

Elektronik und Technische Informatik - Tagung 2014 – „FTKL“



Layout Plus -- C:\USERS\USER\DOCUMENTS\DESIGN2012\BERTL14\BERTL14.MAX

File Edit View Tool Options Auto Window Help

X -671 Y 3581 G 1 1 TOP

Design - Component Tool (DRC ON)

The image shows a complex PCB layout design in the Layout Plus software. The design is a multi-layer board with various components like resistors, capacitors, and integrated circuits. A dense network of yellow lines represents the electrical connections between these components. The layout is organized into several functional blocks, with some components highlighted in red and others in blue. A yellow outline defines the overall shape of the board. At the bottom of the layout, there is a table with the following data:

SYM	DIAM	TOL	QTY	NOTE
x	0,024		10	

[671,3581] RAM: 5111K Used, -1619243K Available

DE 19:00 14.10.2013

7.4. bis 9.4.2014

Elektronik und Technische Informatik 2014, Humer, BULME GRAZ

I .. V Jahrgang

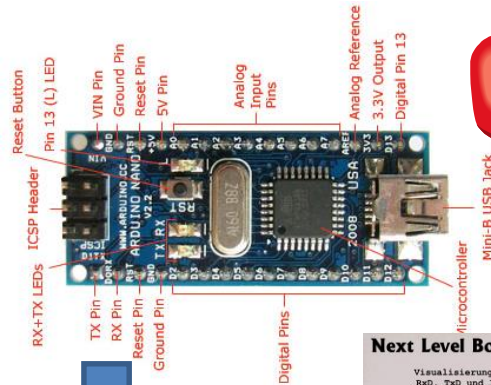
Rückblick: FTKL- Tagung 2010 – Zukunft?



