

Franz Wolf



Herzlich Willkommen!

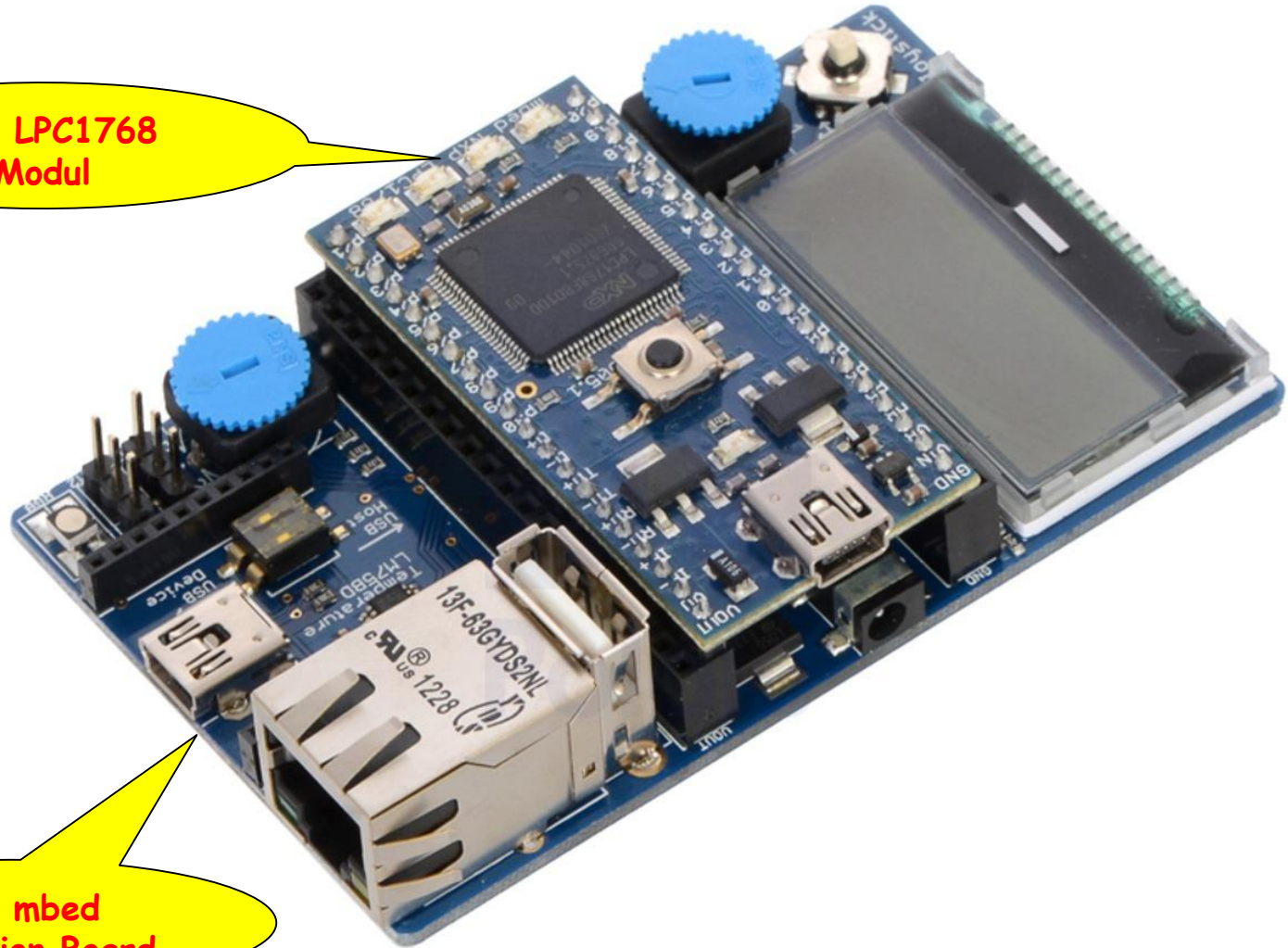


Inhalt

- Hardware
- Programmierung
- Würfel
- DIY - Do it yourself / Tipps

Warum was neues ??

**NXP LPC1768
Modul**



**ARM mbed
Application Board**

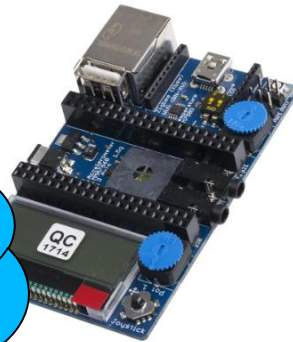
Warum was neues ??

RS Home < Halbleiter < Entwicklungskits < Entwicklungskits Prozessor & Mikrocontroller

Evaluierungsplatine Application Board, Entwicklungsboard

mbed

RS Best.-Nr.: 769-4182 | Herst. Teile-Nr.: mbed-014.1 | Marke: mbed



✓ 11 Lieferbar am folgenden Werktag (Mo-Fr) bei Bestelleingang werktags bis 22 Uhr.

📦 409 weitere lieferbar innerhalb 2 Werktag(e) (Mo-Fr).

Preis pro: Stück

43,32 €
(ohne MwSt.)

51,55 €
(inkl. MwSt.)

Stück	Pro Stück
1 +	43,32 €

1 Stück

Hinzufügen

Lieferverfügbarkeit überprüfen

☆ Zu einer Teiliste hinzufügen

Gesamtpreis
ca. 112 €

- "very old-school" ??
- 2009
- Distributor ??

Microcontroller Development Kit mbed NXP LPC1768, Modul

mbed

RS Best.-Nr.: 703-9238 | Herst. Teile-Nr.: MBED-LPC1768 | Marke: mbed



✓ 5 Lieferbar am folgenden Werktag (Mo-Fr) bei Bestelleingang werktags bis 22 Uhr.

📦 50 weitere lieferbar innerhalb 1 Werktag(e) (Mo-Fr).

Preis pro: Stück

50,70 €
(ohne MwSt.)

60,33 €
(inkl. MwSt.)

Stück	Pro Stück
1 +	50,70 €

1 Stück

Hinzufügen

Lieferverfügbarkeit überprüfen

☆ Zu einer Teiliste hinzufügen

Wird oft zusammen gekauft

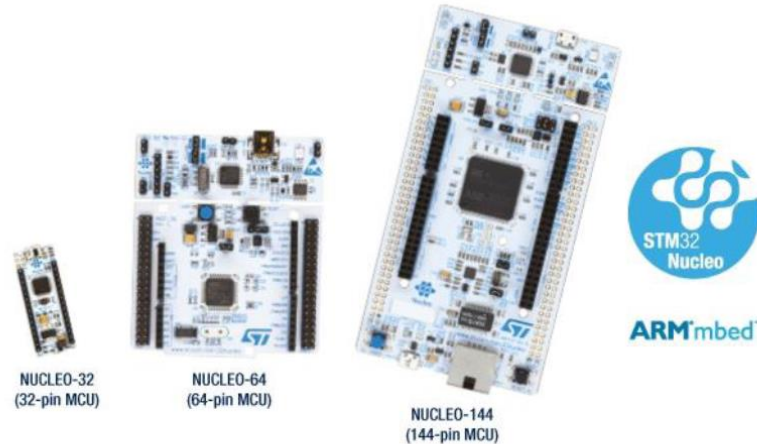


Kennwerte ?

In der Nucleo-Reihe definiert STM drei unterschiedliche Board-Typen:

- Nucleo – 32
- Nucleo – 64
- Nucleo – 144

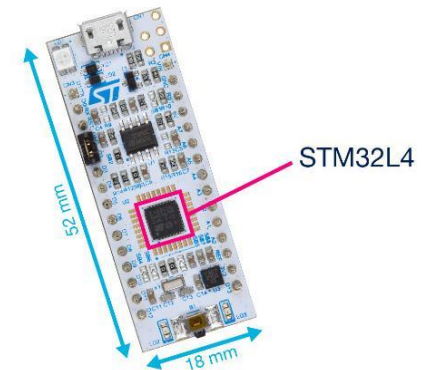
Die jeweils angegebene Zahl beschreibt die **jeweiligen Output-Pins** des verwendeten Mikrocontrollers. Bei dem L476RG handelt es sich um ein „Nucleo – 64“.



First Nucleo-32 board with QFN32 (5x5mm) MCU

Der Aufbau der Nucleo – 64 Boards ist stets identisch.

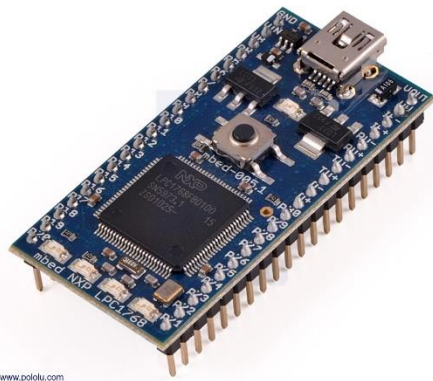
ca. 7 bis 10 €



Kennwerte ?

- **Cortex-M3 Core** LPC1768 Mikrocontroller, 96 MHz mit 512 KB Flash-Speicher, 64 KB RAM
- Schnittstellen für Ethernet, USB, DOSE, SPI, I²C und GPIO
- 40-poliges Modul im DIP-Format, Platinengröße: 44 x 26 mm
- Stromversorgung über USB oder +4,5 bis +9 V an VIN
- Stromverbrauch: <200 mA (ca. 100 mA bei deaktiviertem Ethernet)

- Mikrocontroller mit 256 KB Flash-Speicher, 64 KB SRAM, mit 80 MHz **Cortex-M4F-Kern** STM32L432KCU6
- Adaptiver **Echtzeitbeschleuniger** (ART Accelerator™), der eine 0-Wartezeit-Umsetzung vom Flash-Speicher ermöglicht
- Extrem energiesparender Mikrocontroller mit FlexPowerControl
- Echter Zufallszahlengenerator
- CRC-Kalkulationseinheit
- Eindeutige 96-Bit-ID
- Echtzeituhr und Kalender
- Bis zu 3 kapazitive Abtastkanäle
- Serielle Kommunikation: USART, SPI, I²C, USB, SAI, CAN, SWPMI, IRTIM
- Vierfach-SPI-Speicherschnittstelle
- ST-LINK/V2-1-Debugger/Programmiergerät mit USB-Neuaufzählungsfunktion
- Unterstützung für Arduino Nano-Konnektivität
- Flexible Stromversorgung der Platine: USB oder extern
- ARM mbed-fähig (mbed.org)

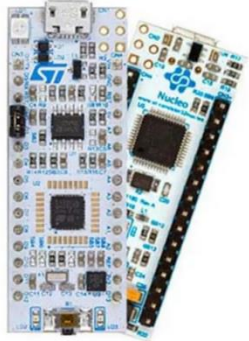


www.pololu.com

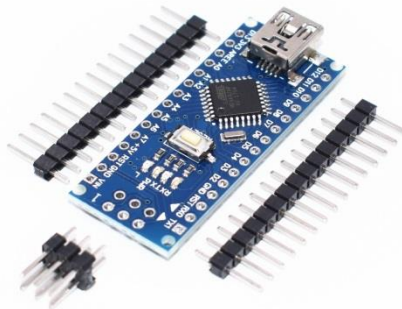


Kennwerte ?

Die **NUCLEO-L432KC** ist eine Nucleo-32-Entwicklungsplatine mit dem extrem energiesparenden Mikrocontroller STM32L432KCU6.



