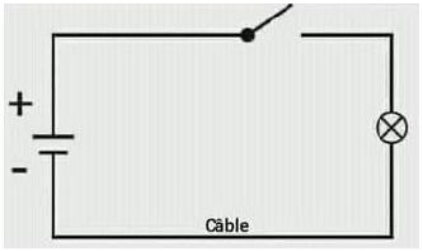
Electronics Laboratory

First meeting

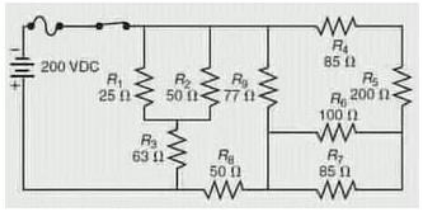
„Electronics are simple!”

Electronics

at the lecture



at the exam



and in real life

Contacts

Institute of Nuclear Technology

Laboratory: R. building 214. classroom

Head of laboratory: Viktor Farkas (viktor.farkas@reak.bme.hu)

Our staff:

- István Andorfi
- András Zsákai
- Bence Szász
- Ádám Angyal
- Norbert Székely

Website: oktatok.reak.bme.hu/farkas/electronics-laboratory/

AND!

The reports have to be uploded to a OneDrive (←link).

Name of the report:

MX_LastName1_LastName2.pdf (X is the number of measurement)

Our measurements

- Transistor amplifiers and the Miller-effect (M1)
- Basic circuits for operational amplifiers (M2)
- Comparators (M3)
- Digital circuits (M4)
- Flip-flops and soldering (M5)
- Microcontroller programming in C (M6)

The measurement guides are available on this website:
https://oktatok.reak.bme.hu/farkas/electronics-laboratory/

Laboratory requirements

- Knowledge of the measurement instructions is mandatory.
- Exam will be a multiple choice test.
- Report (for next measurement).
- Late submission of report will result in deduction of a mark!
- All measurements must be taken, 1 can be made up.
- Name, neptun code, email address, name of measurement, name of measurer, date must be indicated.