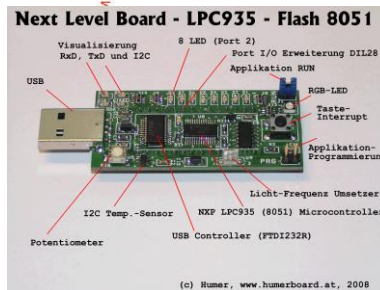
Arduino / AVR o. PIC

Ev. 8051-Flash

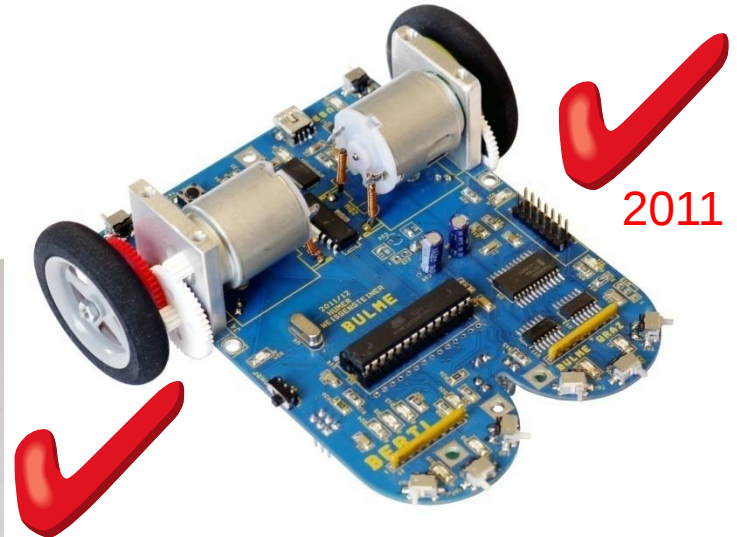
Cortex – M0 o. M3
mbed



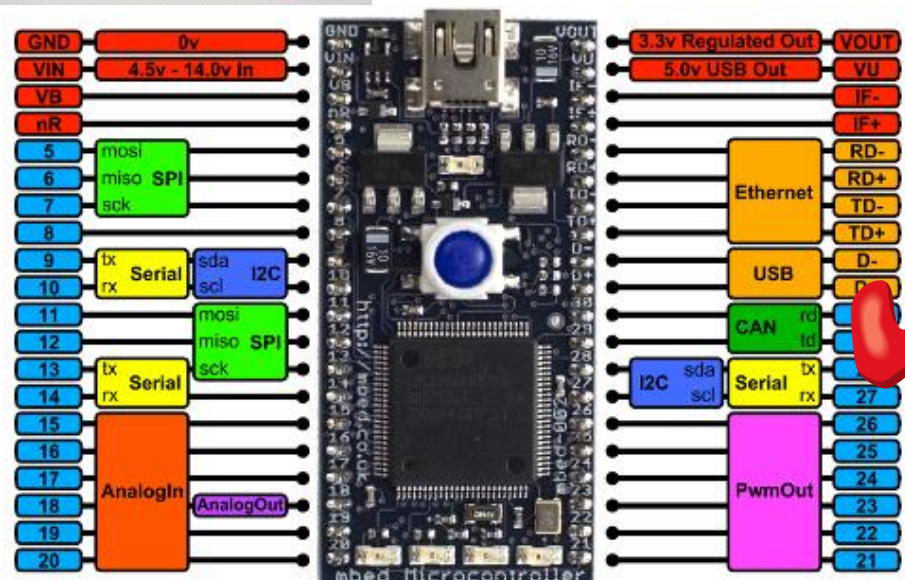
AVR
2011



8051
2010

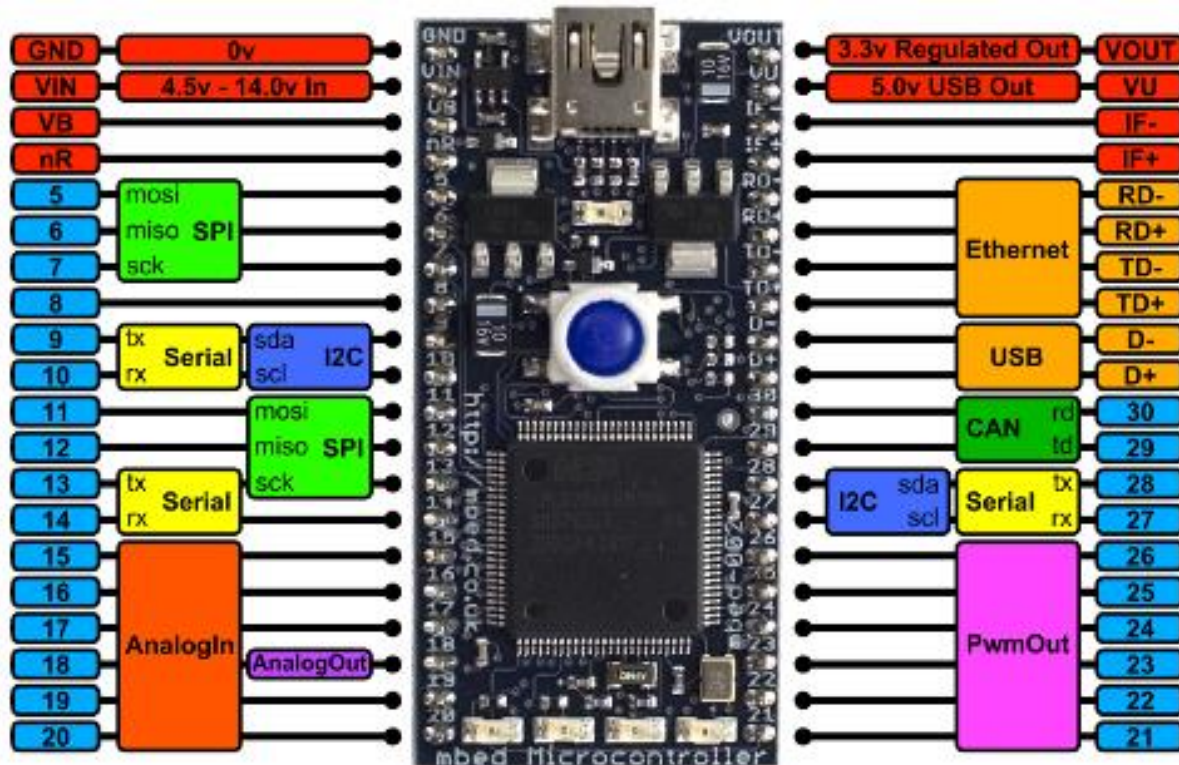


2011



ARM
2012

Rückblick: FTKL- Tagung 2012 – Cortex M3 - mbed



www.mbed.org

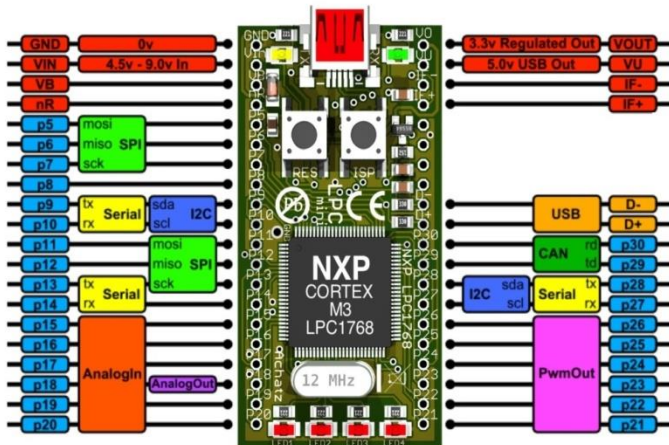
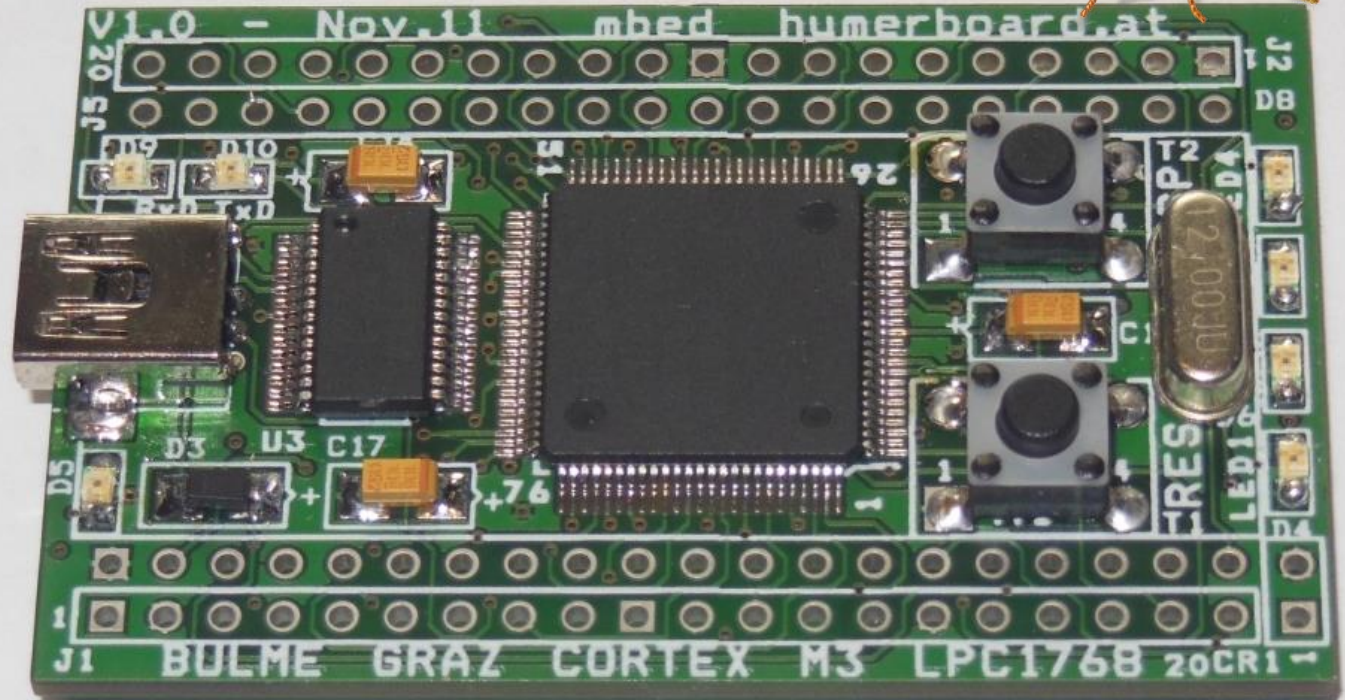
mbed
Online Compiler



ARM-Cortex-M3
96MHz, 32KB RAM, 512KB FLASH

Ethernet, USB Host/Device, 2xSPI, 2xI2C, 3xUART,
CAN, 6xPWM, 6xADC, GPIO

Rückblick: FTKL- Tagung 2012 – Cortex M3 - mbed



Werkstättenprojekt, BULME GRAZ,
Bauteilkosten ca. €15,--
ARM-Cortex-M3, LPC1768
96MHz, 32KB RAM, 512KB FLASH

