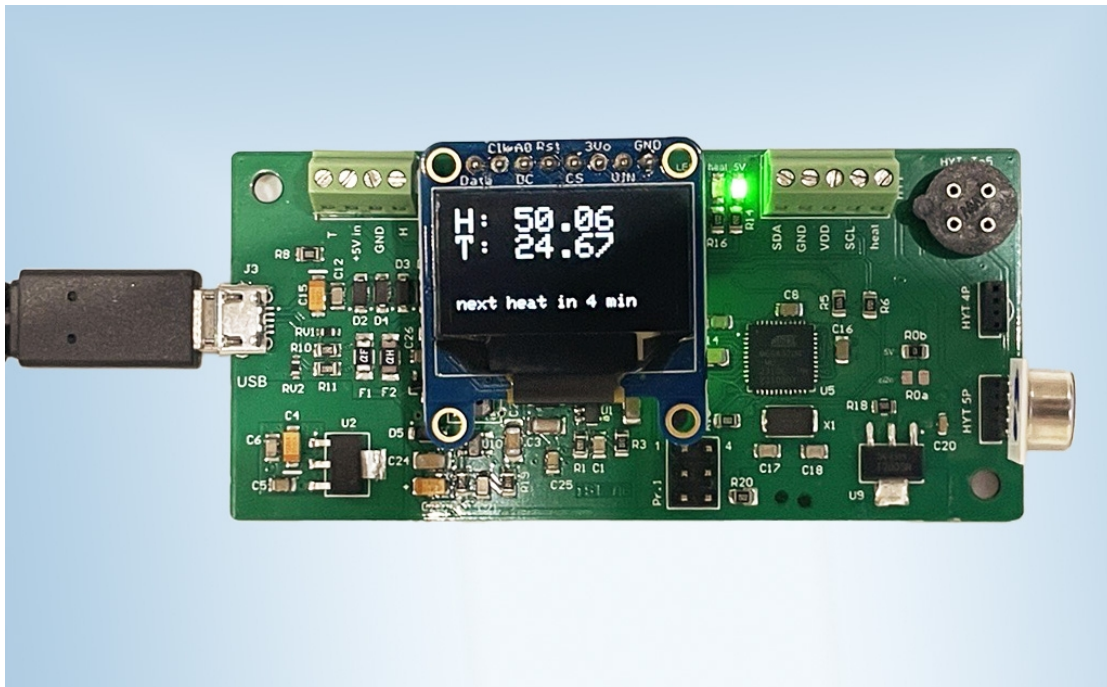




Quick Start Guide

Evaluation board with heating

for RH/T modules HYT223, HYT271, HYT221 and HYT939P



Material no. 157288

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An USB port allows to connect the board to a PC as power supply and to read out and log data. The board is compatible with Arduino IDE platform.



1.3 Analog signal outputs

Pins on connector	Minimum value	Maximum value
H -GND / Humidity	0V / 0%	10V / 100%
T -GND / Temperature	0V / -40°C	10V / +125°C

Use following formula to convert analog voltage output signals to measurement values:

Relative humidity $RH [\%] = U_h [V] * 10$

Temperature $T [^{\circ}C] = U_t [V] * 16.5 - 40$

1.4 Compatibility

For the communication between transmitter and HYT humidity module the digital I²C protocol is applied. The transmitter is pre-programmed to recognise a HYT module with the default I²C address 0x28.

For information on how to change the I²C address of a HYT module, please refer to the HYT application note available from the iST AG website. Please note that no more than one HYT humidity module is to be connected to the transmitter at any given time. Refer to Schematics (1.1) for position of the sockets.

The below listed material numbers refer to our standard versions, which are available in the IST AG webshop. For custom calibration or housing solutions please contact our customer service. Module HYT.R411 is NOT compatible with this evaluation board.

