iST | Innovative
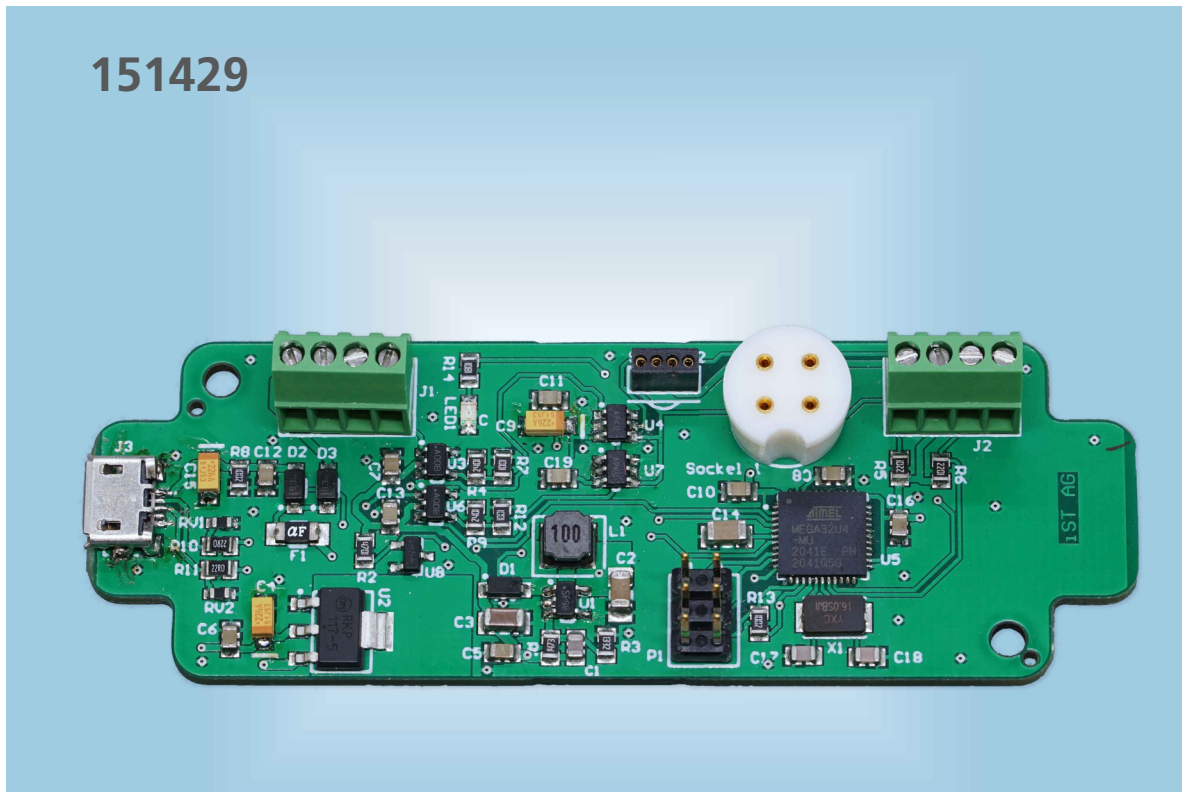Sensor Technology

physical. chemical. biological.

Quick Start Guide
Evaluation kit for digital humidity modules
## HYT 271, HYT 221 and HYT 939

151429

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1. Description

The purpose of this evaluation board is to facilitate the evaluation of HYT sensor modules for humidity and temperature. The evaluation board enables to connect a HYT module and if required convert its digital I²C signal into an analog voltage signal to test the module under the environmental conditions of the intended application. The output signals are proportional to the two parameters measured: relative humidity and temperature. The transmitter can also be connected directly to a PC via a USB cable for signal read-out and logging. The transmitter communication protocol is compatible with standard Arduino IDE software.