Rückblick: FTKL- Tagung 2012 – Cortex M3 - mbed



mbed-Beispiel: Diplomarbeit „Trap Training System“

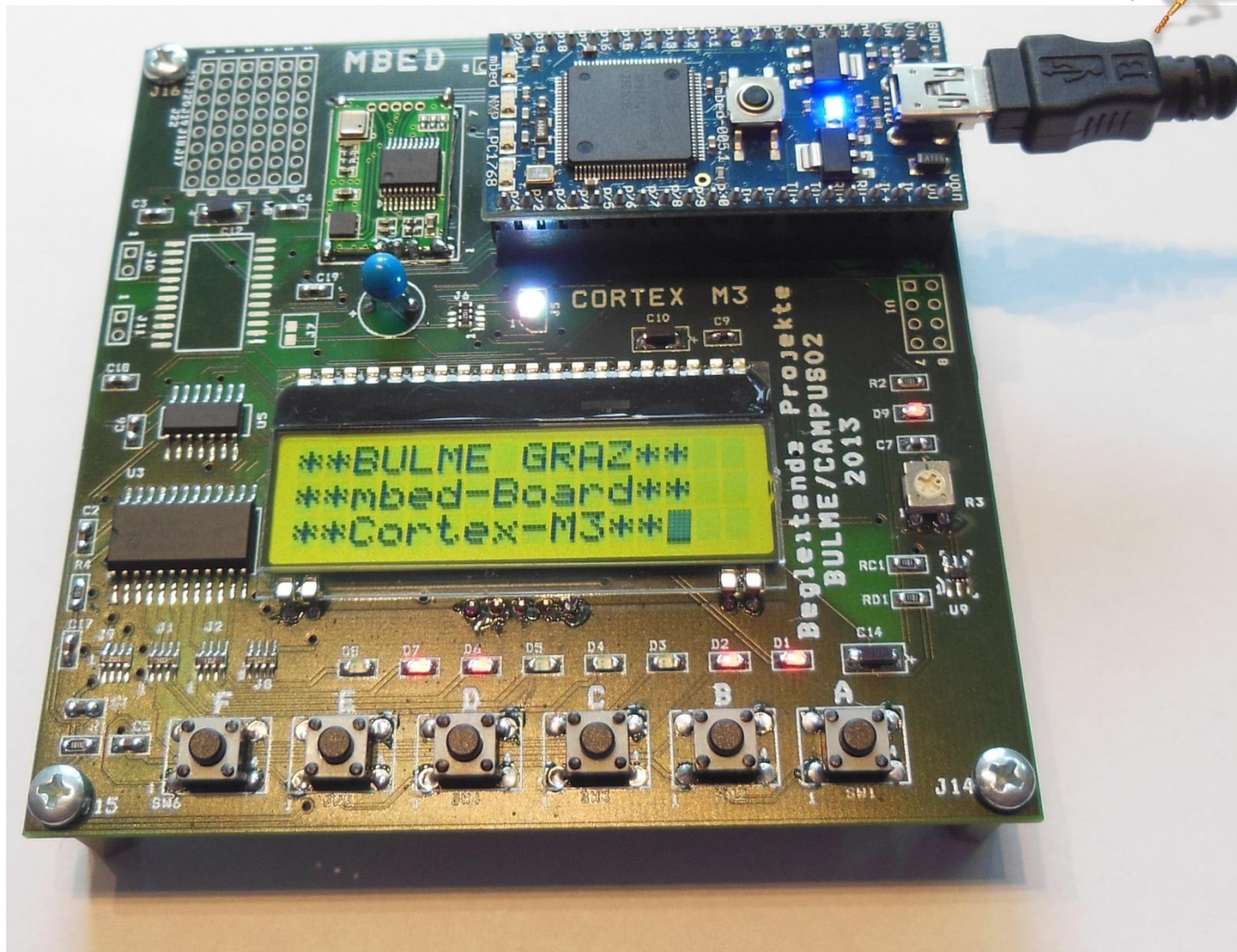


Staatsmeister/Österreichischer Meister 2010+2012+2013

Beschleunigung
und
Gyrator 3 Achsen
Kompass
Luftdruck
Puls



Rückblick - Tagung 2012 – Cortex M3 - mbed



Prototyp, BULME GRAZ, Humer



Break-Out Boards: Beispiel ebay, China, ohne Versandkosten



ca. 18€

9-Axis Module

10DOF 9-axis Indicator
Module L3G4200D ADXL345
HMC5883L BMP085
Acceleration Gyro



€13,--

**! BMP085 Air-pressure model altitude weather/
temperature digital sensor module**



Digital sensing module

Calibrated digital sensor

- ☐ I2C data interface
- ☐ Pressure resolution: 0.01hpa
- ☐ Pressure accuracy: ± 2 hpa
- ☐ Pressure range: 300~1100hpa
- ☐ Altitude resolution: 1m
- ☐ Altitude range: -689~8948m
- ☐ Compass resolution: 1°
- ☐ Compass accuracy: $\pm 3^\circ$
- ☐ Compass range: $0^\circ \sim 359^\circ$
- ☐ Temperature resolution: 0.1°C
- ☐ Temperature accuracy: $\pm 1^\circ\text{C}$
- ☐ Temperature range: $-40^\circ\text{C} \sim +85^\circ\text{C}$
- ☐ Standby current $\leq 2\mu\text{A}$
- ☐ Supply voltage: 2.8~3.3V