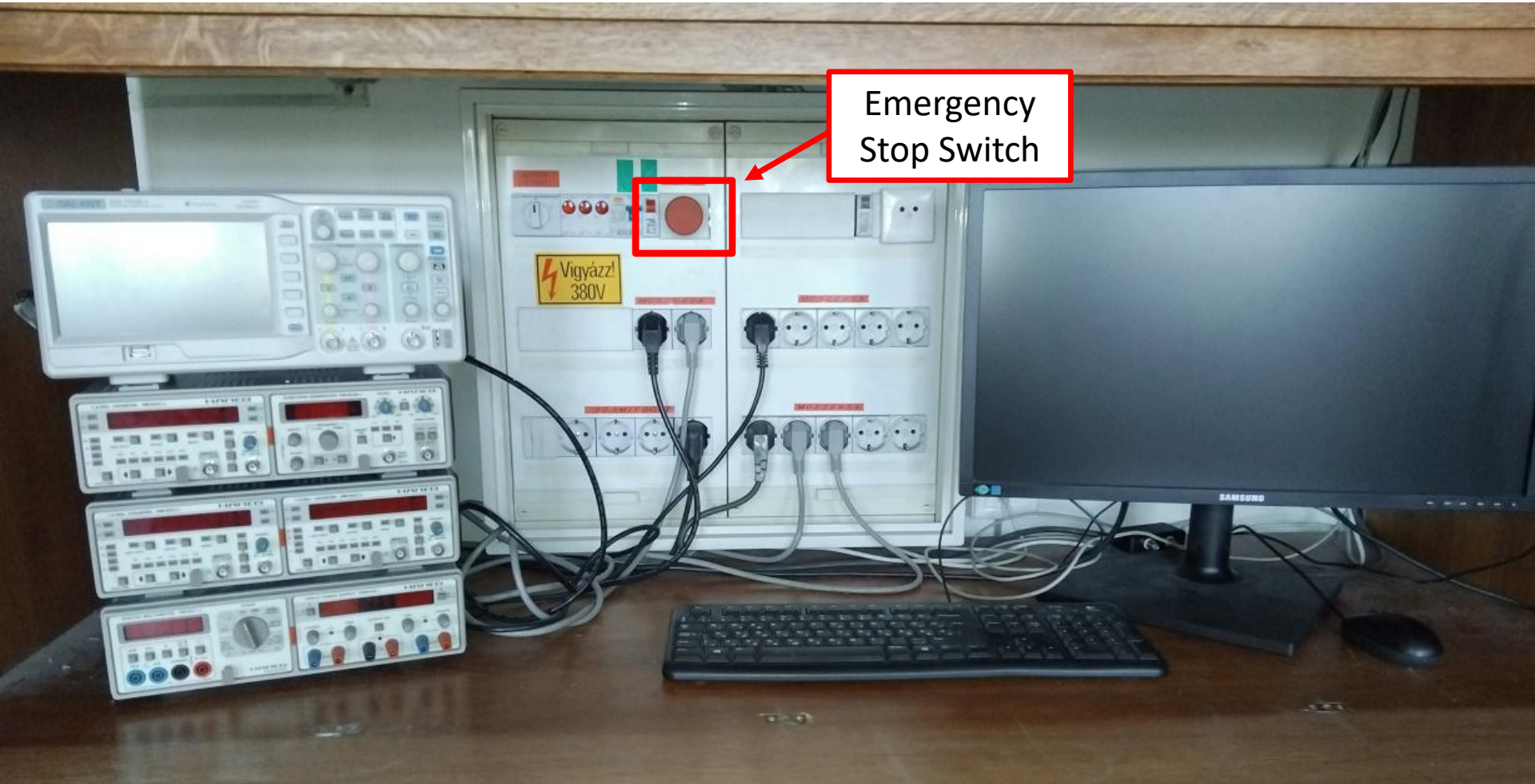
Our devices

Every measuring station has:

- 1 handheld multimeter
- 1 bench multimeter
- 1 digital oscilloscope
- 1 function generator
- 1 DC power supply with 3 ground-independent outputs
- 1 parts box
- 1 breadboard
- test leads, crocodile clips, BNC T-splitters

Accident prevention

Disconnecting workplaces from the power supply using an emergency stop switch.