1.5 Signal Input

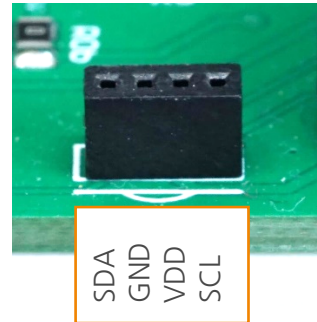
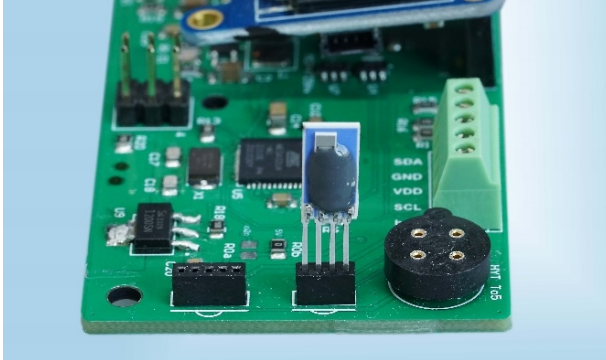
The following images show the correct orientation of the HYT modules in the socket along with the corresponding pin alignment of the modules. At any given time, only 1 module is to be connected to the board.

Legend to pin assignment of HYT modules:

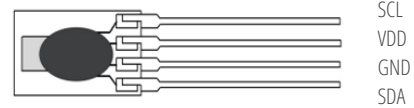
SCL	I2C SCL serial clock
VDD	+5V power supply for HYT module
SDA	I2C SDA serial data
GND	Ground
Heat	+9V power supply for heating structure



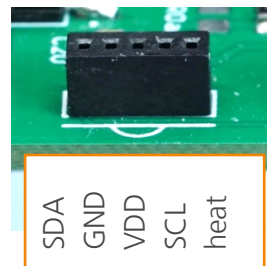
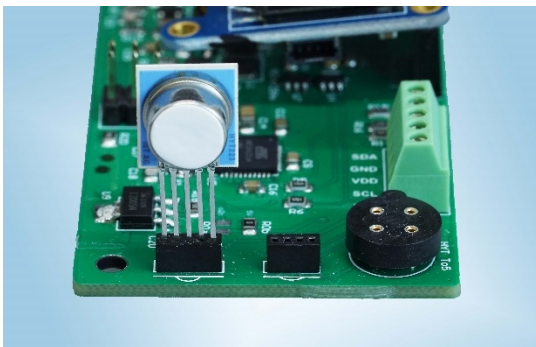
1.5.1 HYT 271



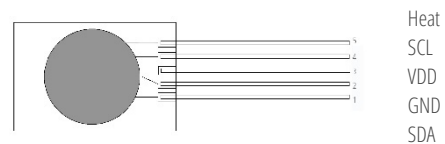
Material no. 153349, 153382, 153680
4-pin socket



1.5.2 HYT 223



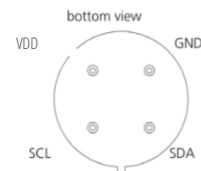
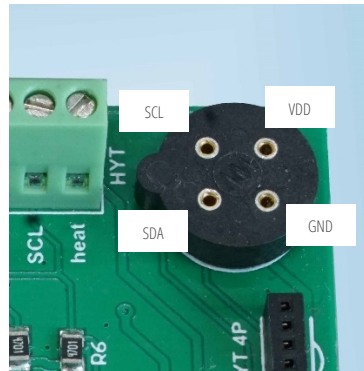
Material no. 151331
5-pin socket