<http://www.neuhold-elektronik.at/>



LIPO-Akkus, 3.7V geschützt und ungeschützt



Bauform 18650/680
LIPO 3,7V/4Ah ca. 4€



Bauform 14500 (AA)
LIPO 3,7V/1Ah ca. 3€

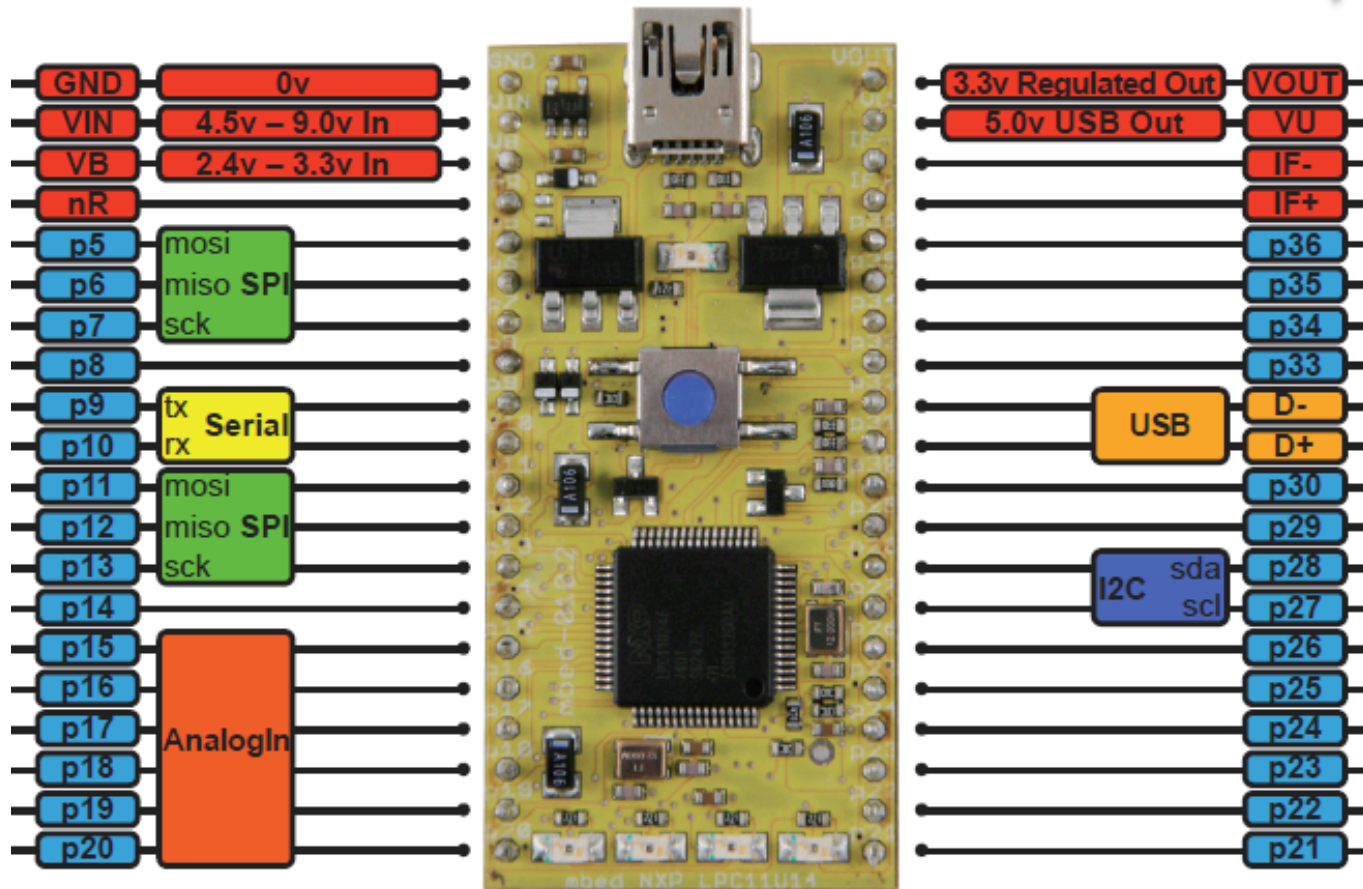
Weitere Bauformen:

26650 bis 6 Ah
18350
18500
18700
16340 ... CR123A
10440 ... (AAA), ... 600 mAh
..... weitere folgen

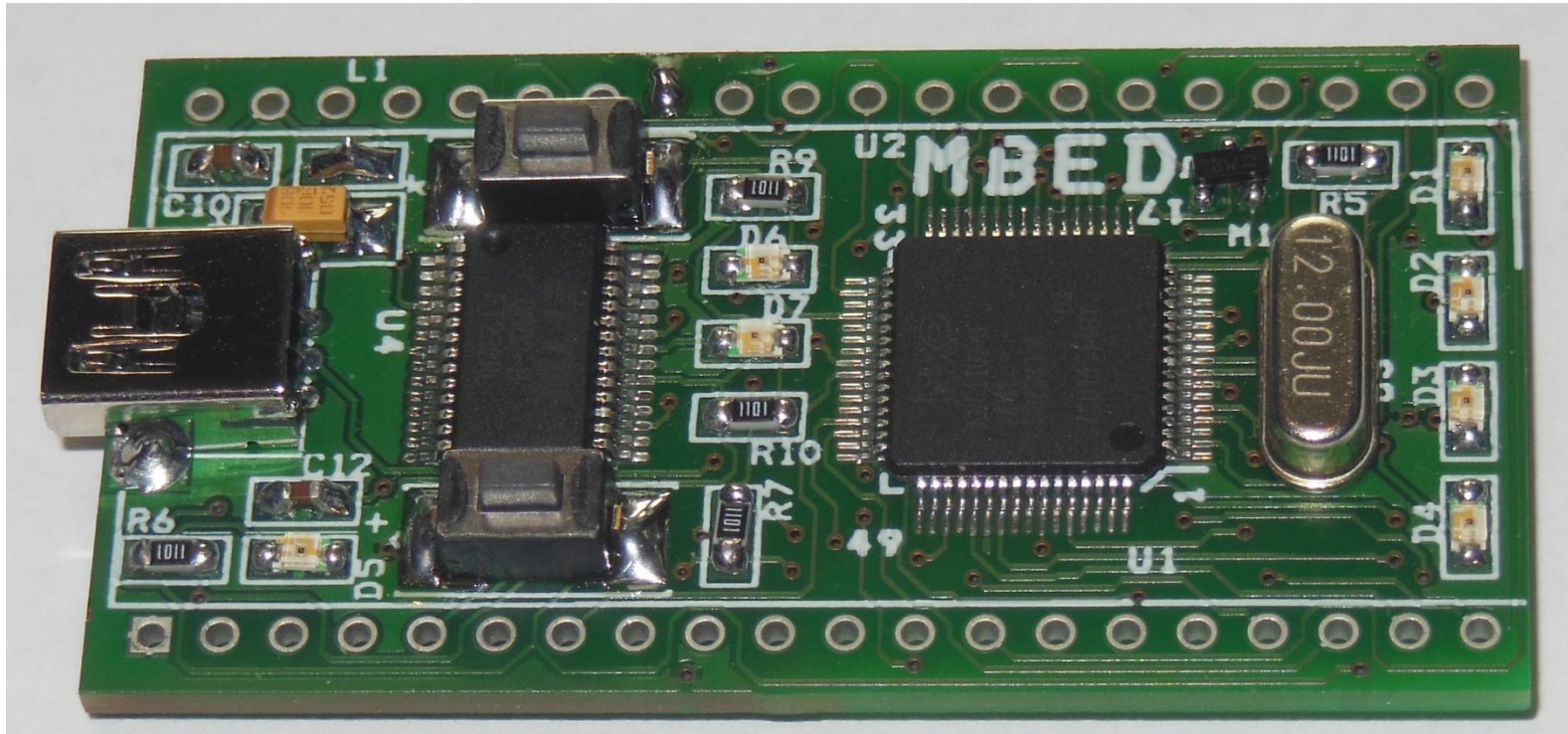
FTKL - Tagung 2013 – was nun?