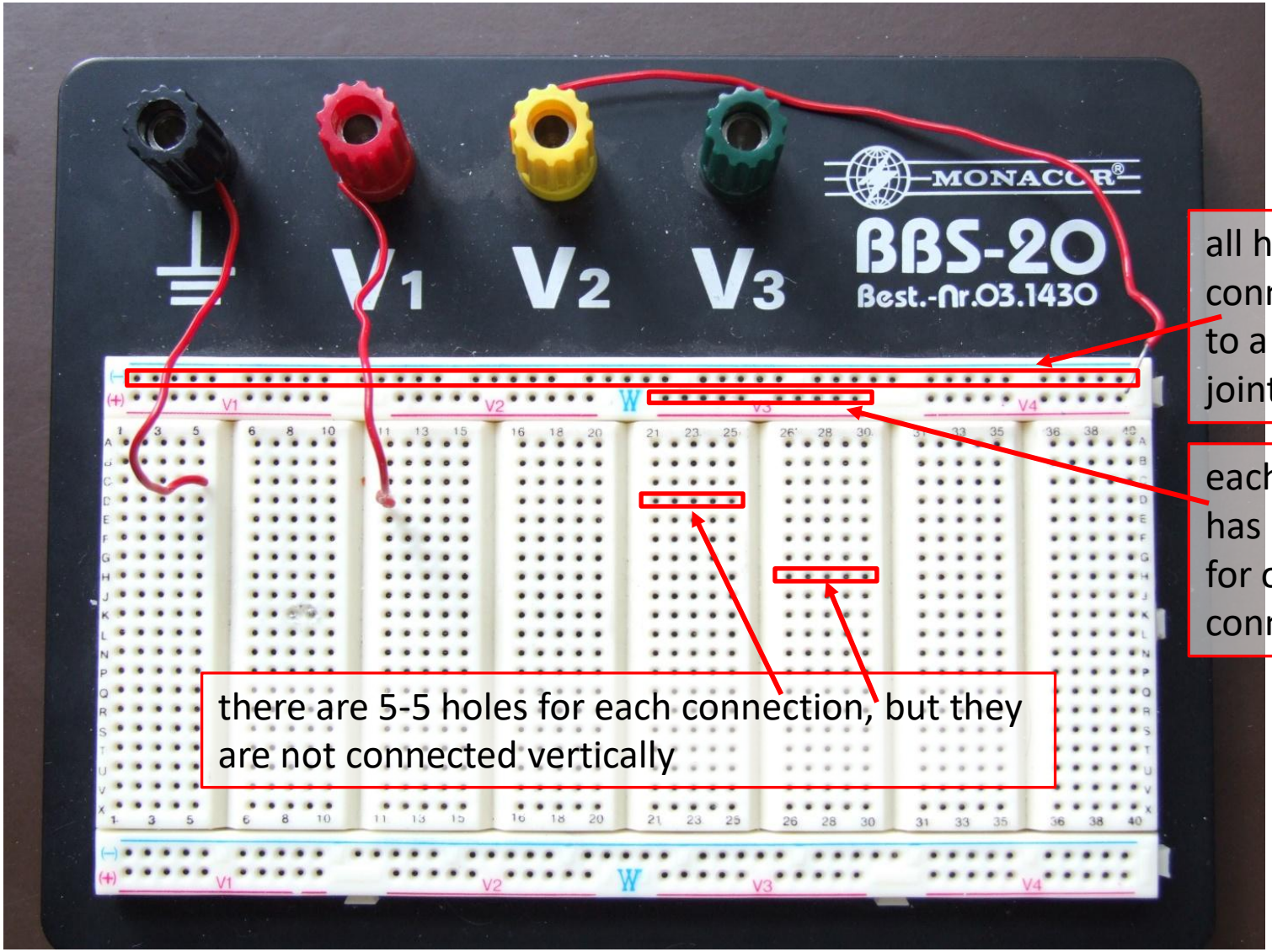


Accident prevention

Other hazards in our work

- The measuring tip of the oscilloscope probe is very sharp due to good contact.
- When soldering, the temperature of the soldering iron is approx. 300 °C.
- The solder is a 63/37% tin-lead alloy. Lead is a heavy metal and is toxic! → Wash your hands after work and before eating!

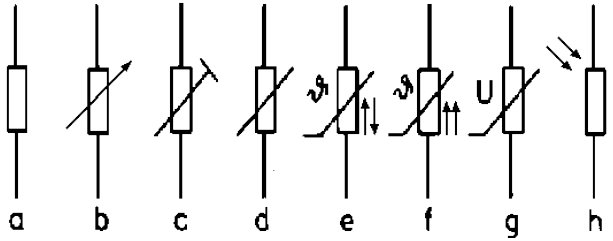
Plug-in test panel (breadboard)

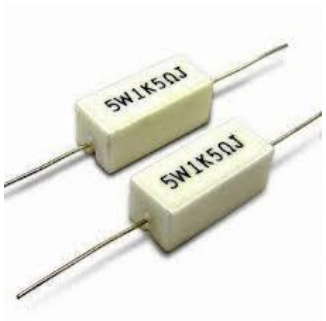


Resistors value marking

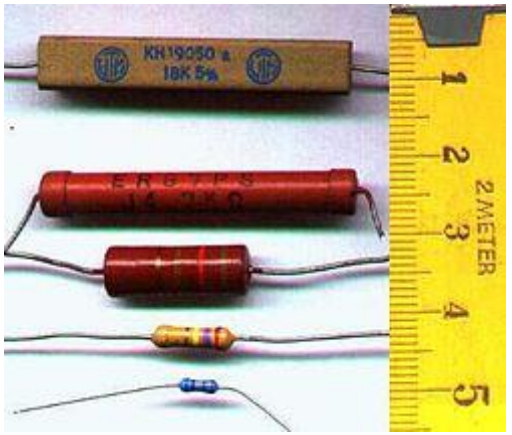
With captions or color codes.

