FAKULTÄT
FÜR !NFORMATIK

Faculty of Informatics

FAKULTÄT FÜR !NFORMATIK

182.694 Microcontroller VU

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SS 2014

Featuring Today: Preliminary Talk

Motivation

After this course you will . . .

- have an in depth understanding of MC fundamentals
- be able to work out small MC applications yourself

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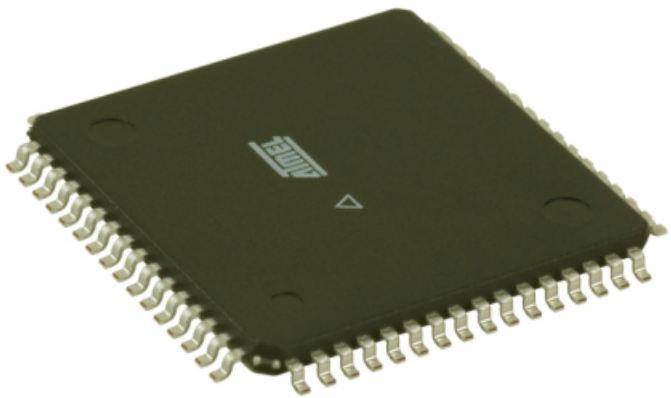
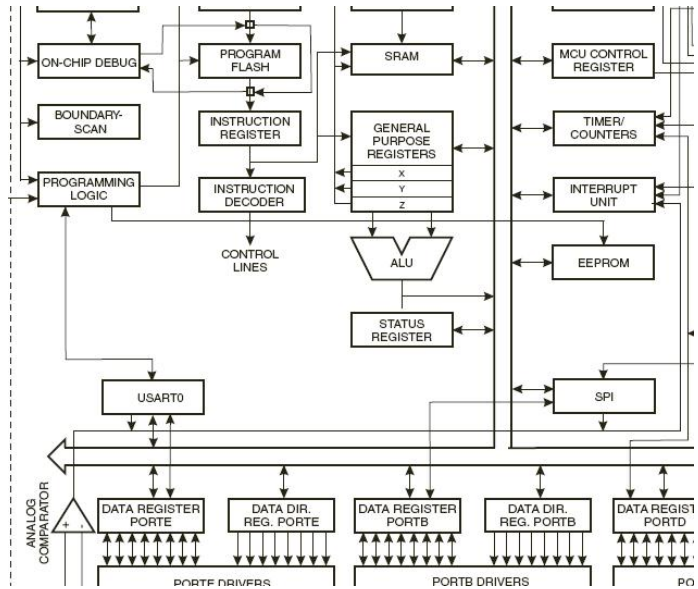
⇒ interesting practicals at the department are open to you





Our Department

Institut für Technische Informatik E182/2
Embedded Computing Systems Group (ECS)

Treitlstrasse 3
2. Stock

`http://ti.tuwien.ac.at/ecs`

Our Laboratory

TILAB

Treitlstrasse 3
Mezzanine (0.5 floor)
Room 4

`http://www.tilab.tuwien.ac.at`

- Extensively use the lab, however come prepared
- There will be slots reserved for you

A Coarse Course Schedule

- Phase 0
  - 9.3. Registration Deadline
  - 27.3. De-Registration Deadline
  - 28.3. Part 0 Exam
- Phase 1
  - 14-25.4. Easter Holidays
    (TILAB *only* closed on public holidays)
  - 15.5. Application 1 Deadline
  - 16.5. Part 1 Exam
- Phase 2
  - 26.6. Application 2 Deadline
  - 27.6. Makeup Exam

First Steps

- Please remember to register soon in TISS (by 9.3.)!
- Make sure you have an account in myTI (by 9.3.)!
  (Login once with your account and upload a photo)
- on 10.3 we will transfer TISS registrations to myTI
  [Bakk TI first]:
  - After that you can suggest up to 3 lab slots
  - Reserved slots will be assigned on 23.3.! (But you should of course start working before)
- your chipcard & account will be activated or you will receive both until course start (expected on 11.3.)
- Late registration (only exceptional!) [no more Bakk TI first]:
  - until 23.3. per mail
  - receive chipcard & account later
  - only remaining slots available!