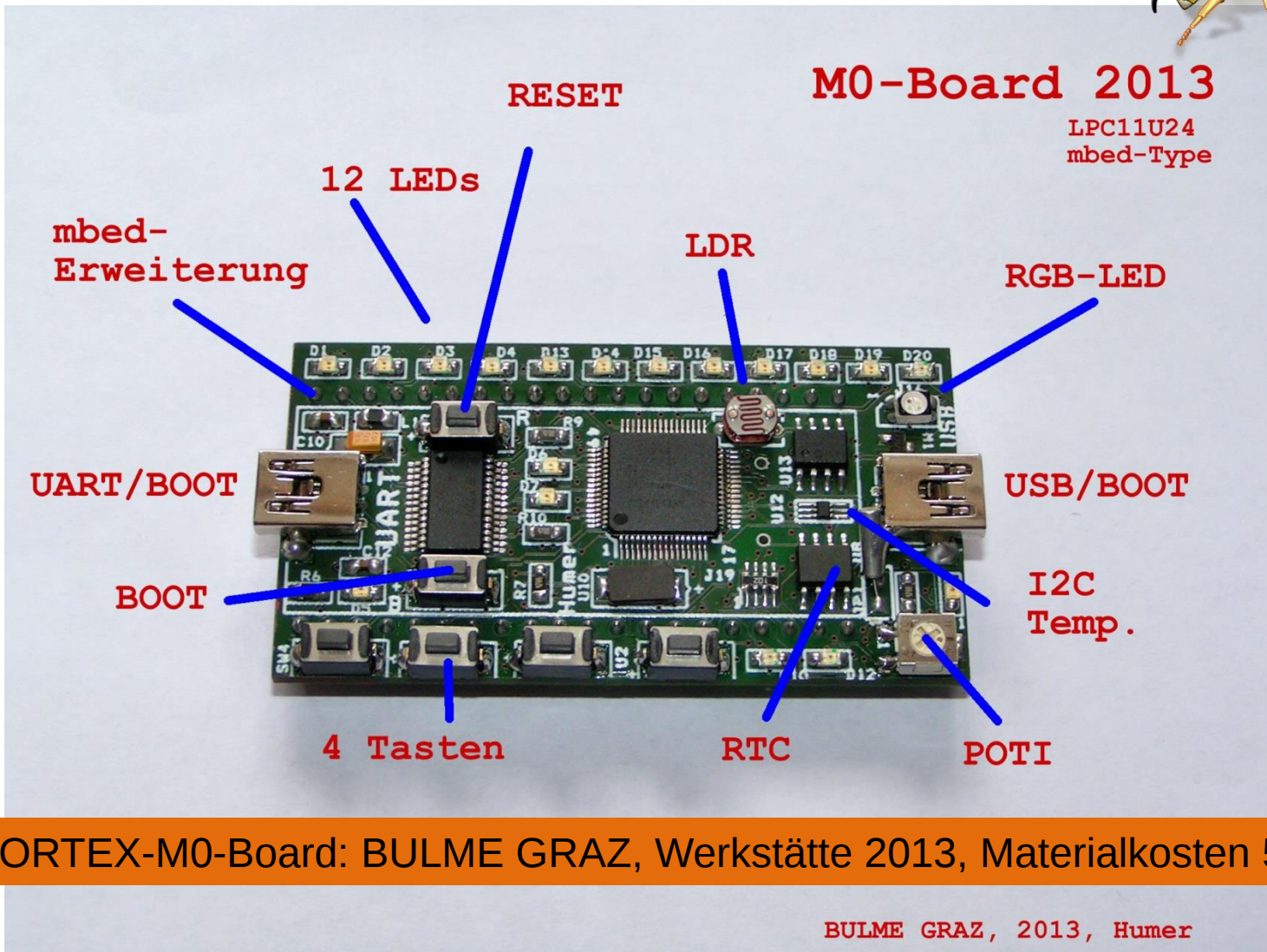
Bericht - FTKL- Tagung 2013 – Cortex M0 - mbed



Low power ARM® Cortex™-M0 Core
48MHz, 8KB RAM, 32KB FLASH
USB Device, 2xSPI, I2C , UART, 6xADC, GPIO