If additional mechanical protection during evaluation tests is required, the transmitter can be placed in a housing. It is compatible e.g. with the following housing type: RND 455-01083
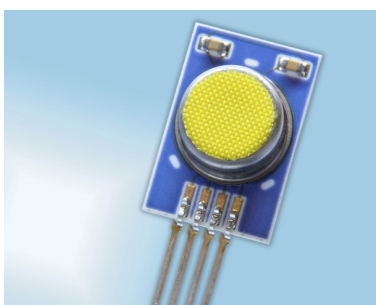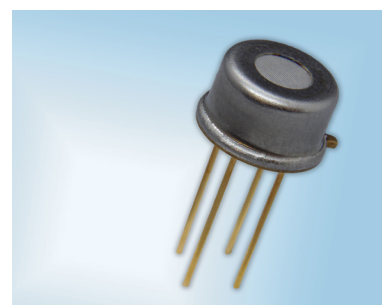
1.1 Schematics
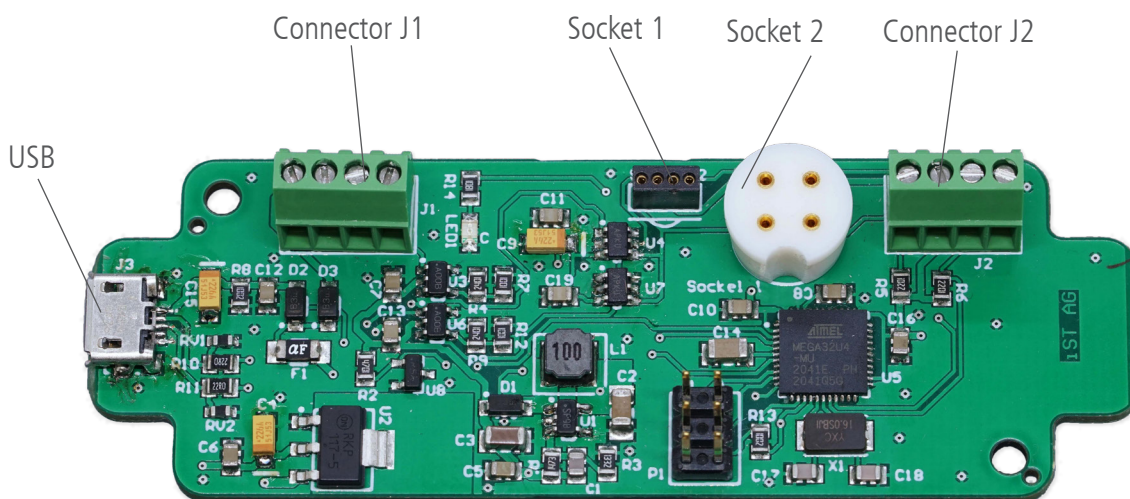
2. Compatibility

The evaluation board is compatible with all IST AG humidity modules of the HYT family.

HYT271
Material no. 153349

HYT 221
Material no. 103923

HYT939
Material no.103922

The 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.

2.1 Input

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 following ports:

Input Ports	Compatible Module
Socket 1	HYT 271 and HYT221
Socket 2	HYT939
Connector J2	All 3 module types 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.
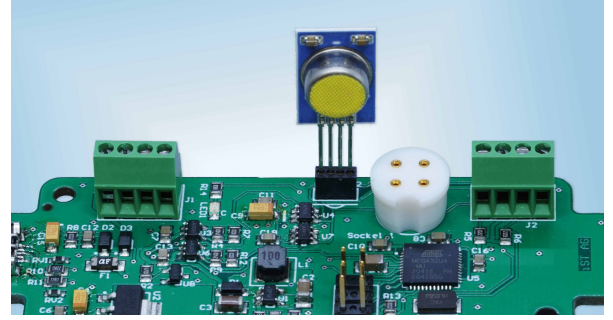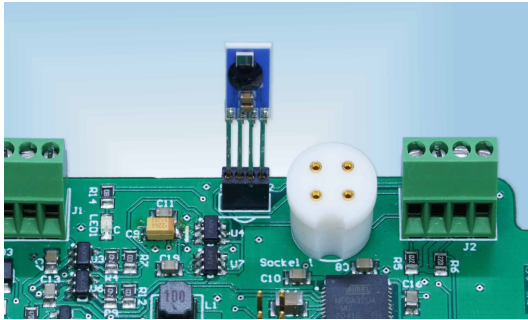
The following images show the correct orientation of the HYT modules in the socket along with the corresponding pin alignment of the modules.