1.5.3 HYT 939

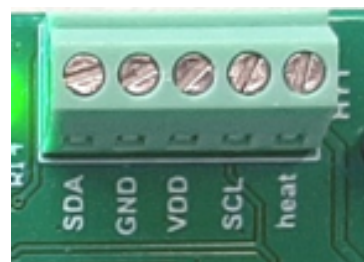
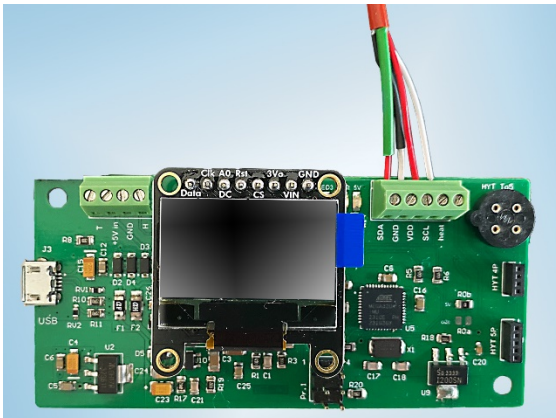
Please note that the shape of HYT939P housing has a marked orientation against the socket.



Material no. 153658, 154417, 153398

TO5 Socket

1.5.4 HYT probe assemblies*



Material no. 156389, 153326, 155958

Connector HYT wire

* All above listed HYT modules connected via an extension cable. The recommended maximum length of the extension cable is 30 cm. The quality of signal transmittance depends on operational conditions and the cable material.



2. Evaluation board start-up

2.1 Analog interface operation

Mount a selected humidity module on the board following instructions in chapter 1.5 Signal input. Check SDA/VDD/GND/SCL markings on the board and match the HYT orientation. While handling HYT modules, take precautions to avoid ESD damage and avoid touching sensitive sensor areas. Consult the HYT application note for detailed handling instructions with pictures.

Set a laboratory power source to provide stable +5V DV. Connect the analog voltage outputs to your data logger and connect the board to the power source. Use pins marked GND and H to measure U_h for relative humidity. Use pins marked GND and T to measure U_t for temperature. Both output signal ranges are 0 to +10V.

After powering on, relative humidity and temperature values shall appear on the display. Analog outputs transmit the measurement values and can be translated according to instructions in chapter 1.3.



2.2 PC interface operation

Mount a selected humidity module on the board following instructions in chapter 1.5 Signal input. Check SDA/VDD/GND/SCL markings on the board to match the HYT orientation. While handling HYT modules, take precautions to avoid ESD damage and avoid touching sensitive sensor areas. Consult the HYT application note for detailed handling instructions with pictures.

Connect a micro USB cable to the board to provide +5V voltage from an power adapter or PC.

With the board powered on, measurement values appear on the display. For signal read out both analog and digital interfaces are available.

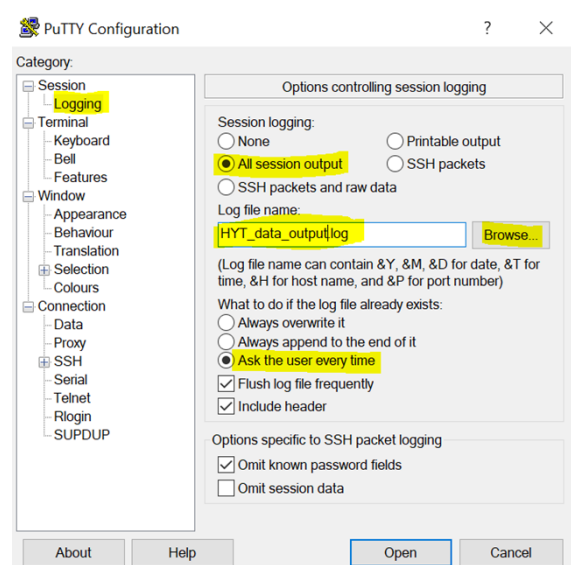
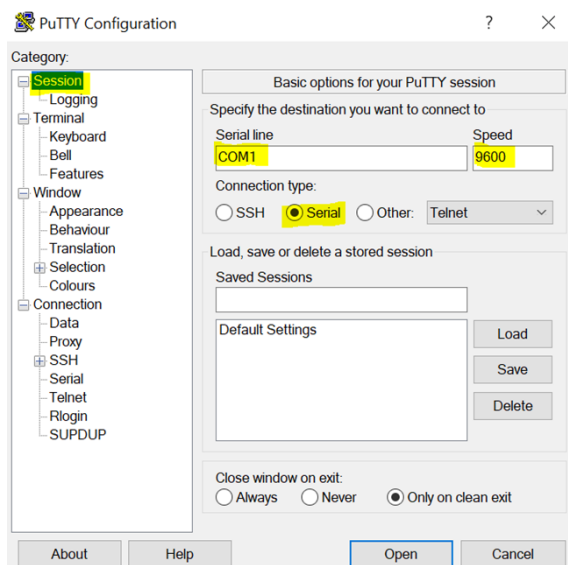