- Mikrocontroller mit 256 KB Flash-Speicher, 64 KB SRAM, mit 80 MHz Cortex-M4F-Kern STM32L432KCU6
- Adaptiver Echtzeitbeschleuniger (ART Accelerator™), der eine 0-Wartezeit-Umsetzung vom Flash-Speicher ermöglicht
- Extrem energiesparender Mikrocontroller mit FlexPowerControl
- Echter Zufallszahlengenerator
- CRC-Kalkulationseinheit
- Eindeutige 96-Bit-ID
- Echtzeituhr und Kalender
- Bis zu 3 kapazitive Abtastkanäle
- Serielle Kommunikation: USART, SPI, I²C, USB, SAI, CAN, SWPMI, IRTIM
- Vierfach-SPI-Speicherschnittstelle
- ST-LINK/V2-1-Debugger/Programmiergerät
- 3 LEDs: Power-LED, USB-Verbindung, Benutzer-LED
- Reset-Drucktaste
- Unterstützung für Arduino Nano-Konnektivität
- Flexible Stromversorgung der Platine: USB oder extern
- **ARM mbed-fähig (mbed.org)**



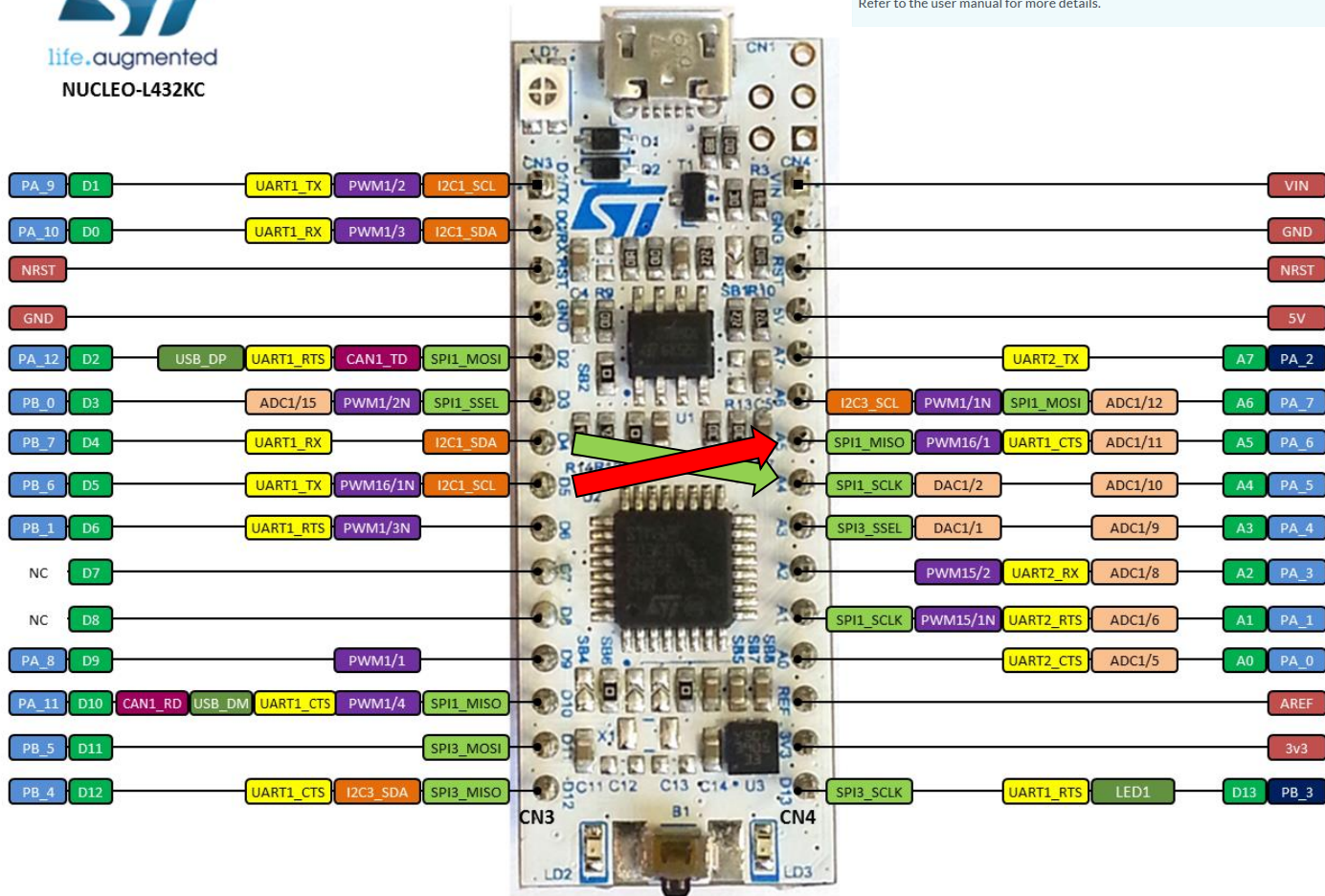
Arduino nano

Welcher ?

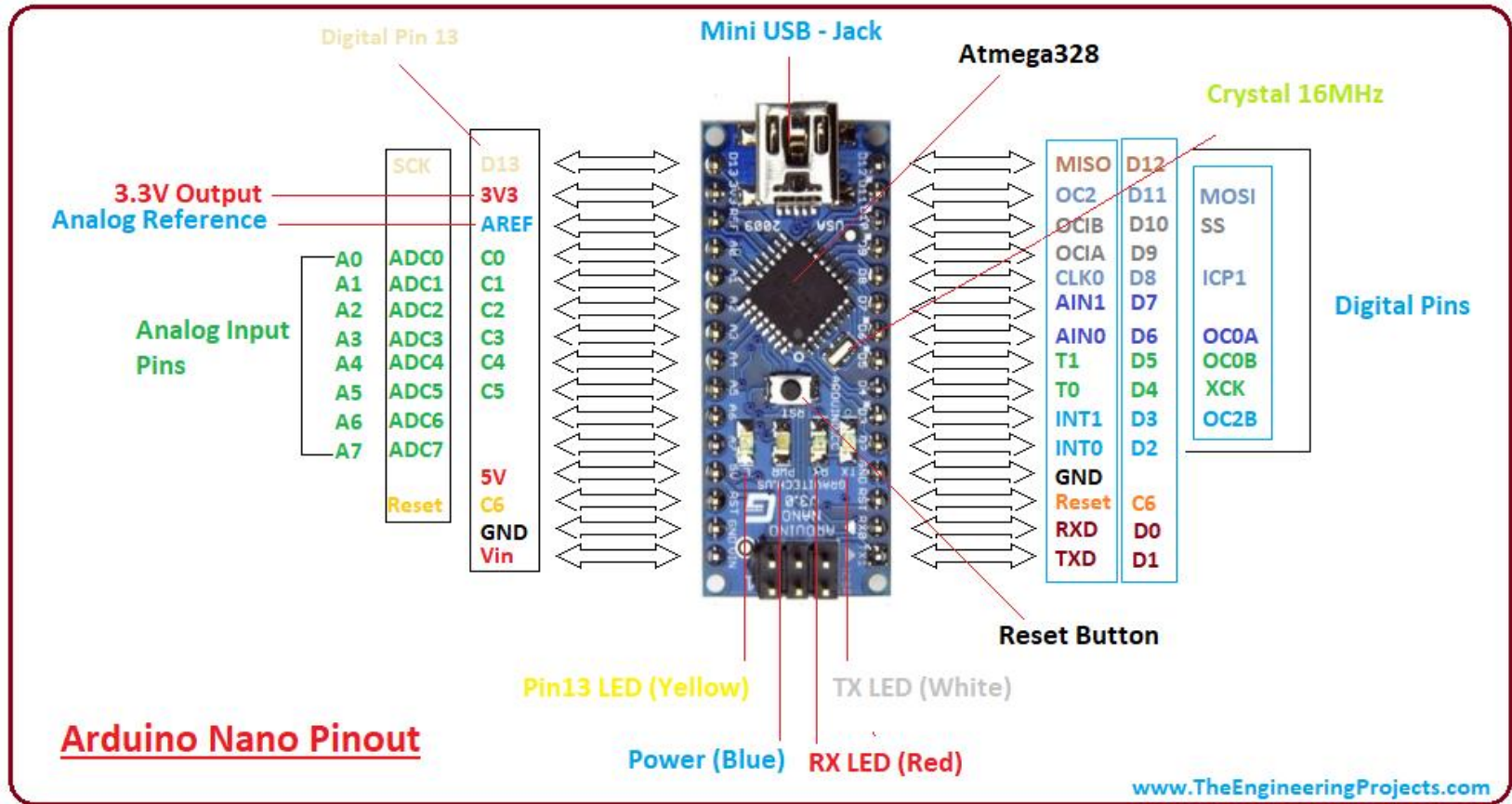


Information

By default the PA_5 (A4) and PA_6 (A5) pins can only be used as Input floating (ADC function). Remove SB16 and SB18 solder bridges in order to use these pins as Digital output and have access to other functions (DigitalOut, SPI, PWM, etc...). Refer to the user manual for more details.



Arduino



www.TheEngineeringProjects.com

Nucleo L432KC vs. Arduino

life.augmented Nucleo L432KC

Legend:

- GND
- POWER
- CONTROL
- PHYSICAL PIN
- PORT PIN
- ATMEGA328 PIN FUNC
- DIGITAL PIN
- ANALOG-RELATED PIN
- PWM PIN
- SERIAL PIN

Warnings:

- Absolute max per pin 40mA recommended 20mA
- Absolute max 200mA for entire package

ICSP: RESET, SCL, MISO, VCC, GND

USB JACK: VCC, GND, RESET, TX, RX, ADIF, ADCS, ADC4, ADC3, ADC2, ADC1, ADIF, TX, SCK

Pinout Table:

Header	ATmega328P Pin	Function	Header	ATmega328P Pin	Function		
CN3	PA0	DIGITAL	PA15	DIGITAL			
	PA1	DIGITAL	PA16	DIGITAL			
	PA2	DIGITAL	PA17	DIGITAL			
	PA3	DIGITAL	PA18	DIGITAL			
	PA4	DIGITAL	PA19	DIGITAL			
	PA5	DIGITAL	PA20	DIGITAL			
	PA6	DIGITAL	PA21	DIGITAL			
	PA7	DIGITAL	PA22	DIGITAL			
	PA8	DIGITAL	PA23	DIGITAL			
	PA9	DIGITAL	PA24	DIGITAL			
	PA10	DIGITAL	PA25	DIGITAL			
	PA11	DIGITAL	PA26	DIGITAL			
	PA12	DIGITAL	PA27	DIGITAL			
	PA13	DIGITAL	PA28	DIGITAL			
	PA14	DIGITAL	PA29	DIGITAL			
	NC	NC					
CN4	PC0	DIGITAL	PC15	DIGITAL			
	PC1	DIGITAL	PC16	DIGITAL			
	PC2	DIGITAL	PC17	DIGITAL			
	PC3	DIGITAL	PC18	DIGITAL			
	PC4	DIGITAL	PC19	DIGITAL			
	PC5	DIGITAL	PC20	DIGITAL			
	PC6	DIGITAL	PC21	DIGITAL			
	PC7	DIGITAL	PC22	DIGITAL			
	PC8	DIGITAL	PC23	DIGITAL			
	PC9	DIGITAL	PC24	DIGITAL			
	PC10	DIGITAL	PC25	DIGITAL			
	PC11	DIGITAL	PC26	DIGITAL			
	PC12	DIGITAL	PC27	DIGITAL			
	PC13	DIGITAL	PC28	DIGITAL			
	PC14	DIGITAL	PC29	DIGITAL			
	INT3	PWM	INT0	PCNT38	PD2	32	2
XCK	T0	PCNT29	PD3	1	3		
T1	PWM	DC2B	PCNT20	PD4	2	4	
A/NO	PWM	DC0B	PCNT22	PD5	8	5	
		A/NO	PCNT23	PD7	10	6	
		ICP1	CLAD	PCNT0	PD0	32	8
SS	PWM	DC1A	PCNT1	PD1	13	9	
MOSI	PWM	DC1B	PCNT2	PD2	14	10	
MISO	PWM	DC2A	PCNT3	PD3	15	11	
		DC1A	PCNT4	PD4	16	12	

Notes:

- Connected to the ATmega and used for USB program and communicating with it
- On version 2 Analog Pins are reversed e.g. AD*AF, AT*AD