SCL	I²C SCL
VCC	Power supply
GND	Ground
SDA	I²C SDA

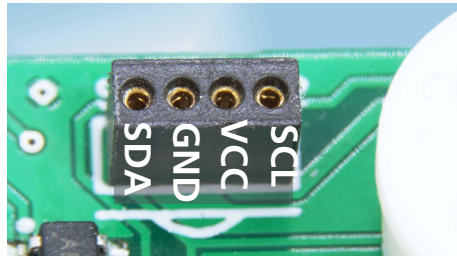### 2.1.1 Modules HYT271 and HYT221
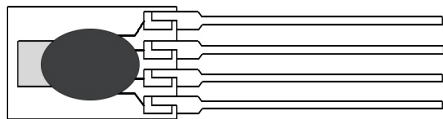
Input socket 1

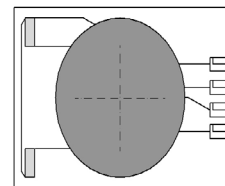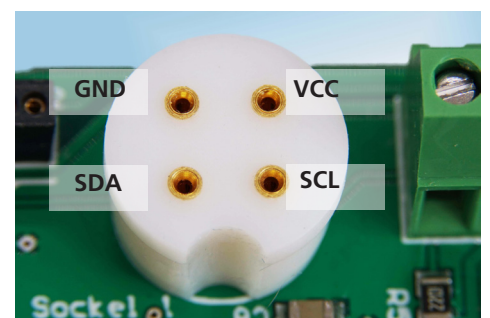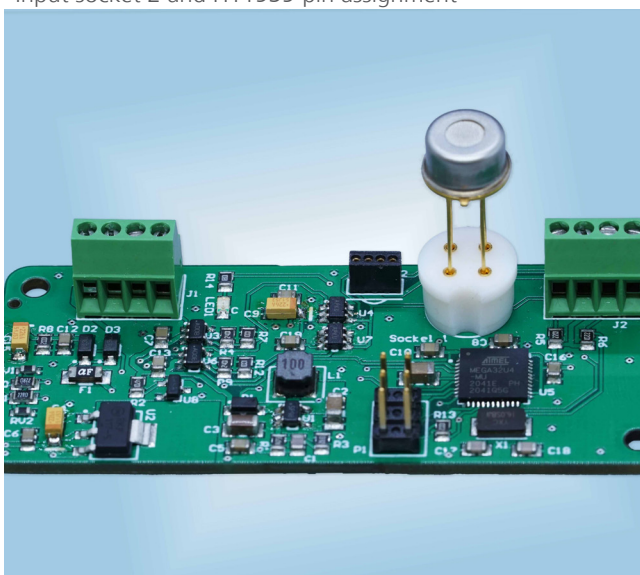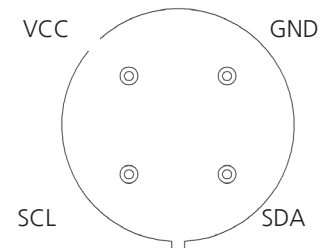HYT271   HYT221

SCL
VCC
GND
SDA

SCL
VCC
GND
SDA

2.1.2 Module HYT939

Input socket 2 and HYT939 pin assignment

bottom view

VCC   GND

SCL   SDA

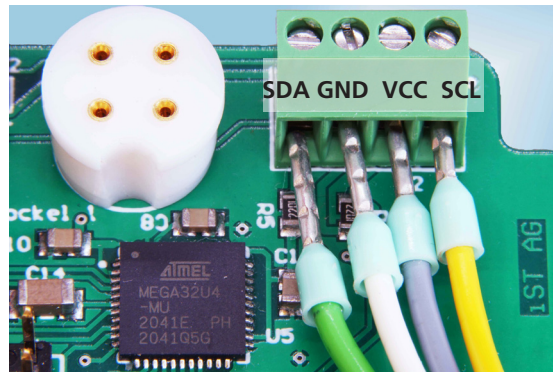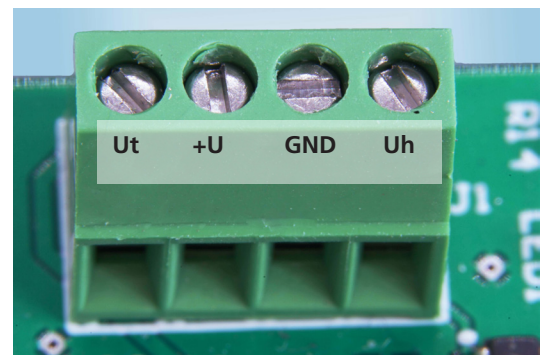**2.1.3 All modules via extension cable**

Input connector J2

Please see pin assignment above. The recommended maximum length of the extension cable is 30 cm.