Value marking: R=Ohm (Ω), k=kilo Ω, M= mega Ω
Examples of captions:
4R7=4,7 Ω, 68k=68 kΩ, 2M2=2,2 M Ω, k68=680 Ω

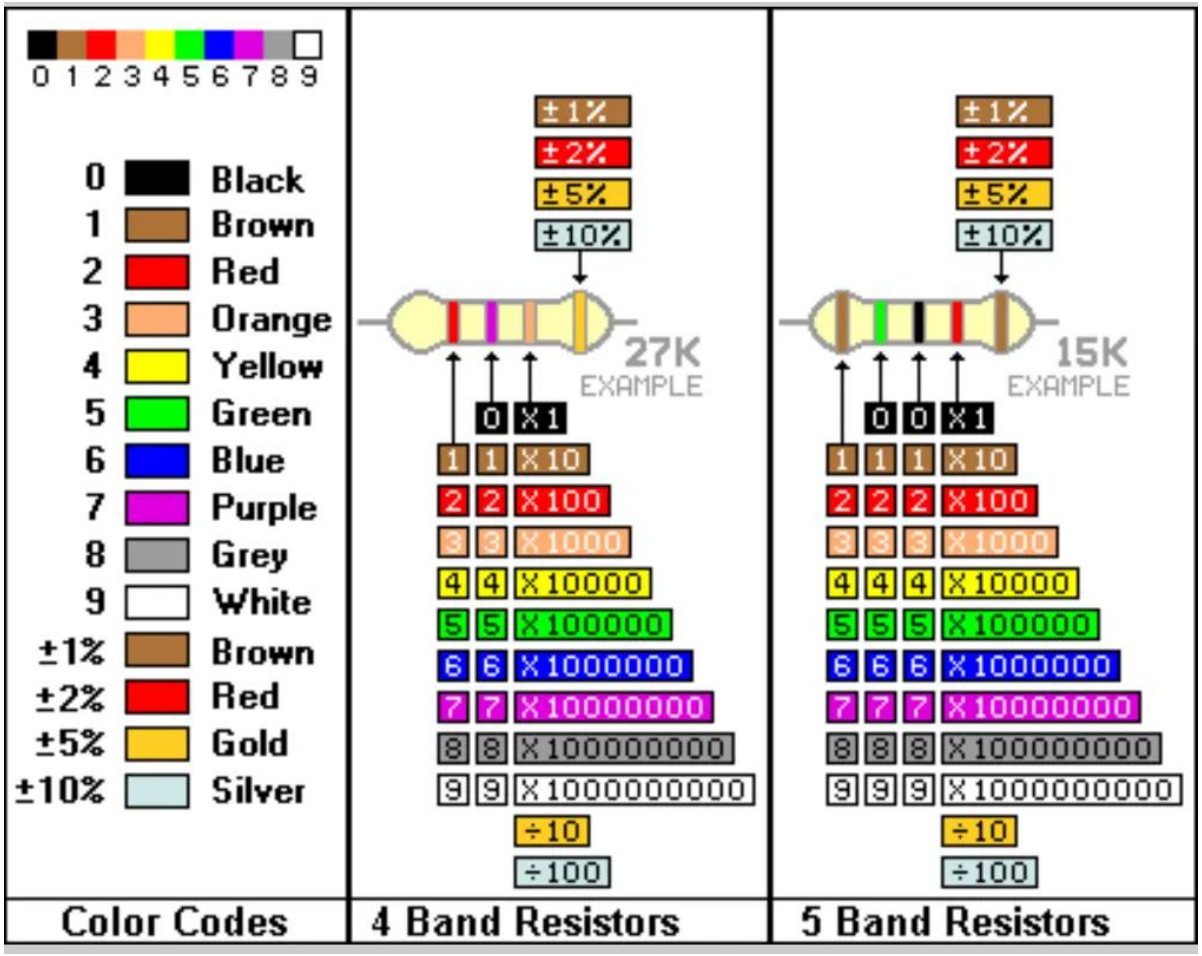




Color codes can be 4 or 5 bands.



Resistors value marking with color codes



Capacitors value marking

For most electrolytic capacitors, the capacitance value is given in uF or mF.
For film capacitors, this value is given in uF or nF.

For some tantalum electrolytic capacitors and ceramic capacitors, the capacitance value is indicated as follows.