Nucleo L432KC

Figure 3. STM32 Nucleo-32 board top layout

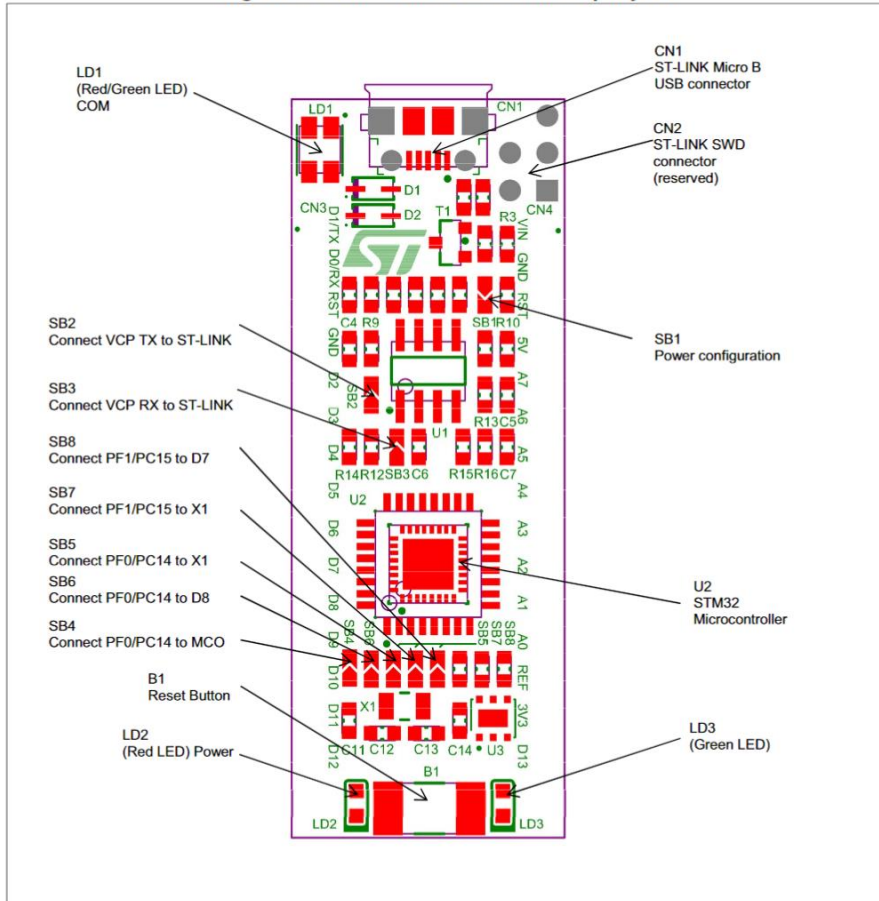
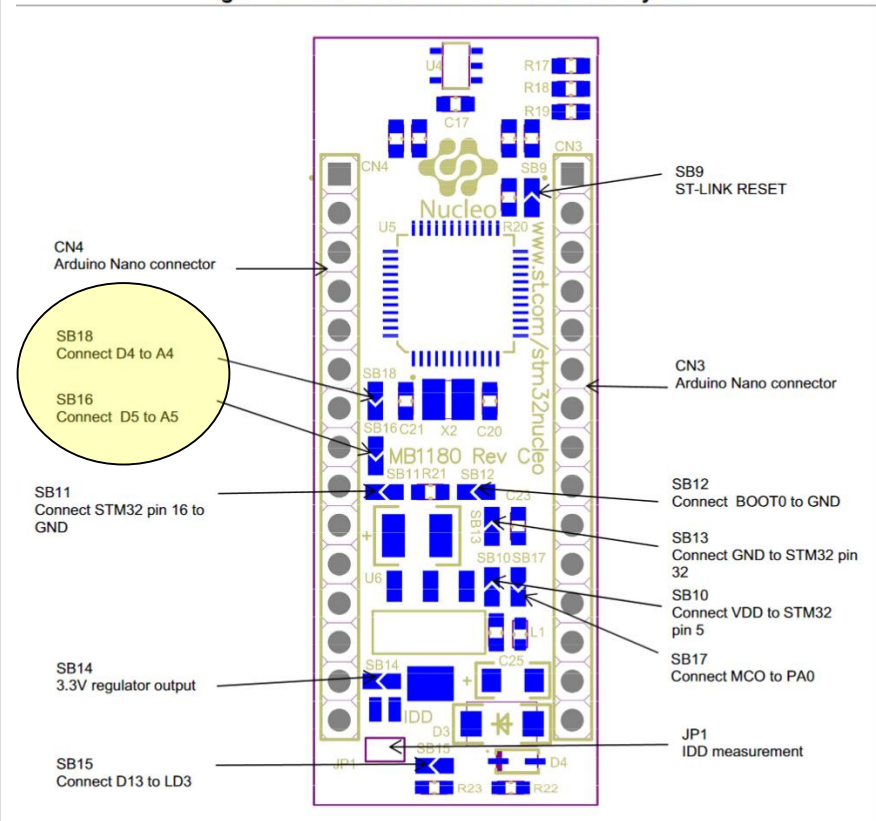


Figure 4. STM32 Nucleo-32 board bottom layout



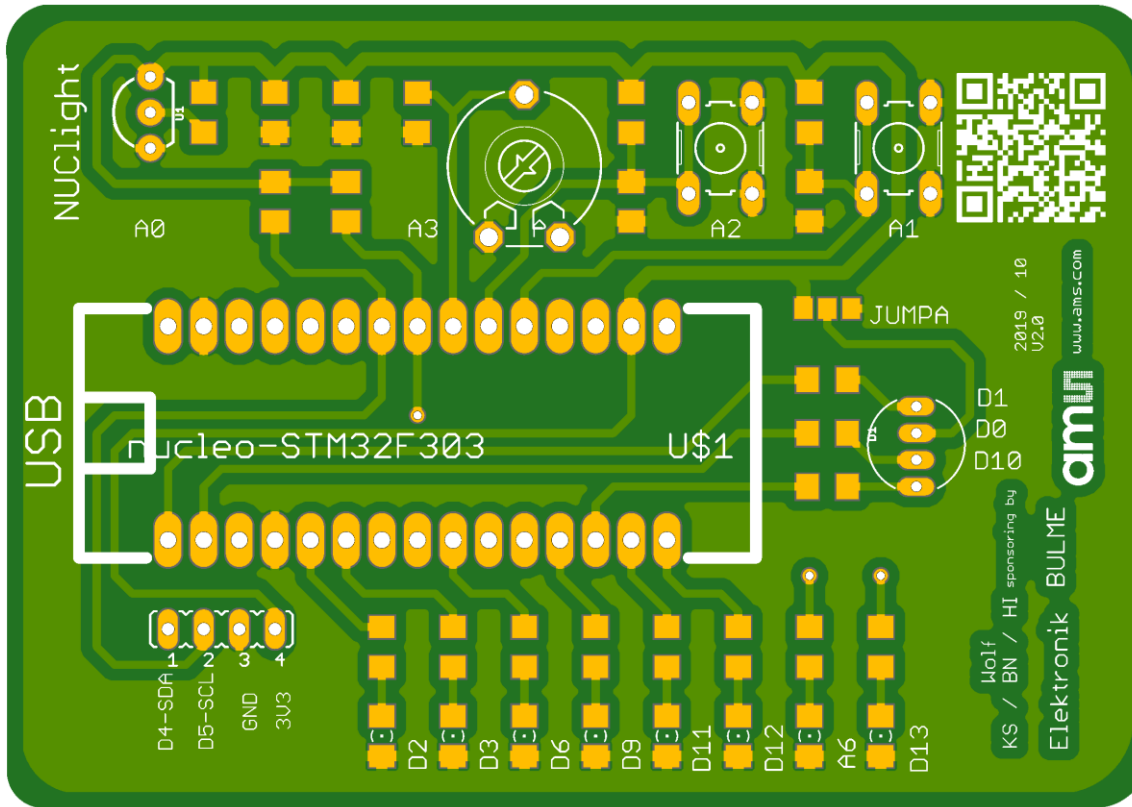
Nucleo L432KC

Table 13. Arduino Nano connectors on NUCLEO-L432KC

Connector	Pin number	Pin name	STM32 pin	Function
Left connector				
CN3	1	D1	PA9	USART1_TX
	2	D0	PA10	USART1_RX
	3	RESET	NRST	RESET
	4	GND	-	Ground
	5	D2	PA12	-
	6	D3	PB0	TIM1_CH2N ⁽¹⁾
	7	D4 ⁽²⁾	PB7	
	8	D5 ⁽²⁾	PB6	TIM16_CH1N ⁽¹⁾
	9	D6	PB1	TIM1_CH3N ⁽¹⁾
	10	D7 ⁽³⁾	PC14	
	11	D8 ⁽³⁾	PC15	
	12	D9	PA8	TIM1_CH1
	13	D10	PA11	SPI_CS ⁽⁴⁾ TIM1_CH4
	14	D11	PB5	SPI1_MOSI TIM ⁽⁵⁾
	15	D12	PB4	SPI1_MISO
Right connector				
CN4	1	VIN	-	Power input
	2	GND	-	Ground
	3	RESET	NRST	RESET
	4	+5V	-	5V input/output
	5	A7	PA2	ADC12_IN7 ⁽⁶⁾
	6	A6	PA7	ADC12_IN12
	7	A5 ⁽¹⁾	PA6	ADC12_IN11 I2C1_SCL
	8	A4 ⁽¹⁾	PA5	ADC12_IN10 I2C1_SDA
	9	A3	PA4	ADC12_IN9
	10	A2	PA3	ADC12_IN8
	11	A1	PA1	ADC12_IN6
	12	A0	PA0	ADC12_IN5
	13	AREF	-	AVDD
	14	+3V3	-	3.3V input/output
	15	D13	PB3	SPI1_SCK

1. D3, D5 and D6 PWM on inverted channel.
2. Limitations on A4 and A5, D4 and D5 related to I²C configuration are explained in [Section 6.10: Solder bridges](#) according to SB16/SB18 setting.
3. D7/D8 shared with OSC32_IN/OSC32_OUT.
4. SPI_CS is made by GPIO.
5. No PWM on D11.
6. PA2 exclusive with VCP_TX.

Nucleo L432KC



bitte klicken!



INFO-Webseite



<https://lehrer.bulme.at/~wf/nucleo/>

BULME Nucleo Entwicklungsboard
Elektronik und Technische Informatik - F. Wolf (WF)

Home Pinout-nucleo L432KC-mbed NUClight V1 NUClight V2 NUClight V3 DOKU Software

Bulme Nucleo Entwicklungsboard

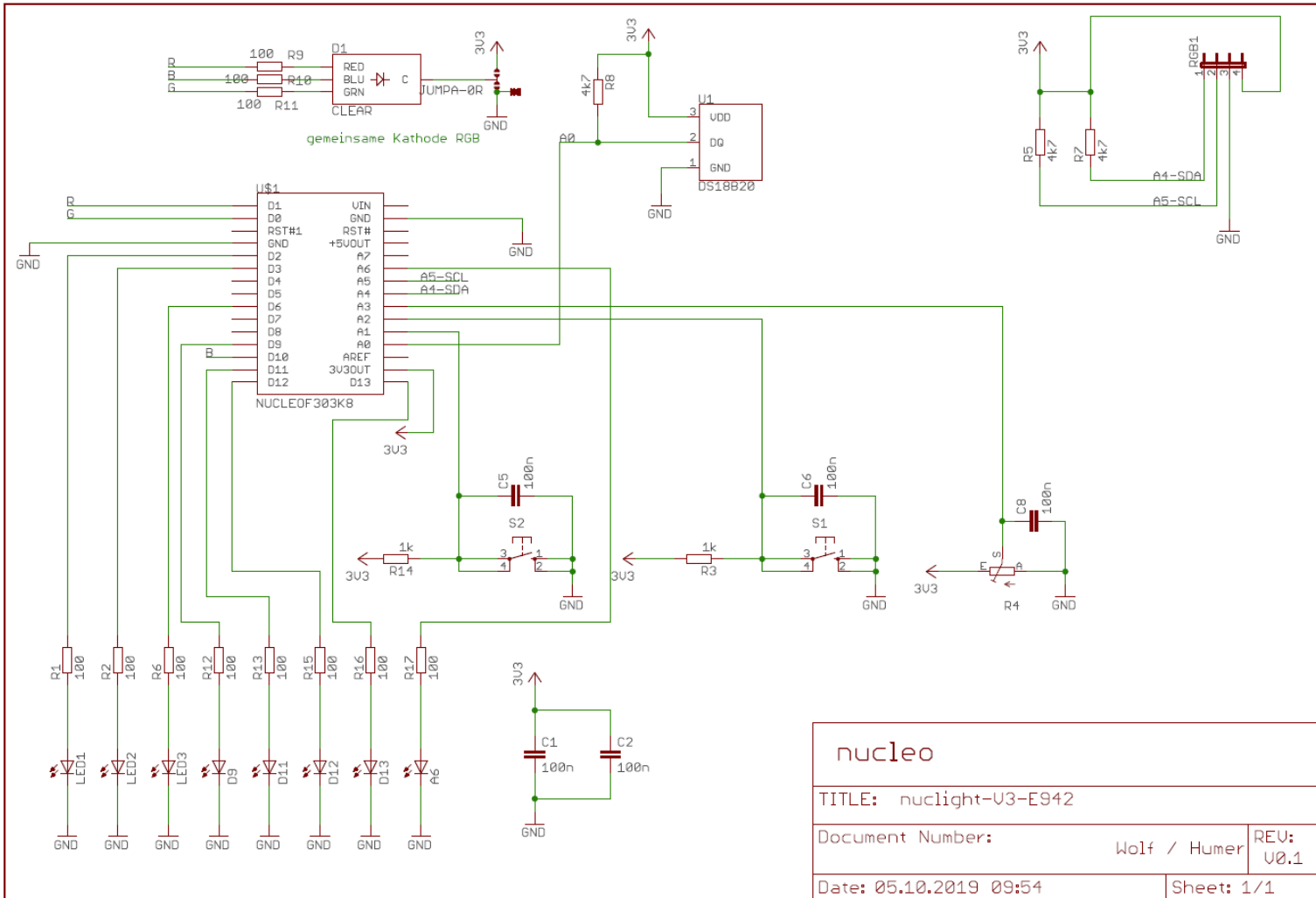
Anwendung: HWE / FSST / Labor Unterricht

An der BULME Graz haben wir uns für das Board "nucleo L432KC" entschieden.