First Steps

Lecture Notes

Available at the homepage (prereading!)

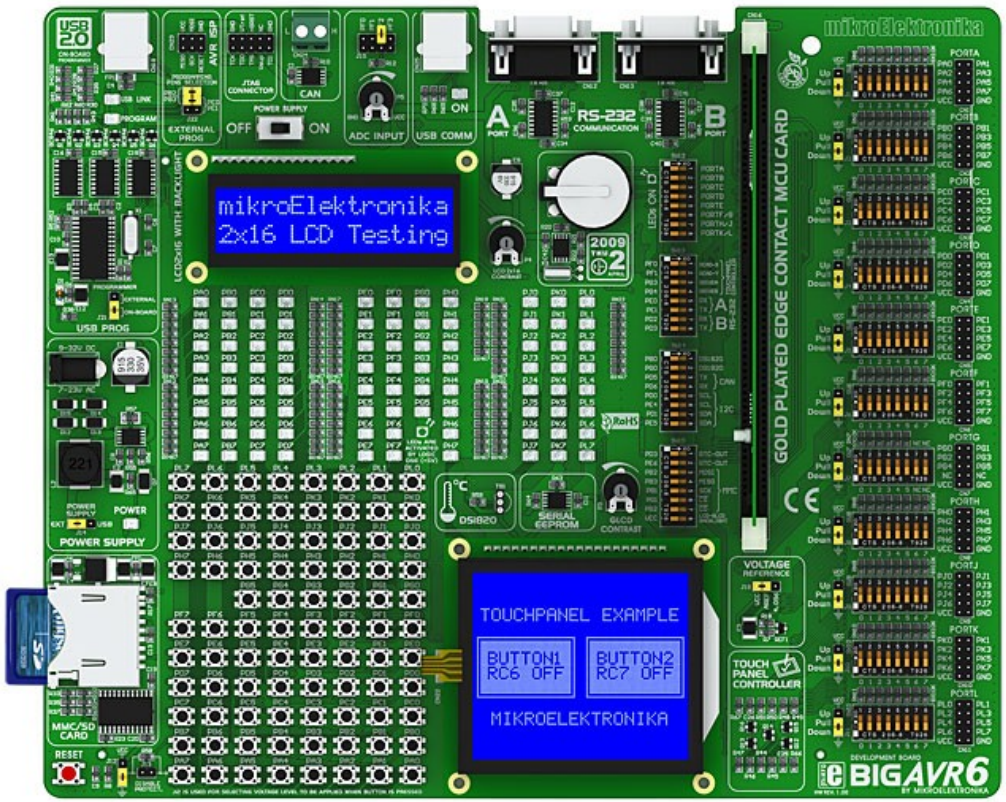
Lab Equipment

Start with exercises soon!