3. Power supply and outputs

The transmitter can be powered via USB cable from a PC or from a DC power source. Please refer to Schematics (1.1) for the position of the corresponding connectors.
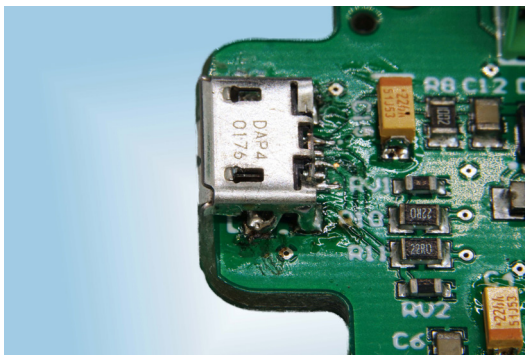
Power supply requirements:

USB	5 V
DC power source	4 to 15 V DC (ca. 50 to 300 mA)

Pin assignment of J1 connector:

Uh	Rel. Humidity, analog output 0-10V
GND	Ground
+U	Power supply PCB, input 4-15V DC
Ut	Temperature, analog output 0-10V

4. Signal transmission

4.1 Analog output

The analog voltage signals transmitted are directly proportional to the measured parameters. The following measuring and signal ranges represent the default HYT calibration:

Parameter	Output	Minimum	Maximum
Relative humidity	**Uh**	0% RH .. 0V	100% RH .. 10 V
Temperature	**Ut**	- 40 °C .. 0V	+125 °C .. 10 V

The effectively measured values can be calculated according to the following formula:

Relative humidity	**RH [%] = Uh [V] * 10**
Temperature	**T [°C] = Ut [V] * 16.5 - 40**

4.2 Digital outputs

The measured values are transmitted via USB.

A terminal software such as PuTTY can be applied 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/ VCC/ GND/ SCL).

2. Connect the evaluation board to a PC using a USB cable.

3. Determine the COM Port number assigned (e.g. look for Arduino Micro in the Ports section of the Windows device manager)

4. Start the terminal software PuTTY.

5. Select Serial and enter the COM port number. Set Speed to 9600.

6. Click Open to connect the board.

7. In the empty window that appears, press the key "m" for measure. Measured values for relative humidity and temperature are displayed.

Functions:

m	Single point measurement
l nnn	Start automatic measurement with set interval nnnn = interval in mSec. (e.g. l 1000 shall log a measurement every 1000 mSec, i.e. 1 second)

small "L"!

To stop an automatic interval measurement, press „m" again

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

4.3 Arduino IDE Connection

The Arduino IDE software allows to:

1. Read out data
2. Update or modify firmware

The Evaluation is supplied with the latest firmware version for direct use. No updates are required or recommended. Therefore, please avoid flashing the firmware of the board. Do NOT press the Upload button.
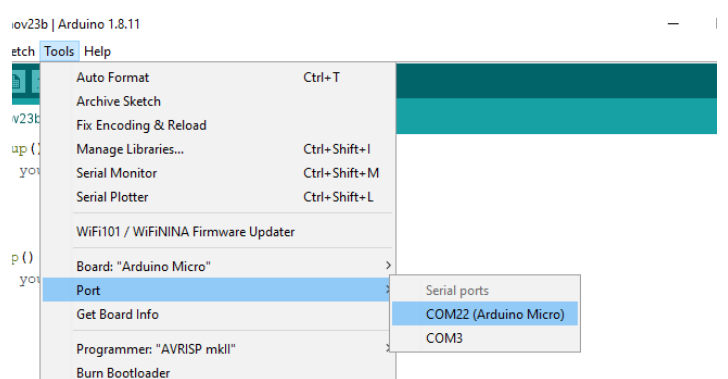Please note that IST AG does not warranty any functionality of the evaluation board after any firmware modification performed by our customers.