2.3 PC read-out

A terminal software such as PuTTY (www.putty.org) can be used to read out and log data.

Start-up:

1. Connect a HYT humidity module to the correct port on the evaluation board. Refer to the corresponding pin assignments for the orientation (match SDA/ VDD/ GND/ SCL).
2. Connect the evaluation board to a PC using a micro USB cable.
3. Determine the COM Port number assigned (e.g. look for Arduino Micro in the Ports section of the Windows device manager section Ports (COM&LPT))
4. Start the terminal software PuTTY.
5. Select Serial and enter the COM port number. Set Speed to 9600.
6. Open the Logging part of Settings. Select logging all session outputs and determine file name with destination folder.
7. Click Open to connect the board.
8. In the empty window that appears, press the key "m" for measure. A single measurement value pair for relative humidity and temperature are displayed.
9. Start interval logging with a set measurement interval. Use e.g. "160000" to log every 60000 milliseconds (equal to 1 minute). Be aware that the response time of the HYT module in a particular installation depends on multiple factors including flow conditions.
10. Check log file in the set folder location for generated content.
11. Press "m" key to stop continuous measurement and logging.





Functions:

m Single point measurement

Ixxxx Start automatic measurement with set interval xxxx = interval in mSec. (e.g. I1000 shall log a measurement every 1000 mSec, i.e. 1 second)

Measurement data can be logged and exported in form of a log file from the PuTTY terminal.

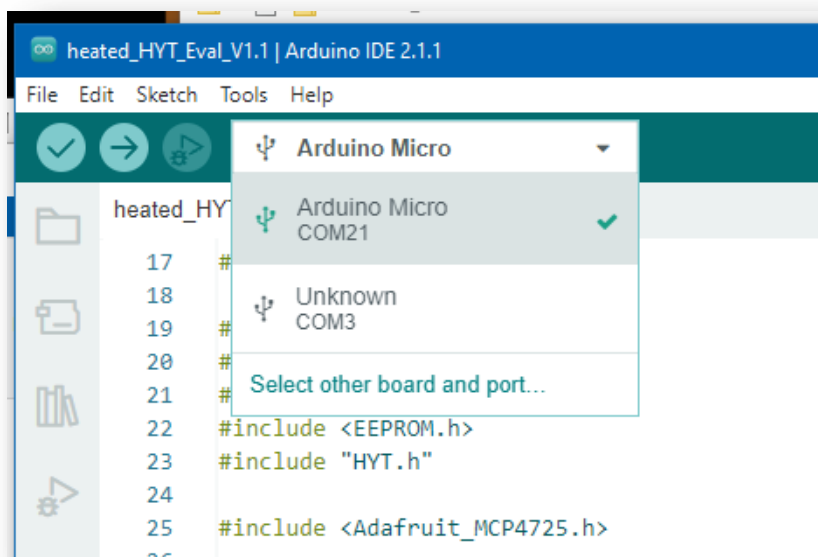
2.4 Connect with Arduino IDE

This test board can be interfaced using the Arduino IDE software.

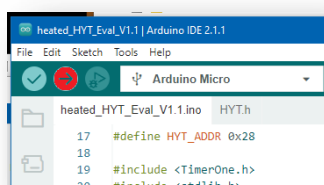
Install and open Arduino IDE software (see chapter 3.1)

- Check if «Arduino Micro» is selected.

(this should happen automatically.)