Datasheets are available at homepage

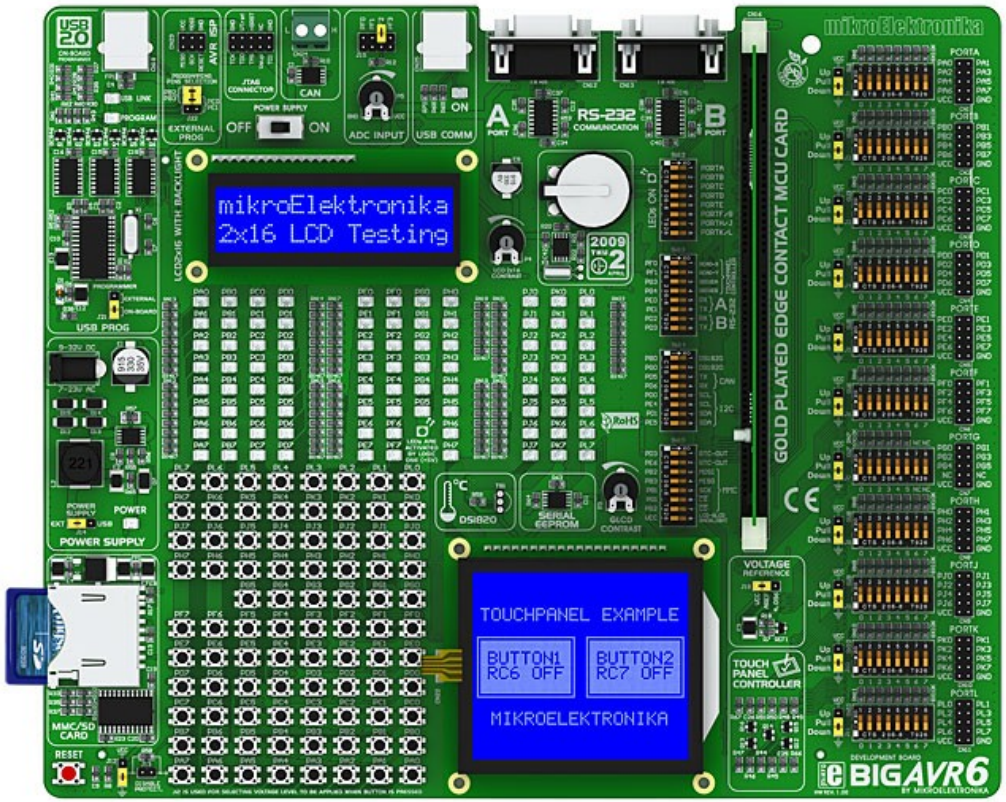
MC Platform

- bigAVR6
  contains the
  ATmega1280 MC,
  16 MHz oscillator
- 2 Displays (text &
  graphical)
- Real-time clock
- serial EEPROM
- SD card reader



Lab Kit

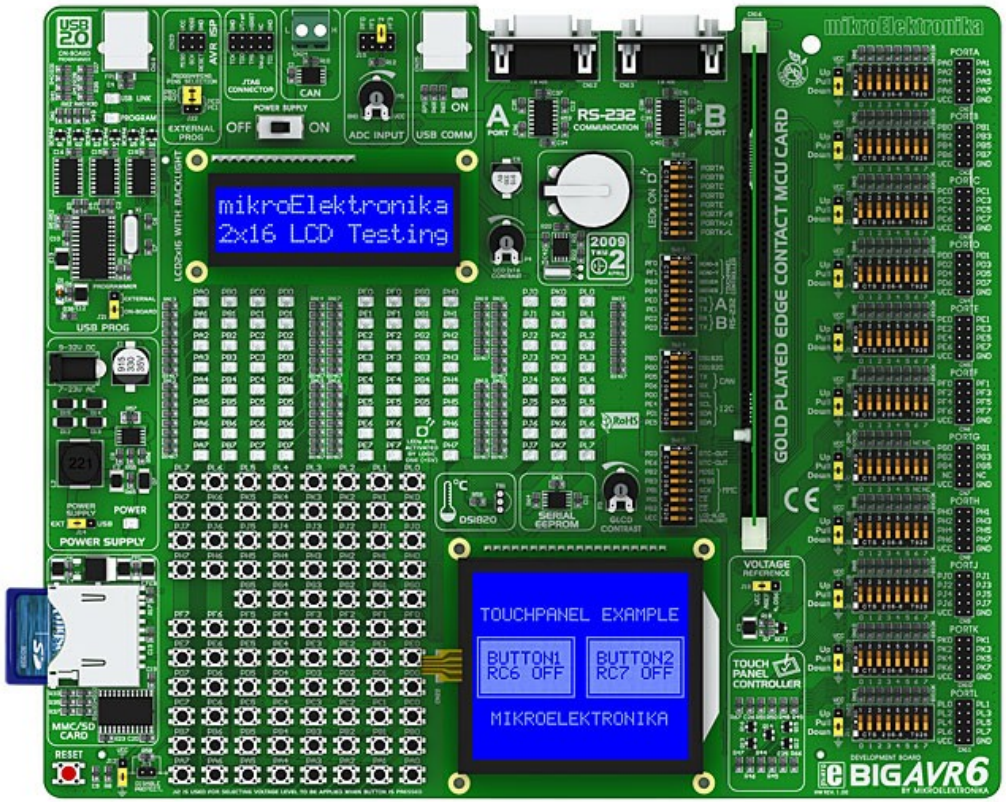
- MC board
- ATmega board
- Display (text)
- Keypad board



