDA - I2C SDA [default, pulled up at Vin]***
4. SCL - I2C SCL [default, pullup up at Vin]***
5. GND - POWER and I2C GROUND

* Default, the I2C reference voltage follow the Vin voltage. If your board (Arduino/other) it's 5V compliant, connect +5V to Vin. Similar, for 3.3V compliant board (RPI/Arduino) connect 3.3V source to Vin.

** 3.3V voltage it's available on <u>Vdd</u> PAD, if Vin it's connected to 5V. Bypass LDO - see schema and read docs.

*** Default, the I2C reference voltage follows the Vin voltage! Read bellow about I2C reference voltage and *s1* solder jumper.
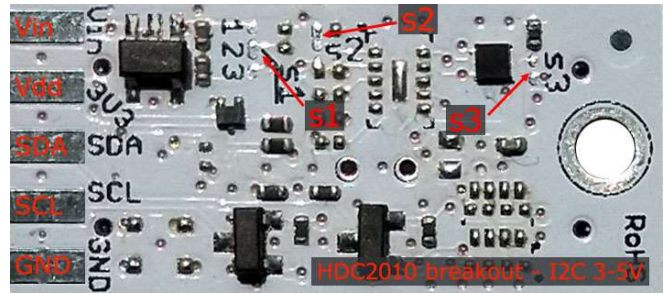

Image 1 – sensor top side

SOLDER JUMPERS

s1 : I2C reference [Vin or 3V3-bypass], default Vin *

s2 : RESERVED

s3 : HDC2010 I2C address [0x40/0x41], default 0x40 *

* Read about s1, s2 and s3 functionality bellow.

SIGNALS INTERFACE and MARKING

In the left edge of the bottom PCB side, top to bottom:

6. RESERVED
7. RESERVED
8. RESERVED
9. HDC2010 INTERRUPT** output (w. pullup***)
nc. NOT CONNECTED

* Read about HDC2010 INTERRUPTS in HDC2010 documentation!

* Taking a look at how-to posts and inside software examples may be quite helpful.
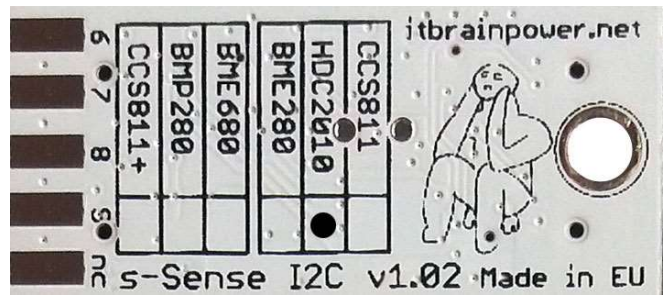
*** Default HIGH level.

Image 2 – sensor bottom side

Observe the sensor breakout marking on PCB board (here, HDC2010 sensor it's marked as populated).

HDC2010 breakout :: Arduino / Raspberry PI basic interfacing

HDC2010 breakout	Arduino 5V [Eg.: UNO]	Arduino 3.3V [Eg.: Zero]	RPI [B/B+/II/3/3+/Zero/Zero W]
Vin PAD*	5V	3.3V	PIN1 (3.3V)
Vdd PAD (3V3)*	-	-	-
SDA PAD	SDA	SDA	PIN3 (SDA)
SCL PAD	SCL	SCL	PIN5 (SCL)
GND PAD	GND	GND	PIN9 (GND)
9 - HDC2010 INT **	-	-	-

* here, power in default mode (sensor & MCU power and I2C at same voltage!!). For alternate mode see solder jumper description bellow.

** HDC2010 INT (output) signal is default HIGH level and the behavior it's programable. If required, connect to one GPIO [set as INPUT], INTERRUPT capable. See examples and read HDC2010 docs.

HDC2010 breakout :: solder jumpers description; power scenarios

s1* - I2C reference voltage selector - shipped with circuit 1-2 closed and circuit 2-3 open (default mode).

In **default mode**, the I2C reference voltage follows the voltage applied to Vin! Default mode use cases:
  - shield/MCU it's 5V compatible ==> connect Vin at 5V; the I2C reference it's 5V!
  - SBC/shield/MCU it's 3.3V compatible ==>connect Vin at 3.3V; the I2C reference it's 3.3V!.

Alternate mode - I2C reference voltage follows the Vdd voltage! - modify *s1* as: 1-2 circuit open, 2-3 circuit closed [carefully interrupt/cut the circuit line between pads 1 and 2, and solder over pads 2 and 3].

Alternate mode scenarios:
  - apply 3.6-7V to Vin. The I2C reference voltage it's set at 3.3V! Also, at Vdd pad (LDO output) 3.3V (up to 100mA) it's available for third part powering (anyway, try to keep the sunk current as low as possible, in order to avoid thermal errors).
  - keep Vin not connected. Apply 2.8 or 3.3V to Vdd (the LDO it's bypassed). The I2C reference voltage it's set at voltage applied to Vdd pad!

s2 - RESERVED

s3 - **HDC2010 I2C address** - default circuit open, HDC2010 having 0x40 as I2C address. Solder over *s3* pads [circuit closed] in order to select the alternate I2C address [0x41].

* Consult s-Sense block schema for more information. See projects/how to section.

HDC2010 breakout :: ARDUINO & RaspberryPI software

https://itbrainpower.net/downloads.php#s-Sense

HDC2010 breakout :: ARDUINO & RaspberryPI documentation

https://itbrainpower.net/downloads.php#s-Sense_documentation

HDC2010 breakout :: projects and how to

https://itbrainpower.net/projects

HDC2010 breakout :: part number / SKU

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