Warning: DO NOT press the Upload button. It is to replace the existing Firmware. The required Sketch is not distributed by IST to customers.

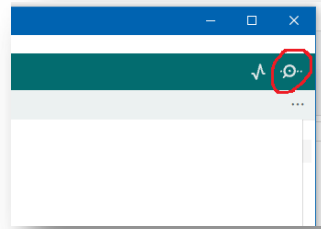




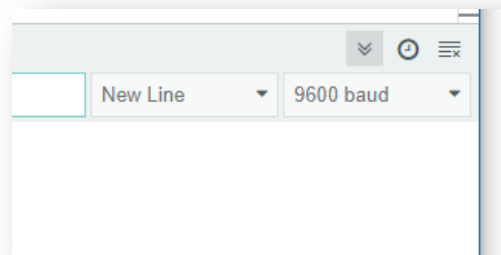
2.4.1 Read out measurement data with Arduino Serial Monitor



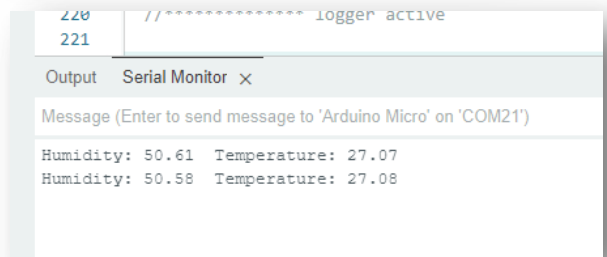
Go to Serial Monitor (icon in the top right corner) to open a new window.



Check the Baud rate is set to 9600.



Enter **m** in the command line to start a single point measurement.



Available commands:

m = one measurement point

reads a single set of RH + Temp. values; effectively stops logging

l + mSec = interval logging

for example **l10000** (small L) shall read RH +Temp. values every 10000 milliseconds (equal to 10 seconds logging interval)

logged values are send over digital and analog outputs



2.5 Additional commands for heated HYT

c + minutes	Switch-off time of the heating cycles for the heating of the heated HYT module
h + minutes	Switch-on time of the heating cycles for the heating of the heated HYT module
w	writes c & h to EEPROM => values are retained next time the device is switched on

3. Software

The test board comes installed with firmware for the evaluation of iST's RH/T modules from the HYT family. See chapter 1.4 for compatibility.

No updates are required or recommended. The Arduino IDE platform allows to modify the firmware. Please note that IST AG does not warranty any functionality of the evaluation board after any firmware modification performed by our customers.

3.1 Installation

Download the up-to-date version of Arduino IDE Software from the Arduino Homepage <https://www.arduino.cc/> and follow the publisher's instructions for a correct installation.

Same applies for the terminal Software PuTTY: www.putty.org

In case of firmware damage, please contact iST's customer service to receive the original firmware for the test board. Please note that additional libraries are required to compile custom firmware.

4. Resources & relevant Documents

	Product :	Document name :
Datasheets	HYT 271/939P/221	DHHYT271, DHHYT939, DHHYT221
	Heated HYT 223	DHHeatedHYT223
	HYT 939P P14 Assembly, RH/T Module	DHHYT939P
Application Notes	Humidity Modules HYT	AHHYTM_E
	Humidity Module with integrated Heater, HYT 223	AHHeatedHYT223_E



5. Disclaimer

The HYT evaluation board is designed solely for preliminary evaluation purposes and tests with IST AG's humidity modules from the HYT family under laboratory conditions. It is not suitable as an electronic component for any type of product. It remains an engineering board, and the electronic layout is subject to changes without prior notice.

6. Contact

Please contact IST AG for individually designed sensor solutions, including signal evaluation and housing. We will be happy to support you with the development and manufacturing of an OEM humidity module to fit your specific requirements.

Please visit our website and get in touch with IST AG for personal support: <https://www.ist-ag.com/en/contact>

We look forward advising you on the perfect sensor solution for your application!

Your IST AG Team



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