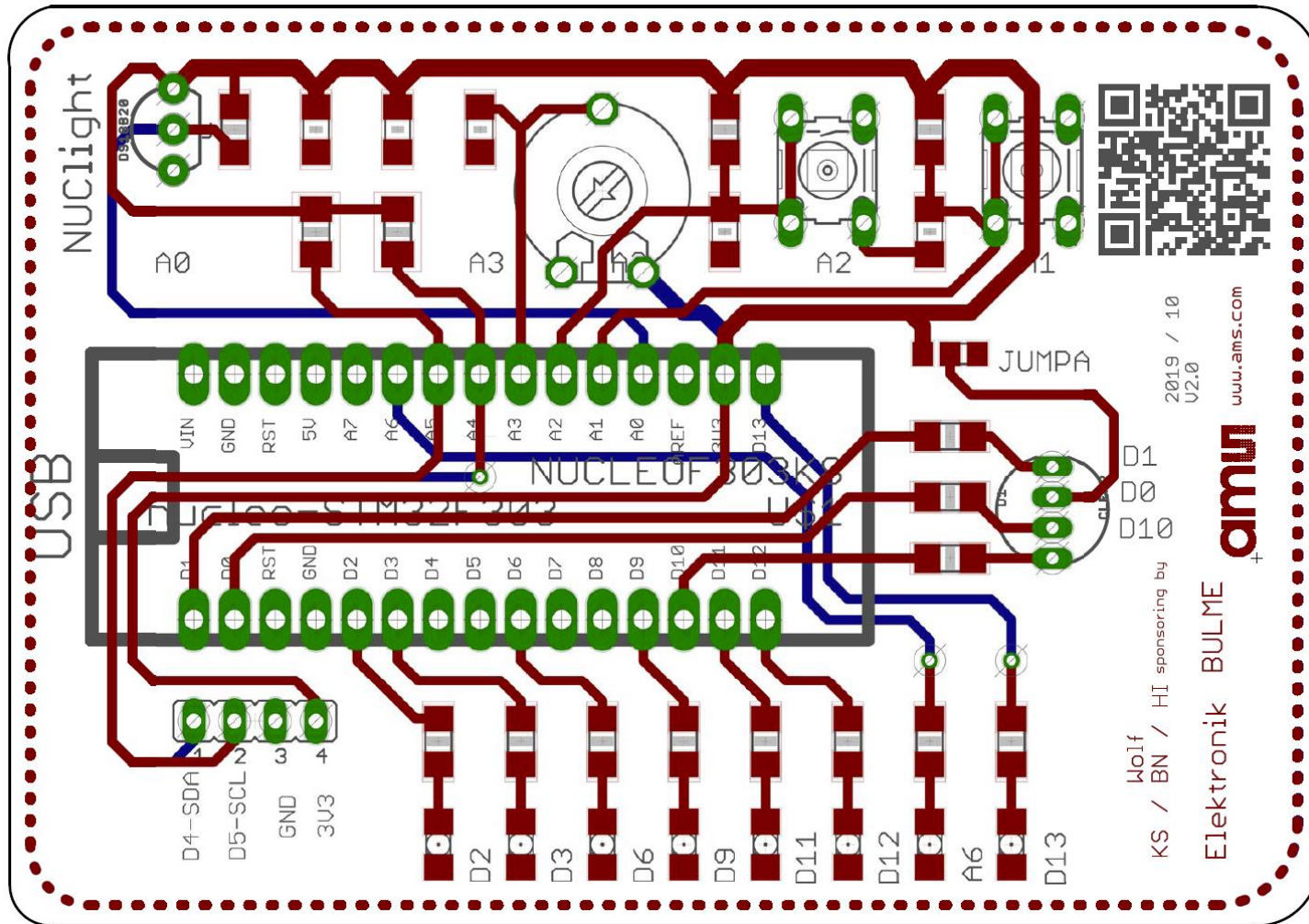
Kenndaten:

- Mikrocontroller mit 256 KB Flash-Speicher, 64 KB SRAM, mit 80 MHz Cortex-M4F-Kern STM32L432KCU6 • Adaptiver Echtze
- Extrem energiesparender Mikrocontroller mit FlexPowerControl
- Echter Zufallszahlengenerator
- CRC-Kalkulationseinheit
- Eindeutige 96-Bit-ID
- Echtzeituhr und Kalender
- Bis zu 3 kapazitive Abtastkanäle
- Serielle Kommunikation: USART, SPI, I²C, USB, SAI, CAN, SWPMI, IRTIM
- Vierfach-SPI-Speicherschnittstelle
- ST-LINK/V2-1-Debugger/Programmiergerät mit USB-Neuaufzählungsfunktion
- 3 LEDs: Power-LED, USB-Verbindung, Benutzer-LED
- Reset-Drucktaste
- Unterstützung für Arduino Nano-Konnektivität
- Flexible Stromversorgung der Platine: USB oder extern
- ARM mbed-fähig (mbed.org)

NUCLight-Board



NUCLight-Board



Wolf
KS / BN / HI sponsoring by

Elektronik BULME

amun⁺

2019 / 10
V2.0
www.ams.com

Shopping

für Material, Kleinwerkzeug, Ersatzteile

Artikelbezeichnung, Dimension	Kat. Nr.:	Einzelpr. excl. MWSt.	Rab	(
PIH 5034 WHITE Rändel für Trimmer PT 10, weiß	PIH 5034 WHITE	€ 0,18		
PIH PT10MV103IPM Trimpot., 10 kOhm, linear	4 PIH PT10MV103IPM	€ 0,310		
Leiterplattenbuchse ASSMANN 2.54mm 32-polig	674-1555	€ 1,81		
TE Connectivity Kurzhubtaster	479-1413	€ 0,078		
NUCLEO-L432KC	143-8574	€ 9,37		
USB 2.0 KAB.A/ST<>m.B/ST 1m	AK-300110-010-S	€ 0,700		



Alle Suchbegriffe oder Artikelnummer

Suchen

Warenkorb 0,00 €
Versandkosten 0,95 €

- Bauelemente
- Raspberry Pi
- Stromversorgung
- Besstechnik
- Werkstatt und Lötlack
- Haarstechnik
- Netzwerktechnik
- PC Technik
- Sat & TV
- Kommunikation & Büro
- Neu

Sie sind hier: Startseite > Bauelemente > Bauelemente_passiv > Potis_Trimmer > Zubehör für Potentiometer

PIH 5034 WHITE Rändel für Trimmer PT 10, weiß



Artikel-Nr.: PIH 5034 WHITE

Farbe:

0,19 €
inkl. gesetzl. MwSt. zzgl. Versandkosten

ab Lager, Lieferzeit: 2-3 Werktage

in den Warenkorb

Zum Vergleich markieren

Warengruppe: 1 = [rabattfähig](#)

Zahlarten: **visa**

mehr >

Sicher und umweltbewusst einkaufen

mehr >

◀ Artikel 114 von 141 Artikeln ▶

Markierte Artikel vergleichen

Artikel drucken

Artikel beobachten

FAQ

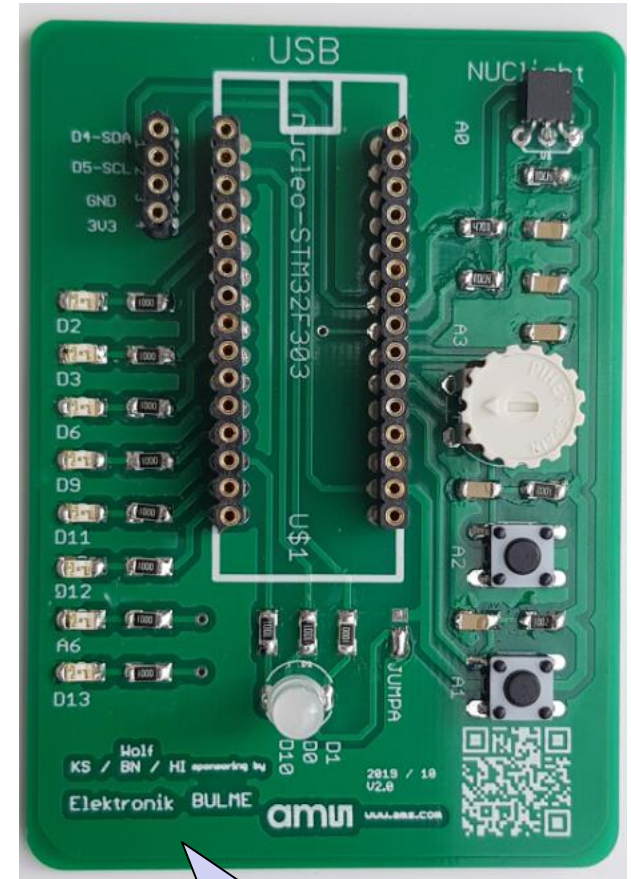
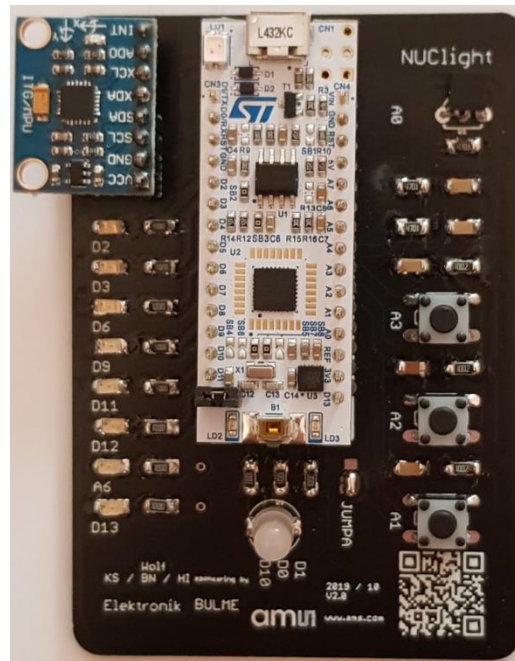
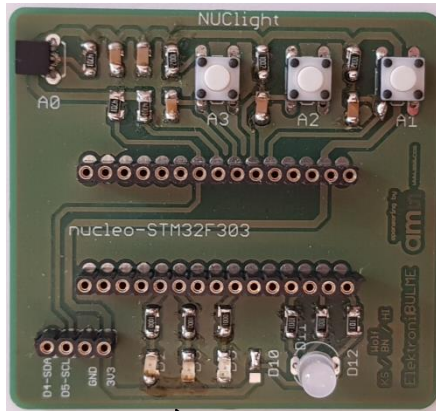
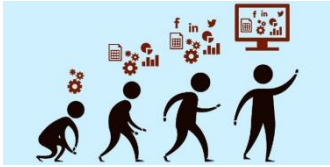
Produktbild

[Link auf diesen Artikel](#)

[Link auf diese Gruppe](#)

[Artikelfehler melden](#)