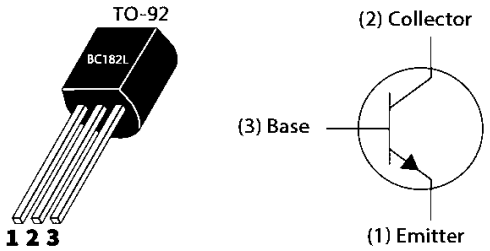
The value is given in pF (10^{-12}), followed by an exponent.

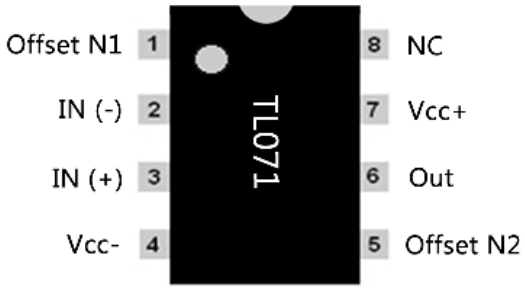
Example:
$103 = 10 \cdot 10^3 = 10\,000$ pF = 10 nF

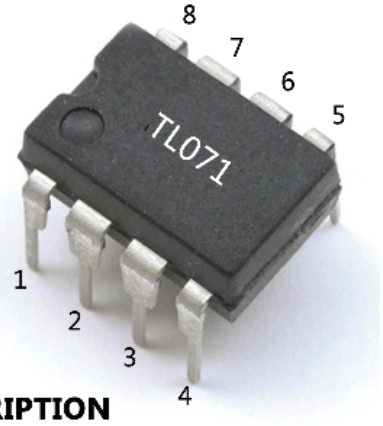
$474 = 47 \cdot 10^4 = 470\,000$ pF = 470 nF

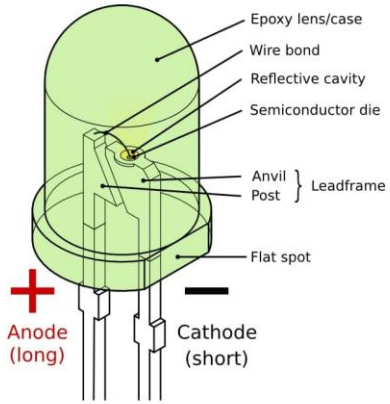
Connecting semiconductors

BC182 Pinout

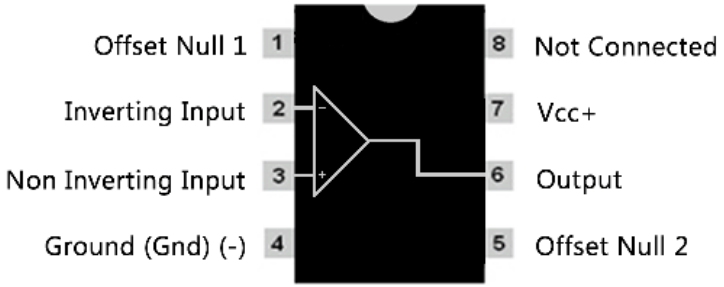








TL071 DETAILED PIN DESCRIPTION



Troubleshooting (circuit activation)

- Voltage measurement in the correct order:
  - Supply voltage(s) value
  - Input voltage(s) value
  - Output voltage(s) value
  - Do the voltages match the expected (!) values?
- Checking contacts
- If all of the above are OK, a component fault may be suspected. (In this case, it is advisable to contact the measurement supervisor for assistance.)

Measurement dates

Measurements are held for 4x45 minutes combined, but you can go out for a break at any time.
Therefore, morning classes will be held from 9:00 a.m. to 12:00 p.m. and afternoon classes from 2:15 p.m. to 5:15 p.m.

Thursday morning
T1 and T3 course
2025.09.25
2025.10.09
~~2025.10.23~~
2025.11.06
2025.11.20
2025.12.04

Thursday afternoon
T2 course
2025.10.02
2025.10.16
2025.10.30
2025.11.13
2025.11.27
2025.12.11

Thursday afternoon
T4 course
2025.09.25
2025.10.09
~~2025.10.23~~
2025.11.06
2025.11.20
2025.12.04

Questions

Thank you for your attention!
Do you have any questions?