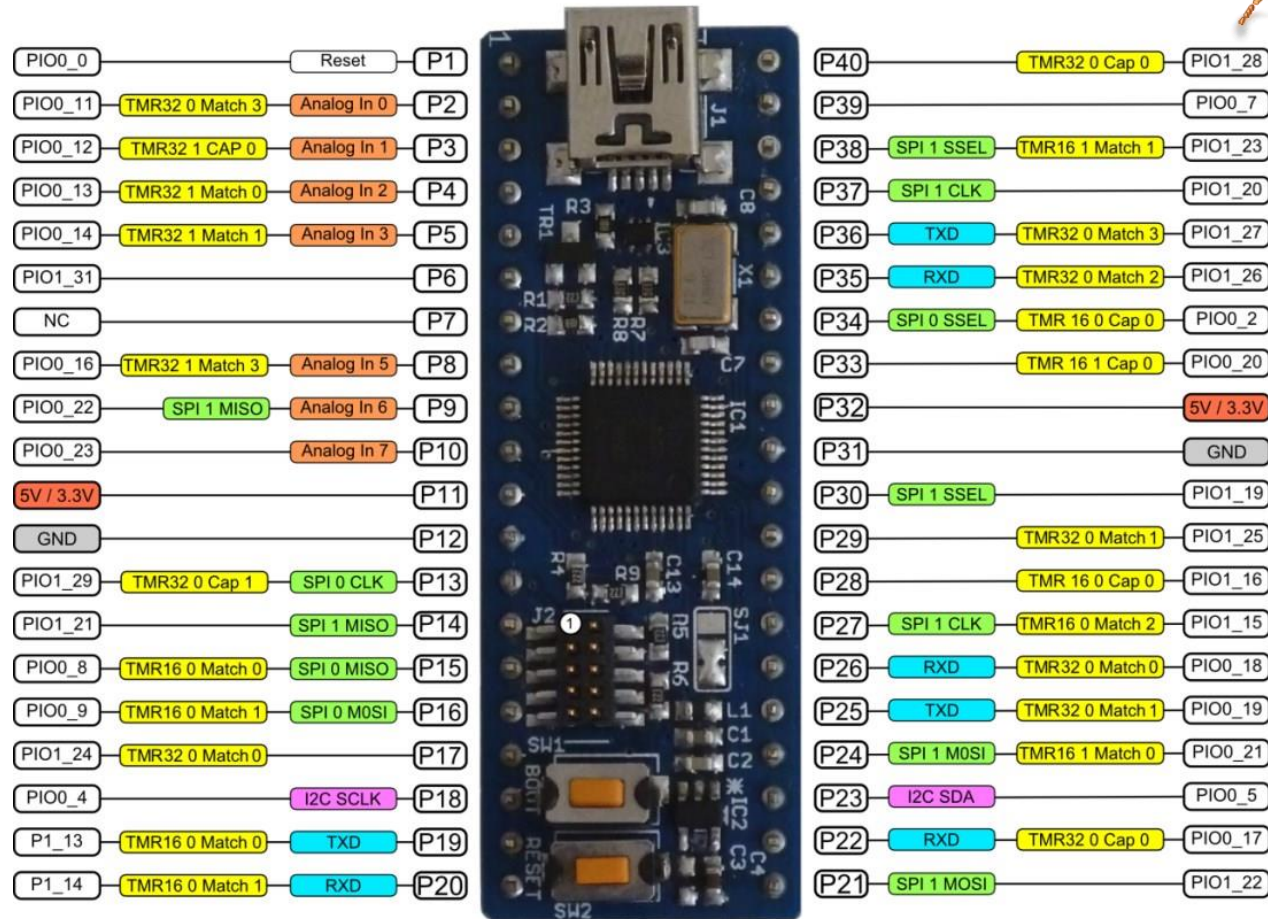


CORTEX-M0-Board: BULME GRAZ, Werkstätte 2012, Materialkosten 9€



CORTEX-M0-Board: BULME GRAZ, Werkstätte 2013, Materialkosten 5..20€

Zukunft (?) FTKL- Tagung 2014 – Cortex M0 - mbed



Boot button : PIO0_1
Reset button : PIO0_0

CORTEX-M0-Board: BULME GRAZ, Werkstätte 2014, Materialkosten ca.5€



Etang Electronics

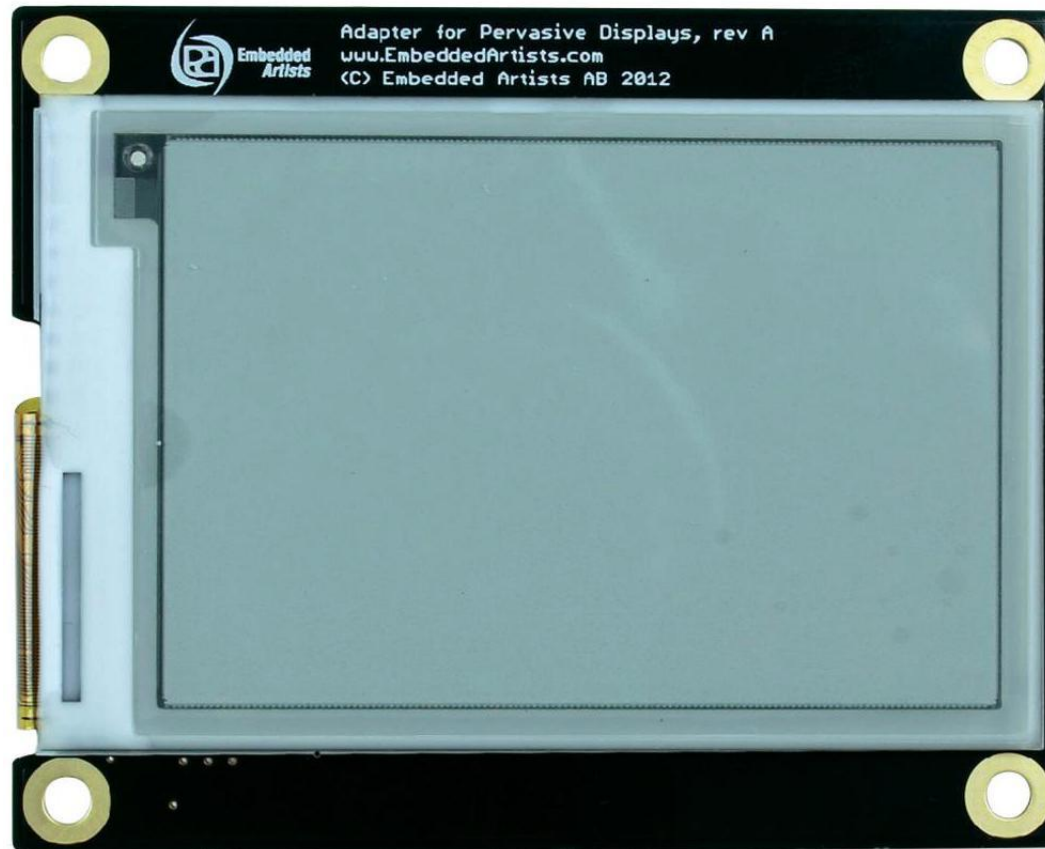