Platinen - Evolution



alle 3. Jahrgänge
 Tagesschule (Elektronik) 2019/20
 Projekt Kick-Off 05/2019

Ab 2019/20
 Abendschule Elektronik

NUCLight-Board

3-Achsen
Beschleunigungs-/
Lagesensor -
GY-521 MPU-6050
2,00 €

NUCLEO-L432KC
10,00 €

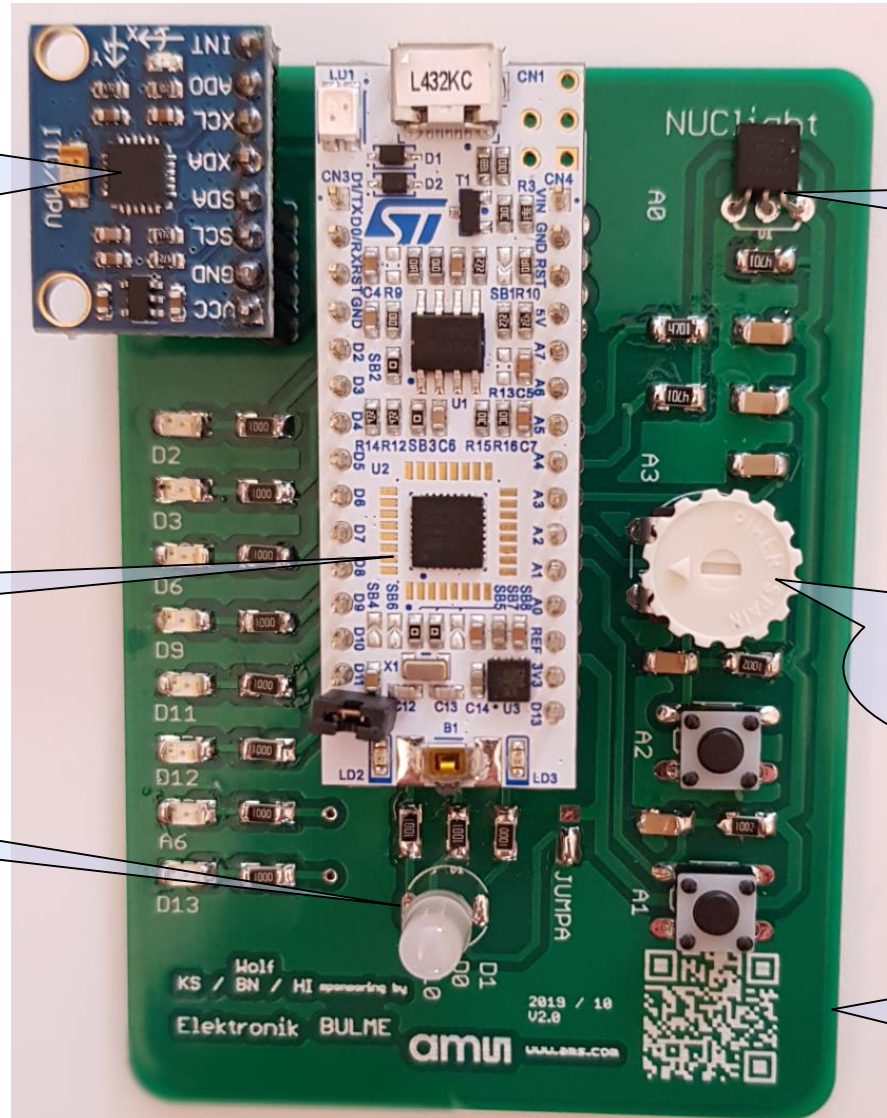
RGB-LED
0,03 €

14,70 €

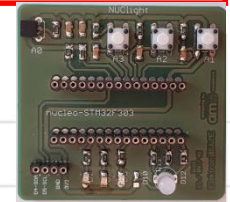
DS18B20
Temperatur
Sensor
1,20 €

Trimpotentiometer
Widerstand: 10 kΩ
Linear + Rändel
0,50 €

Platine
0,90 €



NUClight V1



NUCLEO L432KC

NUClight - V1



HW	Alt. Fkt.	Port	PIN
		D1	1
		D0	2
		NRST	3
		GND	4
LED1		D2	5
LED2		D3	6
MPU6050	SDA_0	D4	7
MPU6050	SCL_0	D5	8
LED3		D6	9
		D7	10
		D8	11
		D9	12
RGB-green		D10	13
RGB-blue		D11	14
RGB-red	PWM	D12	15

PIN	Port	Alt. Fkt.	Debug
16	VIN		
17	GND		
18	NRST		
19	5V0		
20	A7		
21	A6		
22	A5		
23	A4		
24	A3		Taster
25	A2		Taster
26	A1		Taster
27	A0		DS18B20
28	AREF		
29	3V3		
30	D13		

NUClight V3



NUCLEO L432KC NUClight - V3



HW	Alt. Fkt.	Port	PIN
RGB-rot	PWM	D1	1
RGB-green	PWM	D0	2
		NRST	3
		GND	4
LED1		D2	5
LED2		D3	6
MPU6050	SDA_0	D4	7
MPU6050	SCL_0	D5	8
LED3		D6	9
	X	D7	10
	X	D8	11
LED4		D9	12
RGB-blue	PWM	D10	13
LED5		D11	14
LED6		D12	15



PIN	Port	Alt. Fkt.	Debug
16	VIN		
17	GND		
18	NRST		
19	5V0		
20	A7		
21	A6		LED7
22	A5		
23	A4		
24	A3		POT1
25	A2		Taster
26	A1		Taster
27	A0		DS18B20
28	AREF		
29	3V3		
30	D13	Led Board	LED8

Inhalt

- Hardware
- Programmierung
- Würfel
- DIY - Do it yourself / Tipps

Software ?

The banner features the ARM Mbed logo at the top left. Navigation links include Overview, Hardware, Docs, Code, Support, and Case Studies. A search icon, Portal, and Compiler buttons are on the right. A survey notification reads: "Make your voice heard! Take part in our survey for a chance to win a trip to an Arm developer summit in California. Take the survey". The main heading is "IoT Device Development". Below it, text states: "Mbed makes device development quicker. For IoT and many other embedded use cases, Mbed helps you and your team to take a product from prototype to production rapidly." Two orange buttons are present: "Create an Mbed Account to Get Started" and "Try Pelion Device Management with Mbed". The background is a stylized blue cityscape with IoT icons. A large yellow arrow points from the banner towards the Mbed IDE screenshot below.

ARM[®]mbed™

The screenshot shows the Mbed IDE interface. The top bar includes "Mbed" and "Workspace Management" with the version "1.10.25.0". The left sidebar shows a tree view of "My Programs" with various project names like "_B14Test1", "app-board-analog-csv", etc. The main area is titled "Manage your Program Workspace" and contains a table listing all programs in the workspace. The table has columns for Name, Tags, Modified, and Description. The right sidebar shows "Workspace Details" for user "wf", including "Total Programs: 167" and a "Recently Modified" list.

Name	Tags	Modified	Description
<input checked="" type="checkbox"/> _B14Test1		28 Jan 2015	
<input checked="" type="checkbox"/> app-board-analog-csv		05 Oct 2018	
<input checked="" type="checkbox"/> app-board-AnalogOut		05 Oct 2018	
<input checked="" type="checkbox"/> app-board-Bubble-Level		08 Apr 2019	
<input checked="" type="checkbox"/> app-board-LCD		07 Oct 2018	
<input checked="" type="checkbox"/> app-board-LM75		07 Oct 2018	BULME
<input checked="" type="checkbox"/> app-board-LM75-ok		07 Oct 2018	
<input checked="" type="checkbox"/> app-board-LM75B		07 Oct 2018	
<input checked="" type="checkbox"/> app-board-RGB		07 Oct 2018	
<input checked="" type="checkbox"/> app-board-TempAlarm		07 Oct 2018	
<input checked="" type="checkbox"/> app-shield-pots		03 Mar 2019	
<input checked="" type="checkbox"/> B17_Lektion02a		01 Mar 2019	
<input checked="" type="checkbox"/> BERT16-ESP		26 Feb 2016	
<input checked="" type="checkbox"/> BERT16-ESP_UART		28 Dec 2016	
<input checked="" type="checkbox"/> btm222_mbed1768_hyper		24 Nov 2011	
<input checked="" type="checkbox"/> btm222_mbed1768_LED		24 Nov 2011	

Software ?

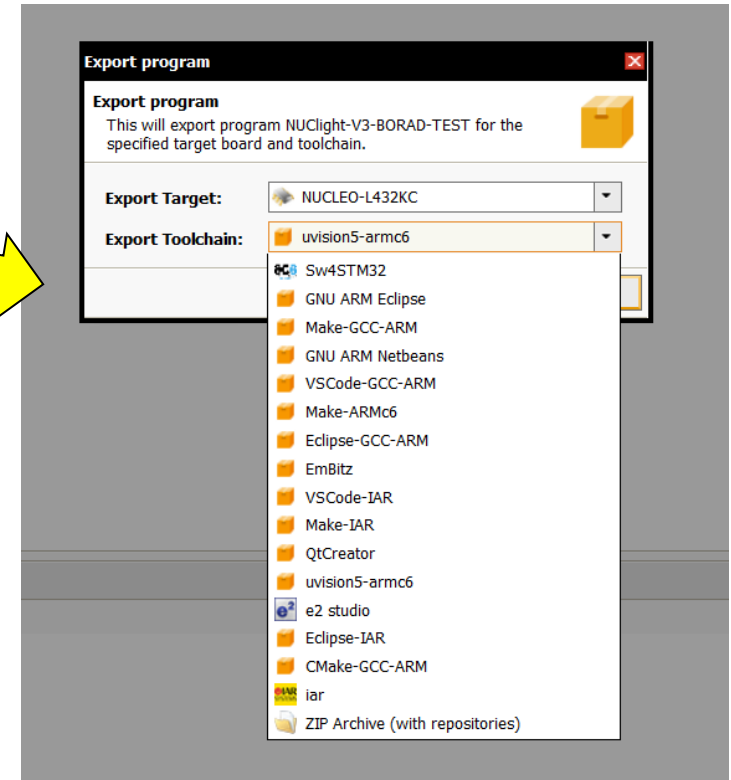
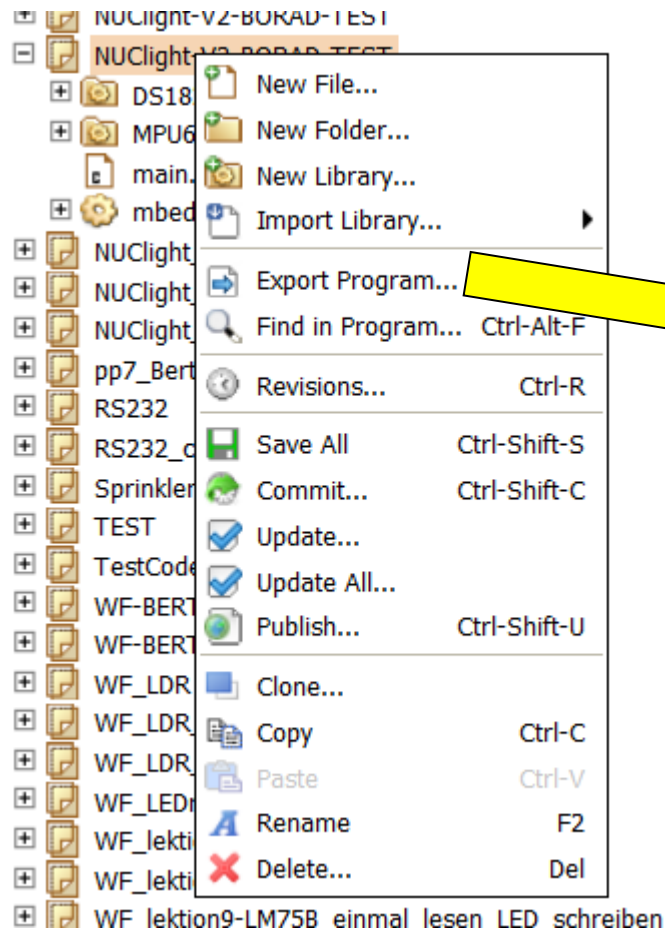
<https://os.mbed.com/users/wf/code/NUCLight-V3-HW-BORAD-TEST/>

The screenshot shows the Mbed OS web interface. At the top, there is a navigation bar with 'arm MBED' logo and links for Overview, Hardware, Docs, Code, Support, and Case Studies. A search bar and buttons for 'Portal' and 'Compiler' are also present. A notification banner reads: 'Make your voice heard! Take part in our survey for a chance to win a trip to an Arm developer summit in California. Take the survey'. Below this, the breadcrumb 'Users » wf » Code » NUCLight-V3-HW-BORAD-TEST' is shown. The main header identifies the user 'Franz Wolf' and the repository 'OS 2 NUCLight-V3-HW-BORAD-TEST'. A 'Test ok' status is displayed. The 'Dependencies' section lists 'mbed', 'MPU6050', and 'DS1820'. A navigation menu includes 'Home', 'History', 'Graph', 'API Documentation', 'Wiki', 'Pull Requests', and 'Admin settings'. An 'Edit repository readme' link is available. The main content area shows 'Files at revision 3:3dcdaf0d09a1' with a 'Download repository: zip gz' link. A table lists the files:

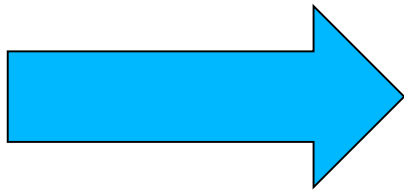
Name	Size	Actions
↑ [up]		
DS1820.lib	59	Revisions Annotate
MPU6050.lib	56	Revisions Annotate
main.cpp	7287	Revisions Annotate
mbed.bld	69	Revisions Annotate

On the right side, the 'Repository toolbox' contains buttons for 'Import into Compiler', 'Export to desktop IDE', 'Build repository', 'Send Pull Request from here', and 'Following'. It also provides an 'Embed url' and a 'Clone repository to desktop' option with the command 'hg clone https://wf@os.mbed.c'. Below this, the 'Repository details' section shows: Type: Program, Version: Mbed OS 2, Created: 3 minutes ago, and Imports: 0.