To establish a connection with Arduino IDE, please apply following settings:

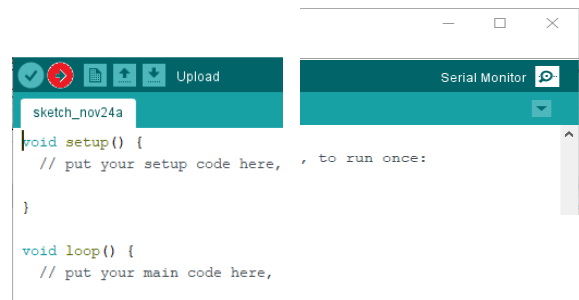1. Go to Tools and select Board: Arduino Micro
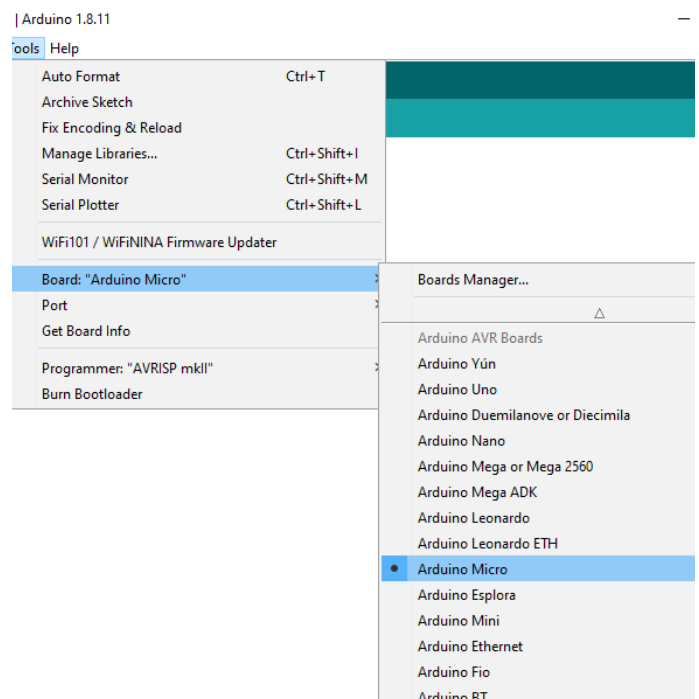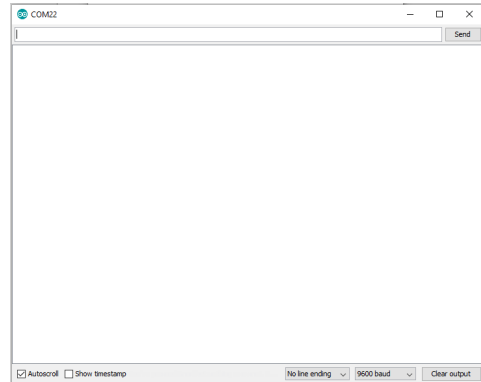

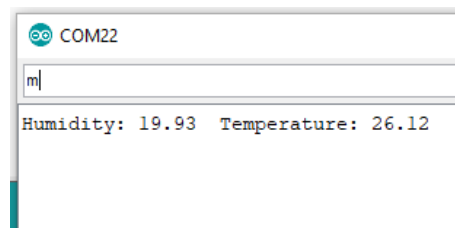2. Select the Port marked with Arduino Micro

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

4. Check that the baudrate is set to 9600

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

Humidity: 19.93   Temperature: 26.12

5. Order information

Product description	Order code
Humidity evaluation board	151429
Humidity/temperature module HYT271	153349
Humidity/temperature module HYT221	103923
Humidity/temperature module HYT939	103922

6. Resources and download links

Visit **www.ist-ag.com** and go to the **Download** section for the following documents:

- Datasheets for individual humidity modules HYT271, HYT221, HYT939
- Application note with handling instructions for HYT modules
- Firmware for the evaluation board (published on www.ist-ag.com/download)
Terminal Software PuTTY: www.putty.org

For the latest Version of Arduino IDE please visit https://www.arduino.cc/ and follow the installation instructions.
Please note that additional libraries are required to compile custom firmware.

7. 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.

8. 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

Innovative Sensor Technology IST AG
Stegrütistrasse 14
9642 Ebnat-Kappel
Switzerland
info@ist-ag.com
+41 71 992 01 00