Lab Kit

- MC board
- ATmega board
- Display (text)
- Keypad board

Available at the department from 9:00 – 12:00 by our technician (Mr. Malle), for a €100 security deposit.



The Keypad Board

. . . there are more add-on boards waiting for you in the application parts 1 and 2

Digital Storage Oscilloscope

TDS2024B
bandwidth 200MHz
4 channels
8 bit resolution

This and the LEDs will be your friends when you're debugging

Aims

- Get used to the lab equipment
- Understand tool-chain
- Get to know insides of MC hardware & their peculiarities
- Solve simple MC exercises (4 per week!)

Aims

- C programming for MC (gcc, . . .)
- Learn to use the MC's periphery (timer, ADC, . . .) in detail
- Communicating with the MC (UART, I^2C, . . .)
- Solve more demanding MC exercises

The Application: Game

- ADC
- Graphical display
- Bluetooth (stack provided by us)
- UART communication
- Wii controller

Aims

. . . after having learned assembler and C . . .

- get to know an OS from scratch
- develop low-level drivers for OS
- develop high-level application (with tasks)

The Application: Chat

- Ethernet board (stack provided by us)
- MP3 board

Grading

For each of the 3 exams (part 0, 1 and make up) you can achieve:

- 15 pts per programming exam
  Each exam consists of 2 practical exercises.
  Grading is binary (7.5 pts or 0 pts)!
- 15 pts per theory exam
- But: the worst programming exam and the worst theory exam is discarded
  - $2 * 15 + 2 * 15 = 60$ pts maximum

For the 2 application exercises you can achieve:

19 pts $+$ 21 pts

Grading

Positive grade prerequisite:

15 pts $\geq \sum$ programming exams

points	Grade
$[0, 100]$, prerequisite not fulfilled	nicht genügend
$[0, 52)$	nicht genügend
$[52, 64)$	genügend
$[64, 76)$	befriedigend
$[76, 88)$	gut
$[88, 100]$	sehr gut

Online Information Sources

Course homepage

- `http://ti.tuwien.ac.at/ecs/teaching/courses/mclu`
- Timetable, exercises, MCLab FAQ, ...

TISS Forum

- `http://tiss.tuwien.ac.at`
- For our announcements and your questions
  $\rightarrow$ subscribe!

TILAB Homepage

- `http://www.tilab.tuwien.ac.at`
- Room assignments, email howto, ...

Personal Information Sources

1. Consult online sources
2. Ask our tutors
   - In their slot
   - Per email (available at homepage)
3. Ask our "Studienassistent"
   - Per email mc-studass@tilab.tuwien.ac.at
4. Write an email to mc-leitung@tilab.tuwien.ac.at

A Word of Warning ...

Through Part 0 (assembler):
No compulsory exercises

But:
We will check your learning progress afterwards!

And:
The exams (both theoretical and practical) **will be difficult!!**

For your help:
Weekly learning objectives

Learning Objectives

Lab exercises available online
We give recommendations which exercises you should solve

Tutors

Available to help you solve the exercises and give feedback on your solutions