Unterlagen



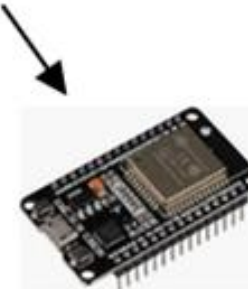
IDE



OR

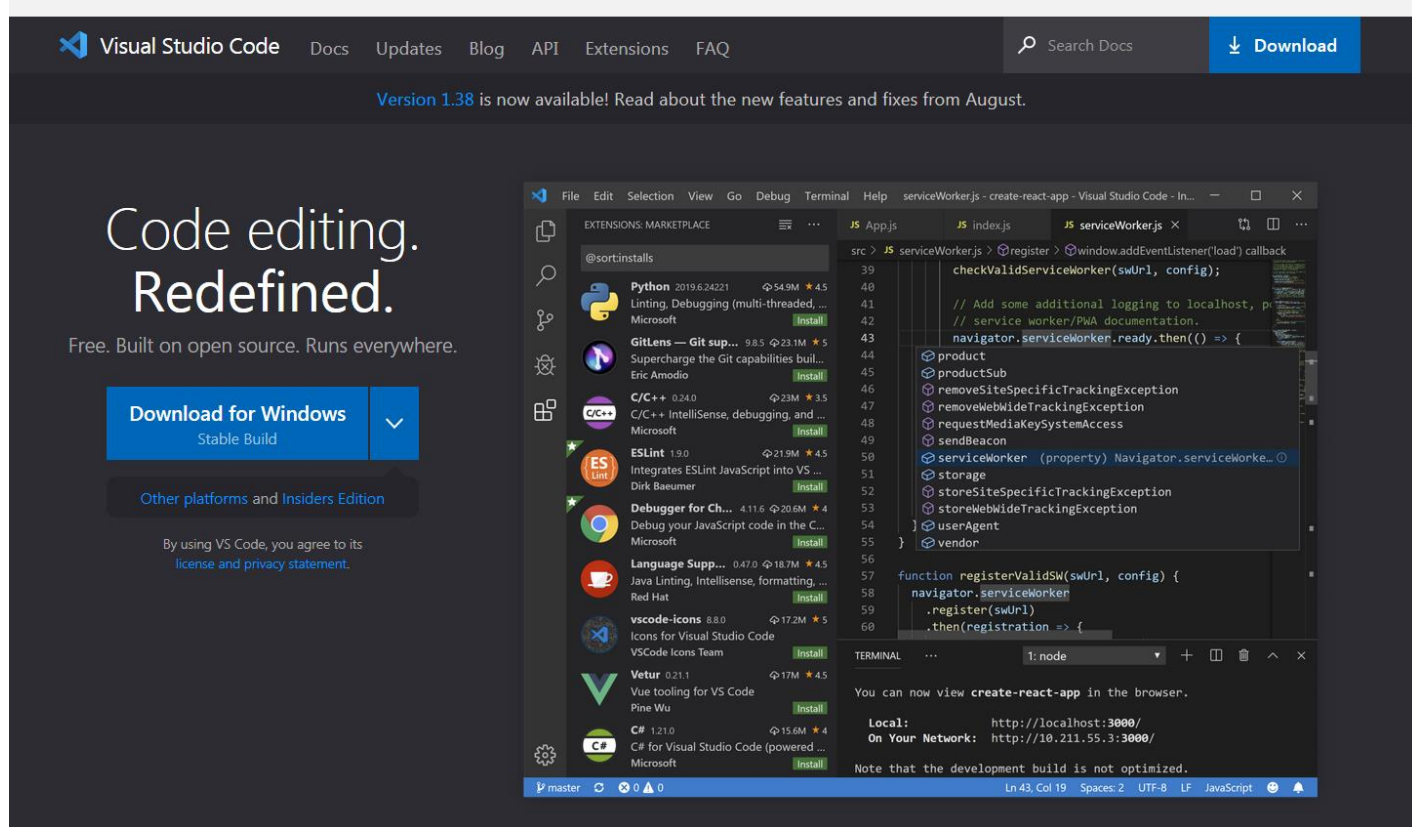


PLATFORM IO



Unterlagen

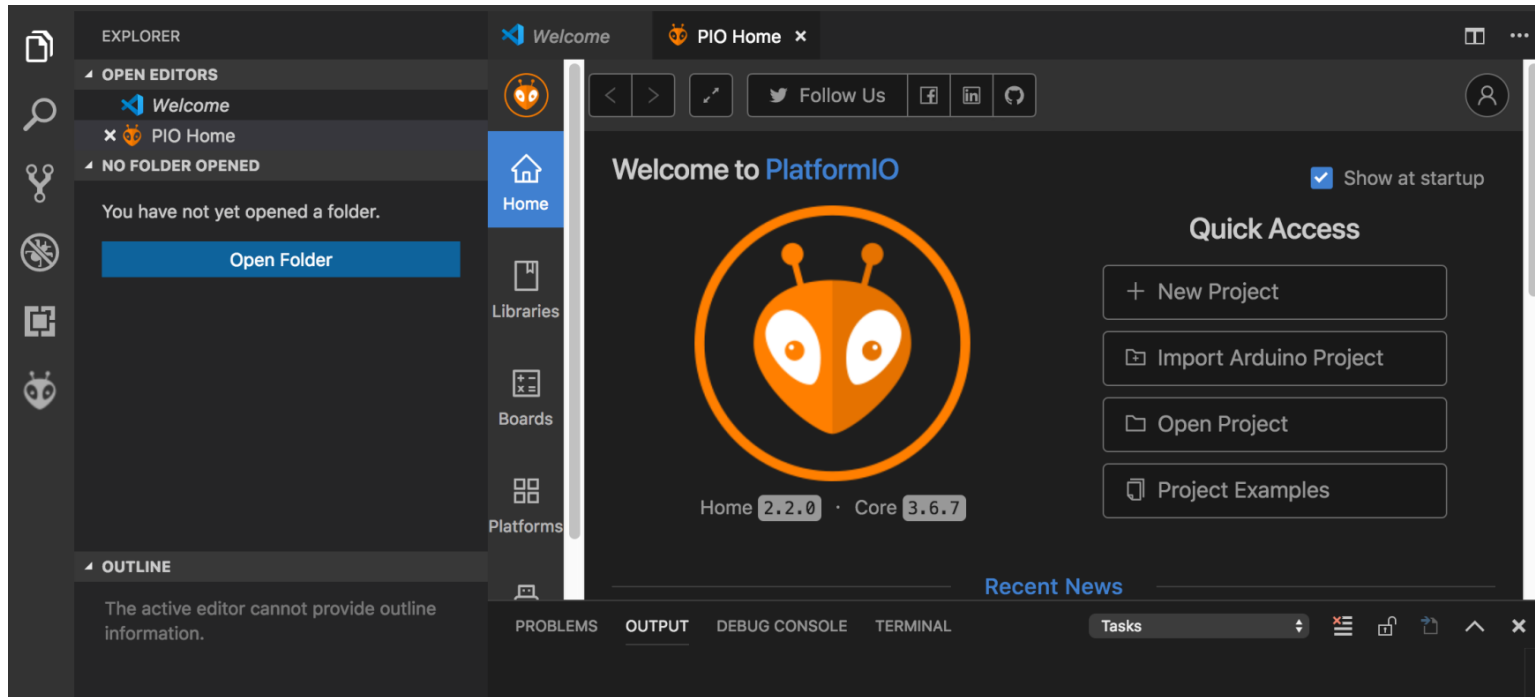
<https://code.visualstudio.com/>



<https://os.mbed.com/docs/mbed-os/v5.14/tutorials/visual-studio-code.html>

Unterlagen

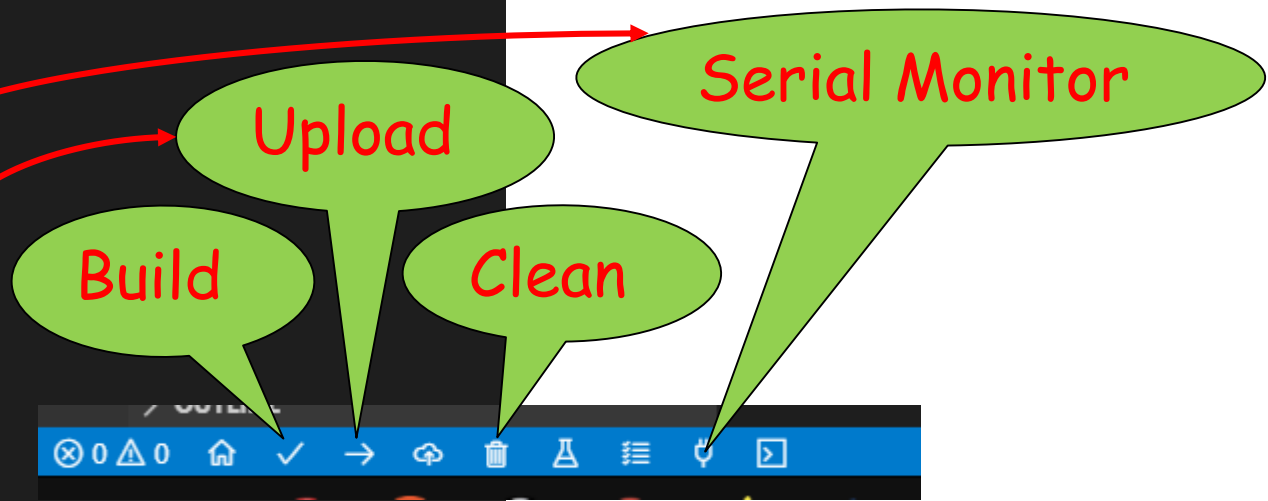
<https://code.visualstudio.com/>



<https://os.mbed.com/docs/mbed-os/v5.14/tutorials/visual-studio-code.html>

platformio.ini

```
PIO Home main.cpp platformio.ini
2019-10-25_B1-DS1820 > platformio.ini
1 ;PlatformIO Project Configuration File
2 ;
3 ; Build options: build flags, source filter
4 ; Upload options: custom upload port, speed and extra flags
5 ; Library options: dependencies, extra library storages
6 ; Advanced options: extra scripting
7 ;
8 ; Please visit documentation for the other options and examples
9 ; https://docs.platformio.org/page/projectconf.html
10
11 [env:nucleo_l432kc]
12 framework = mbed
13 platform = ststm32
14 board = nucleo_l432kc
15
16 monitor_speed = 9600
17 monitor_port = COM20
18
19 upload_speed = 115200
20 upload_port = COM20
21
22 lib_deps =
23 # Lib: DS1820
24 3127
25
```



<https://os.mbed.com/docs/mbed-os/v5.14/tutorials/visual-studio-code.html>

Platformio

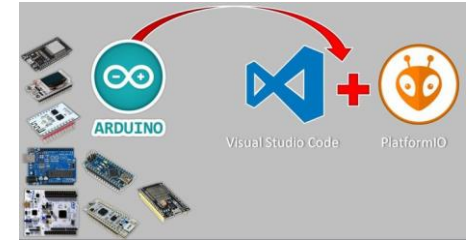


- 200+ Boards
- 15+ Platforms:
Atmel AVR, Atmel SAM, Espressif, Freescale Kinetis, Nordic nRF51, NXP LPC, Silicon Labs EFM32, ST STM32, Teensy, TI MSP430, TI TIVA
- 10+ Frameworks:
Arduino, CMSIS, WiringPi, libOpenCM3, Energia, SPL, mbed
- IDE (Visual Studio Code , Atom)

Arduino vs. Visual Studio Code+Platformio

Vorteile gegenüber der Arduino IDE:

- Code highlighting
- Code vervollständigung
- sofortige Fehleranzeige (teils zu voreilig)
- Projektverwaltung

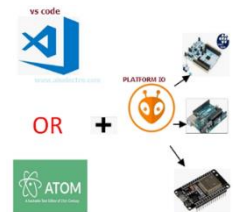


Nachteile:

- Änderung des Boards nur über platformio.ini oder neues Projekt

Neutral:

- Darkmode
- Statt in einer .ino wird der Sketch im Projekt unter src/main.cpp geschrieben



HWE / FSST Reifeprüfung ?? (2019/2020)



2018/2019

Reifeprüfung
Bitte um Ruhe!