Dispatch within 24 hours

CORTEX-M0-Board – DEBUG/KEIL BULME GRAZ, ebay ca.15..30€

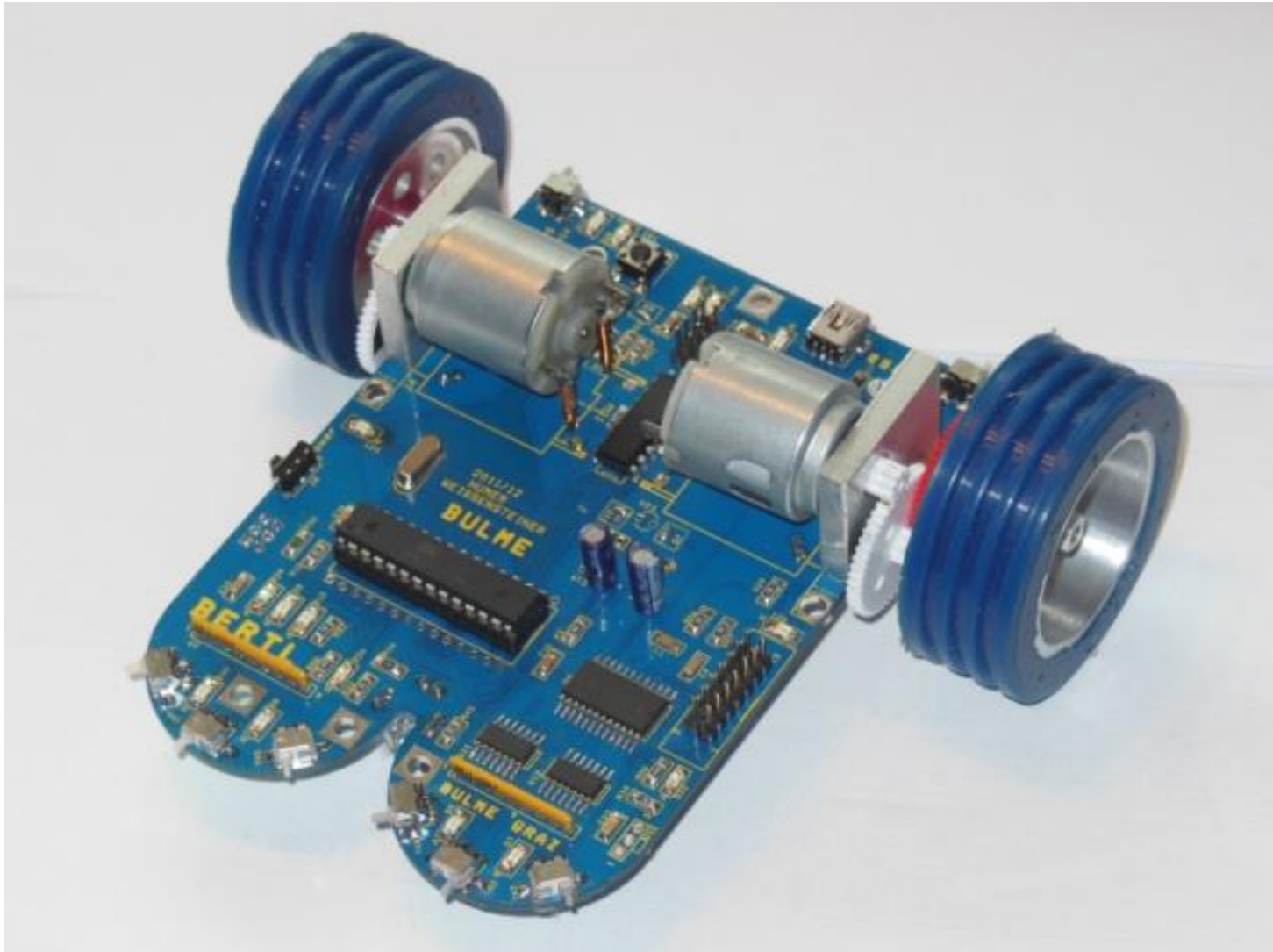


Nächstes Projekt: E Paper Displays



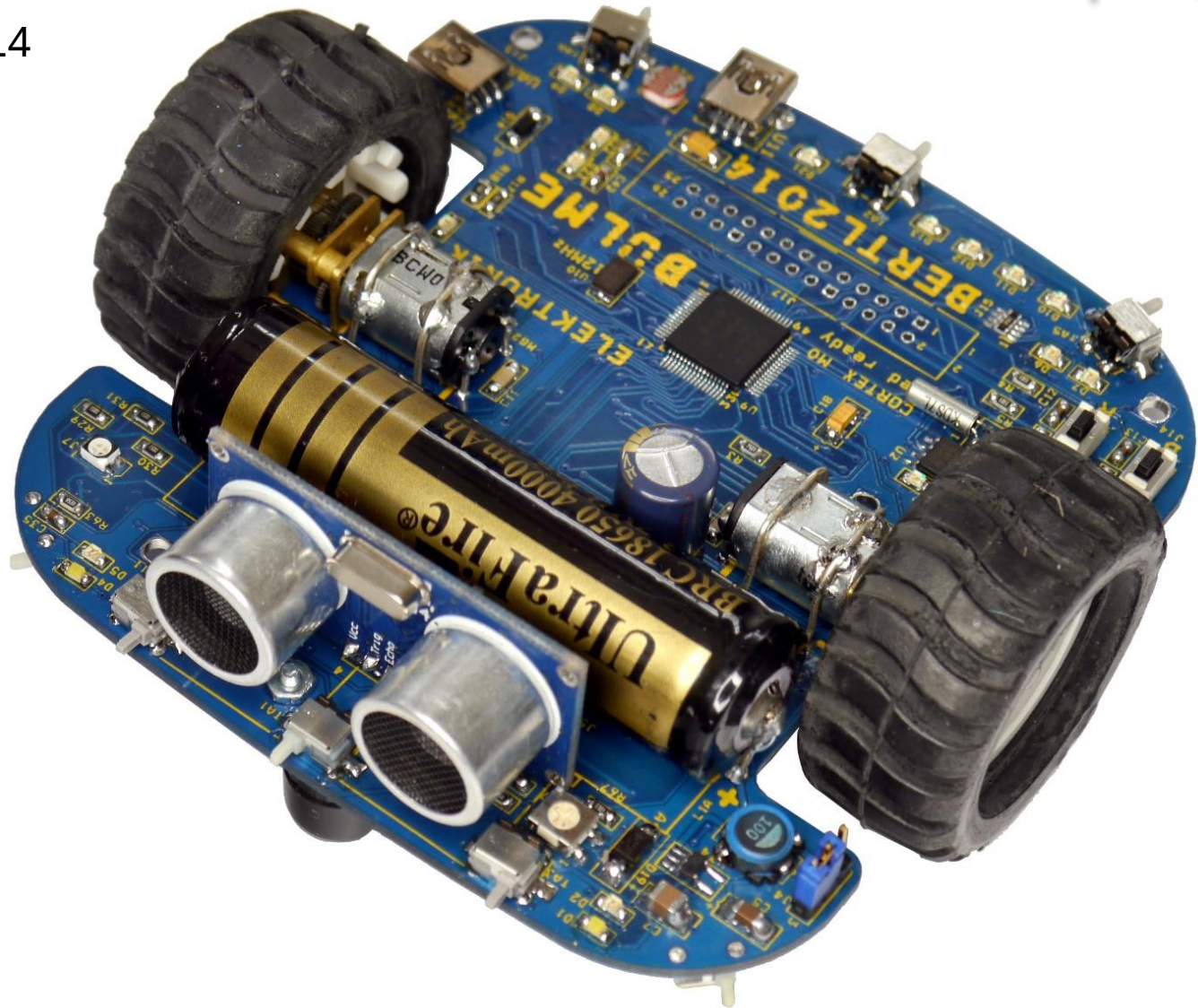


BERTL 2011/2013



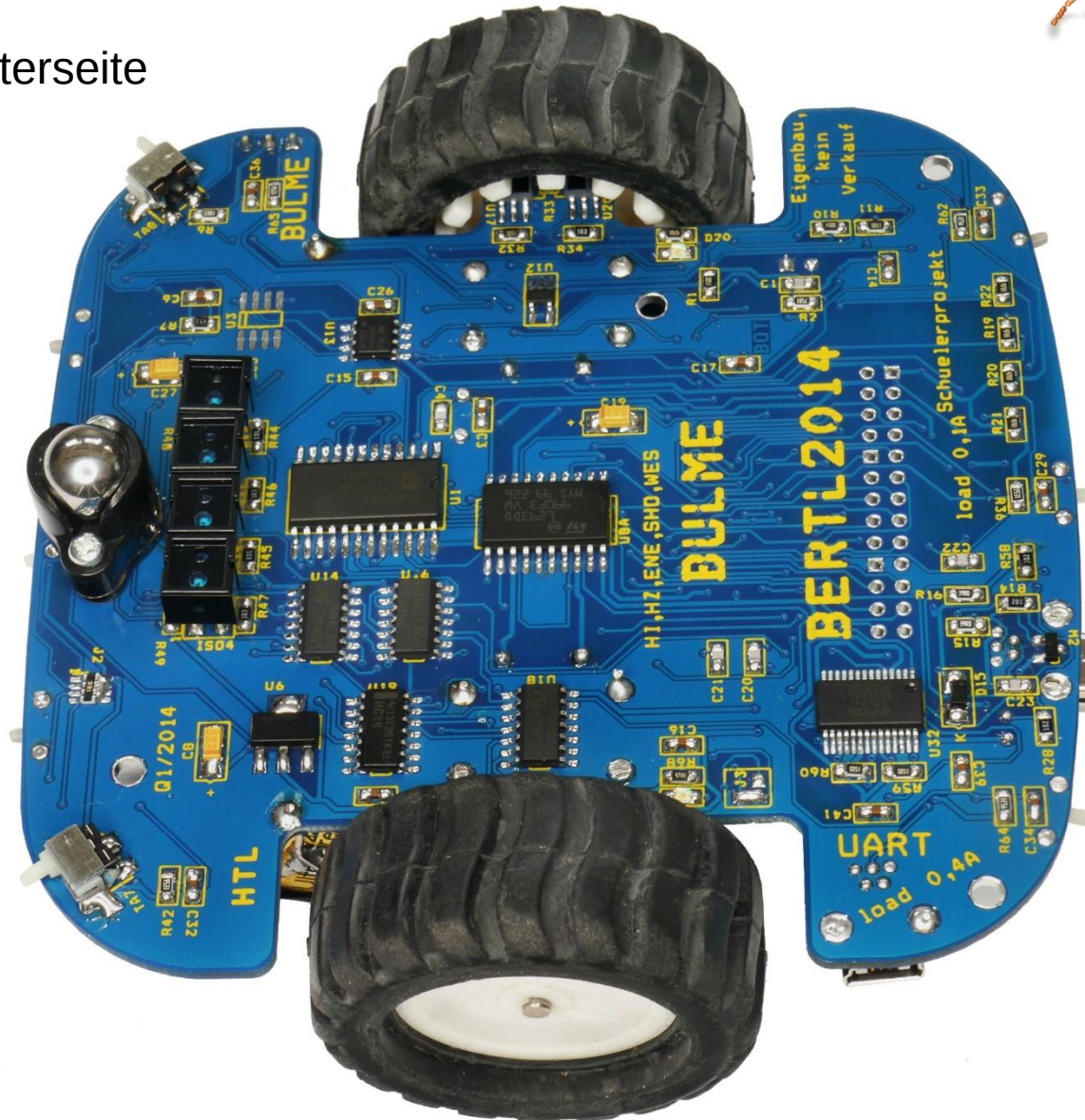


BERTL 2014





BERTL 2014 Unterseite



FTKL- Tagung 2013 – Zukunft?

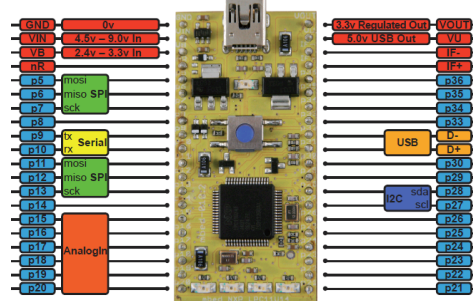