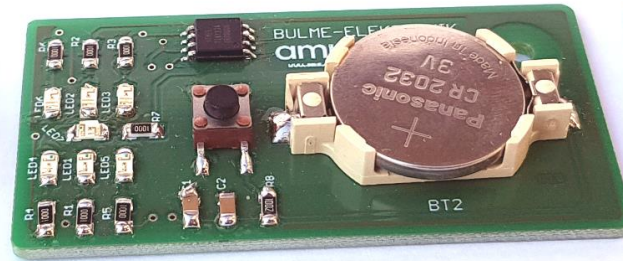
Inhalt

- Hardware
- Programmierung
- Würfel
- DIY - Do it yourself / Tipps

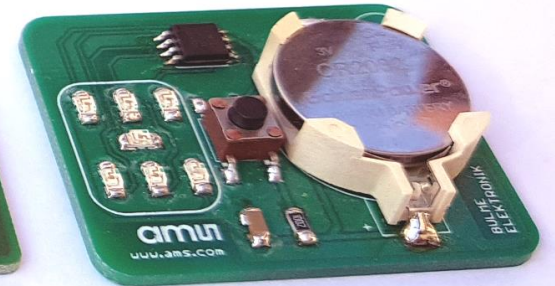
BULME-Würfel-Evolution



11/2014



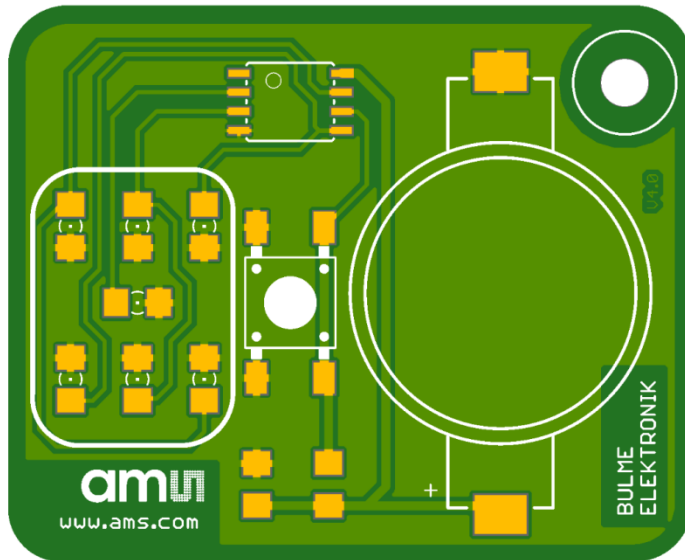
05/2018



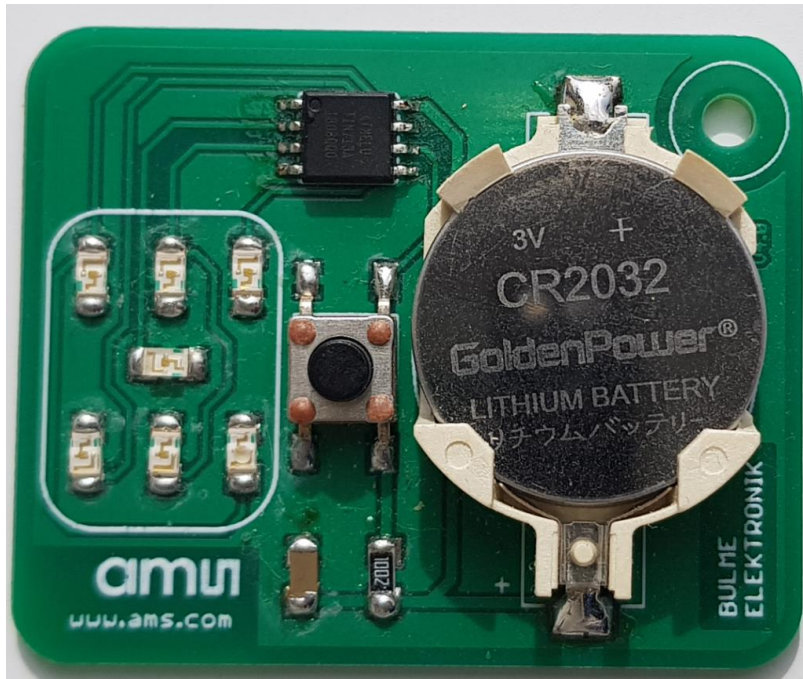
03/2019



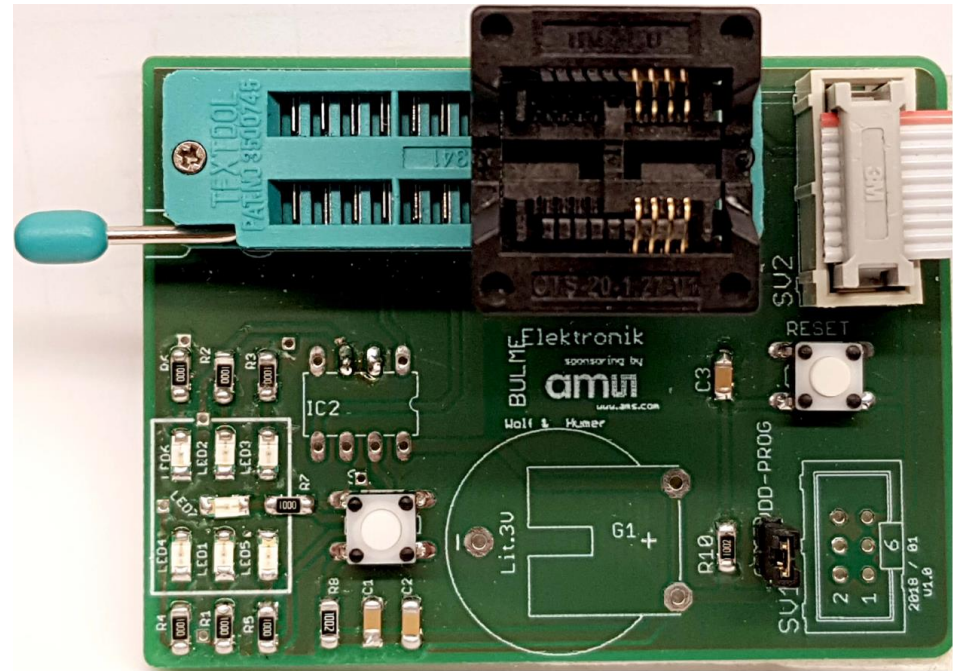
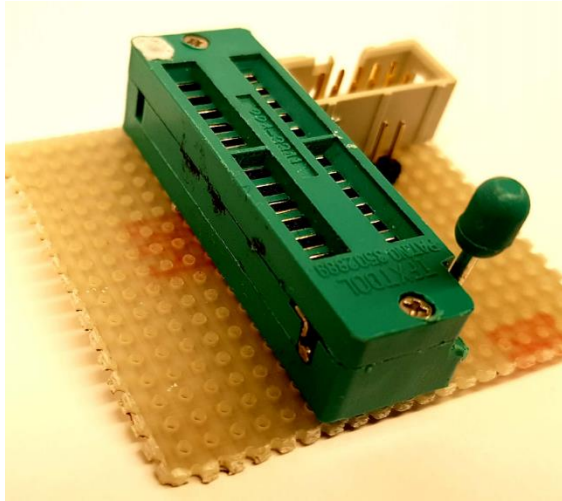
BULME-Würfel



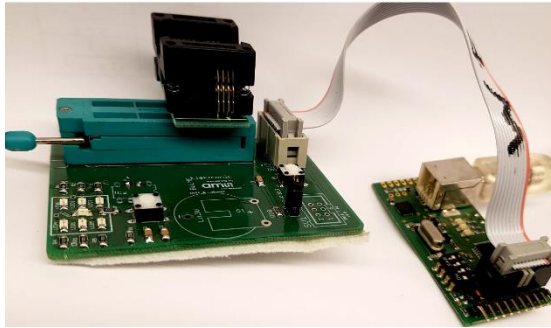
BULME-Würfel



BULME-Würfel-programmierung



BULME-Würfel-programmierung



<http://shop.myavr.de/index.php?404:http://myavr.de:80/shop/article.php?artDataID=36>



myAVR myXMC my

Home Shop Warenkorb Seminare Download FAQ Kontakt / Service Infos

mySmartUSB MK2 (Programmer und Bridge)

> Übersicht > myAVR Produktlinie > Systemboards und Programmer > mySmartUSB MK2 (Programmer und Bridge)
> Übersicht > Topseller > mySmartUSB MK2 (Programmer und Bridge)

mySmartUSB MK2 (Programmer und Bridge)

Preis: **28,00 Euro** **in den Warenkorb**
Netto: 23,53 Euro

Alle Preise enthalten die gesetzliche MwSt. von z.Z. 19% bzw. 7%, wenn nicht anders angegeben.

ausgewählte Downloads zu diesem Produkt:

- [Produktbeschreibung](#)
- [Techn. Beschreibung](#)
- [Datenblatt CP2102](#)
- [USB-Treiber für myAVR-Produkte](#)
- [myAVR ProgTool](#)
- [mySmartUSB-Kommandos](#)
- [mySmartUSB Terminal](#)
- [Kommandozeilen-Tool myAVR ProgSwitch](#)
- [myAVR Workpad PLUS, Demo Version](#)
- [Beispiel: Umschaltung zwischen 5V und 3,3 V](#)
- [Beispiel mit AVR Studio 5 und 6](#)

myAVR ProgTool V 1.42

myAVR ProgTool

Brennen Auslesen Hardware Ausgabe Hilfe

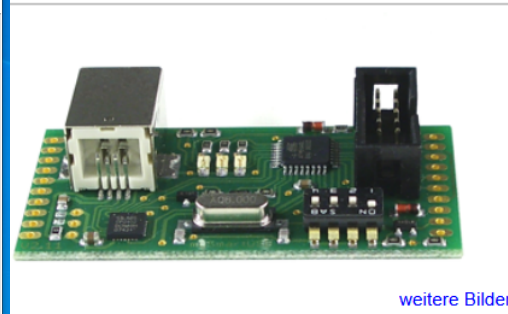
Wählen Sie hier die zu übertragenden Daten aus:

Flash brennen:
Beachte: Abhängig vom Fuse-Bit EESAVE wird beim Schreiben des Flash auch der EEPROM gelöscht.

EEPROM brennen:

Fuses brennen: ohne Sicherheitsabfrage
Low: 0x High: 0x Ext.: 0x Lock: 0x

© Laser & Co. Solutions GmbH, www.myavr.de = Mikrocontroller leicht gemacht



[weitere Bilder](#)

Vielen Dank für Ihre Aufmerksamkeit und Arbeitszeit !

NOCH FRAGEN ?

Inhalt

- Hardware
- Programmierung
- Würfel
- DIY - Do it yourself / Tipps

Anmeldung Labor-PC



Windows-Sicherheit

Anmeldeinformationen eingeben

Diese Anmeldeinformationen werden für das Herstellen einer Verbindung mit TI-LAB-T-072 verwendet.

Domäne: TI-LAB-T-071

Anmeldeinformationen speichern

OK Abbrechen

123456

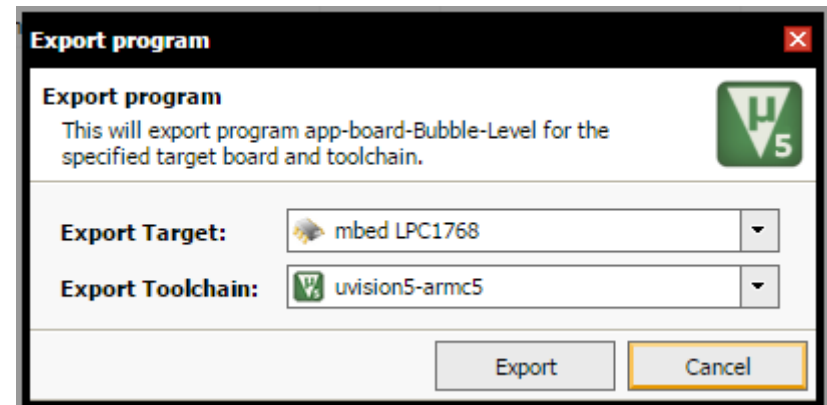
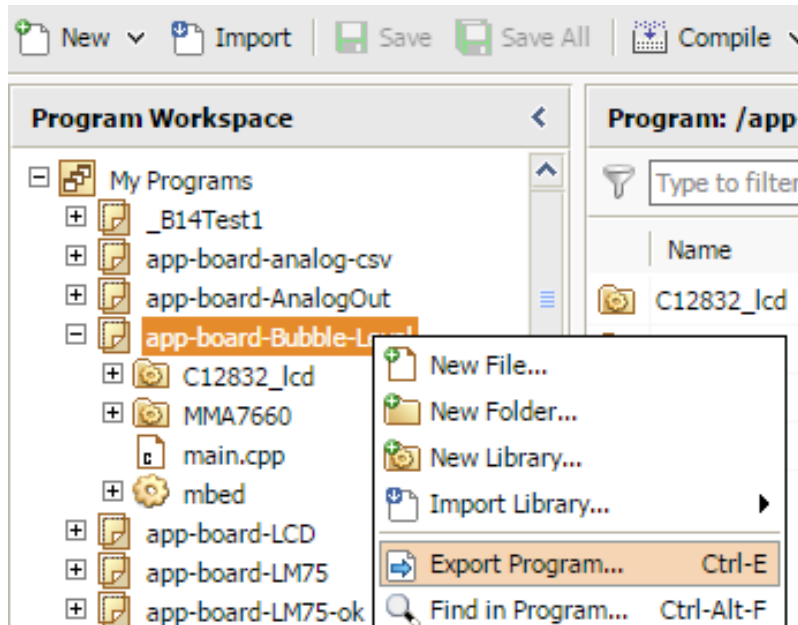
nucleo

Learning
by Doing!



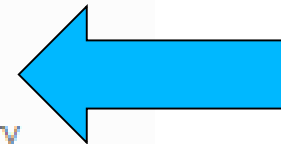
KEIL

<https://os.mbed.com/compiler/>



mbed Application Board

Name	Typ
C12832_lcd	Dateiordner
mbed	Dateiordner
MMA7660	Dateiordner
.mbed	MBED-Datei
app-board-Bubble-Level.uvoptx	UVOPTX-Datei
app-board-Bubble-Level.uvprojx	µVision5 Project
C12832_lcd.lib	Object File Library
GettingStarted.html	Firefox HTML Document
main.cpp	C++ Source File
mbed.bld	BLD-Datei
mbed_config.h	C/C++ Header
MMA7660.lib	Object File Library



mbed Application Board

The screenshot shows the µVision IDE interface. The main window displays the source code for `main.cpp`. The code includes headers for `mbed.h`, `MMA7660.h`, and `C12832_lcd.h`. It defines an `lcd` object and an `MMA7660` accelerometer. The `main` function initializes the LCD, tests the accelerometer connection, and enters a `while` loop that reads the accelerometer data, scales it, and draws a bubble on the LCD. The Build Output window at the bottom shows a fatal error: `fatal error: '\\nc-ncc-fs01\Ldat$\\TI\\WF\\Downlo...\\InterruptIn.h(136): error: #20: identifier "Channel_channel" is undefined`. A red arrow points to this error message.

```
1 //Uses x & y acceleration to simulate a bubble level
2 //on the application board LCD display
3 #include "mbed.h"
4 #include "MMA7660.h"
5 #include "C12832_lcd.h"
6
7 C12832_LCD lcd; //On board LCD display
8 MMA7660 MMA(p28, p27); //I2C Accelerometer
9 DigitalOut connectionLed(LED1); //Accel OK LED
10
11 int main()
12 {
13     int x=0,y=0;
14     lcd.cls(); //clear LCD screen
15     if (MMA.testConnection())
16         connectionLed = 1; //Accelerometer init OK
17     while(1) {
18         //read X,Y +/-Gs and scale for #display pixels
19         x = (x + MMA.x() * 32.0)/2.0;
20         y = (y - (MMA.y() * 16.0))/2.0;
21         lcd.fillcircle(x+63, y+15, 3, 1); //draw bubble
22         lcd.circle(63, 15, 8, 1);
23         wait(.1); //time delay
24         lcd.fillcircle(x+63, y+15, 3, 0); //erase bubble
25     }
```

Build Output

```
mbed\InterruptIn.h(136): error: #20: identifier "Channel_channel" is undefined
Channel_channel;
MMA7660/MMA7660.cpp(194): warning: #1-D: last line of file ends without a newline
}
MMA7660/MMA7660.cpp: 1 warning, 28 errors
".\BUILD\app-board-Bubble-Level.axf" - 142 Error(s), 2 Warning(s).
Target not created
```

mbed Application Board

The image shows the 'Options for Target' dialog in Keil IDE, specifically the 'Linker' tab. The target is 'app-board-Bubble-Level'. The 'Scatter File' is set to '.\mbed\LPC1768\ARM\LPC1768.sct'. The 'Linker control string' is '-cpu Cortex-M3 *.o -strict -scatter ".\mbed\LPC1768\ARM\LPC1768.sct"'. A file explorer window shows the project structure with 'LPC1768.sct' highlighted by a red arrow. A code editor window shows the content of 'LPC1768.sct'.

Options for Target 'app-board-Bubble-Level'

Device | Target | Output | Listing | User | C/C++ | Asm | Linker | Debug | Utilities

Use Memory Layout from Target Dialog X/O Base:

Make RW Sections Position Independent R/O Base:

Make RO Sections Position Independent R/W Base:

Don't Search Standard Libraries disable Warnings:

Report 'might fail' Conditions as Errors

Scatter File: Edit...

Misc controls:

Linker control string:

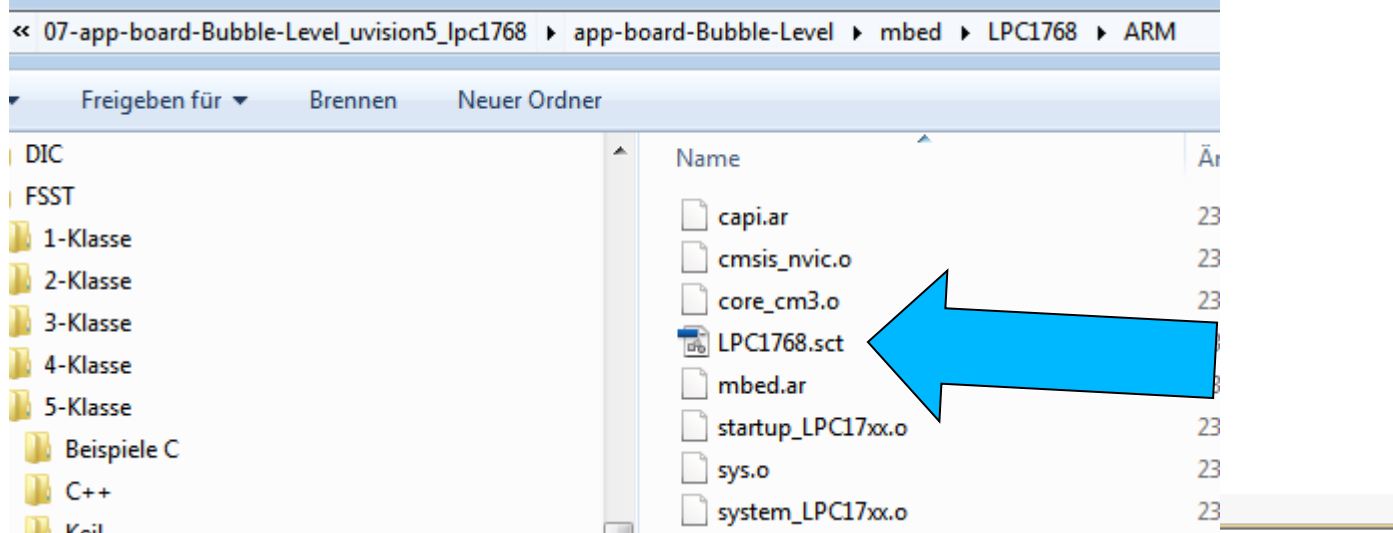
OK Cancel Defaults

File Explorer: Freigegeben für: Brennen Neuer Ordner

Name	Är
capi.ar	23
cmsis_nvic.o	23
core_cm3.o	23
LPC1768.sct	23
mbed.ar	23
startup_LPC17xx.o	23
sys.o	23
system_LPC17xx.o	23

```
1
2 LR_IROM1 0x00000000 0x80000 { ; load region size_region
3 ER_IROM1 0x00000000 0x80000 { ; load address = execution address
4 *.o (RESET, +First)
5 *(InRoot$$Sections)
6 .ANY (+RO)
7 }
8 ; 8_byte_aligned(49 vect * 4 bytes) = 8_byte_aligned(0xC4) = 0xC8
9 ; 32KB - 0xC8 = 0x7F38
10 RW_IRAM1 0x100000C8 0x7F38 {
11 .ANY (+RW +ZI)
12 }
13 RW_IRAM2 0x2007C000 0x4000 { ; RW data, ETH RAM
14 .ANY (AHBSRAM0)
15 }
16 RW_IRAM3 0x20080000 0x4000 { ; RW data, ETH RAM
17 .ANY (AHBSRAM1)
18 }
19 RW_IRAM4 0x40038000 0x0800 { ; RW data, CAN RAM
20 .ANY (CANRAM)
21 }
22 }
23
```

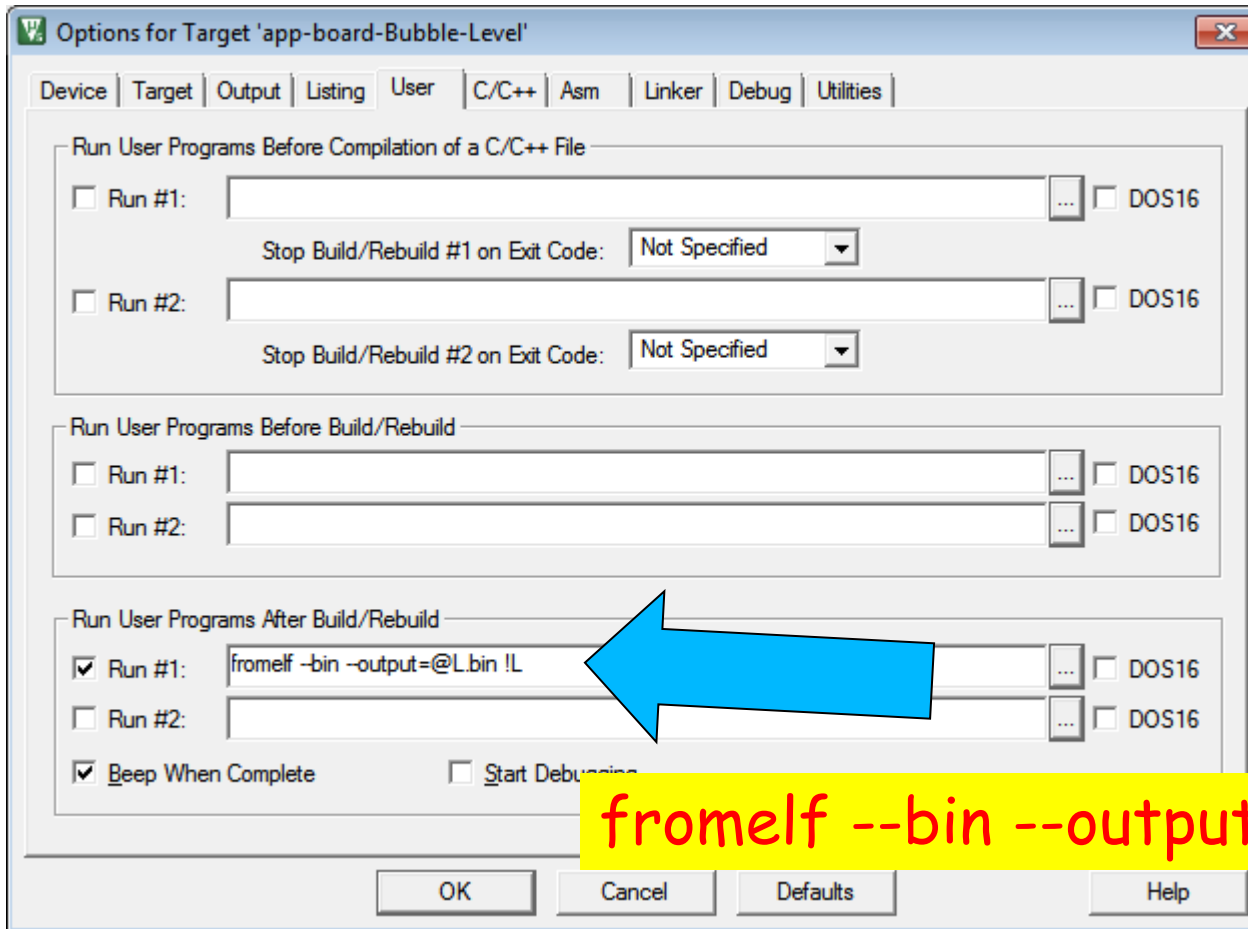
mbed Application Board



```
1
2 LR_IROM1 0x00000000 0x80000 { ; load region size_region
3 ER_IROM1 0x00000000 0x80000 { ; load address = execution address
4 *.o (RESET, +First)
5 *(InRoot$$Sections)
6 .ANY (+RO)
7 }
8 ; 8_byte_aligned(49 vect * 4 bytes) = 8_byte_aligned(0xC4) = 0xC8
9 ; 32KB - 0xC8 = 0x7F38
10 RW_IRAM1 0x100000C8 0x7F38 {
11 .ANY (+RW +ZI)
12 }
13 RW_IRAM2 0x2007C000 0x4000 { ; RW data, ETH RAM
14 .ANY (AHBSRAM0)
15 IRAM2 0x2007C000 0x4000 { ; RW data, ETH RAM
16 .ANY (AHBSRAM1)
17 }
18 }
19 RW_IRAM4 0x40038000 0x0800 { ; RW data, CAN RAM
20 .ANY (CANRAM)
21 }
22 }
23
```

`.\mbed\LPC1768\ARM\LPC1768.sct`

mbed Application Board



fromelf --bin --output=@L.bin !L