II .. V Jahrgang

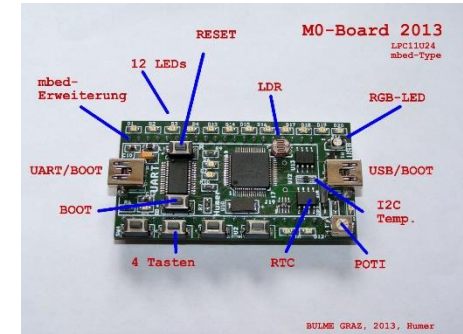
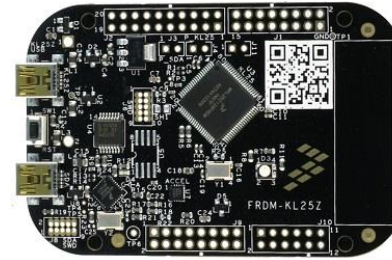
ARM: Cortex-M0/M0+

ARM: Cortex-M3

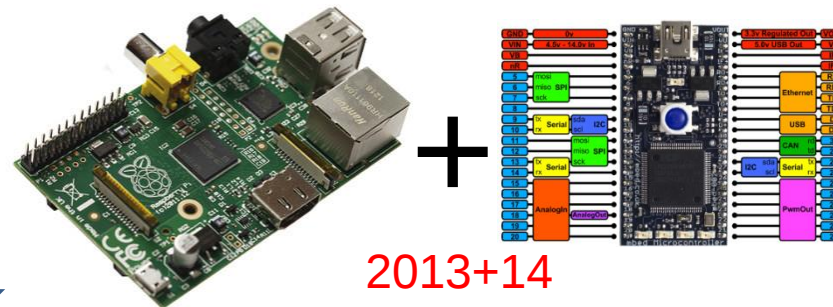
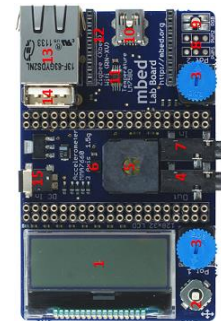
Raspberry + mbed



2013



2014



2013+14

Projekte..



12 Jahre „FTKL-Tagung“ unter der Leitung Humer –

was nun?

10. November 2014 ?

Thema: Cortex M0, Raspberry?





Vielen Dank!