n-PRO-00

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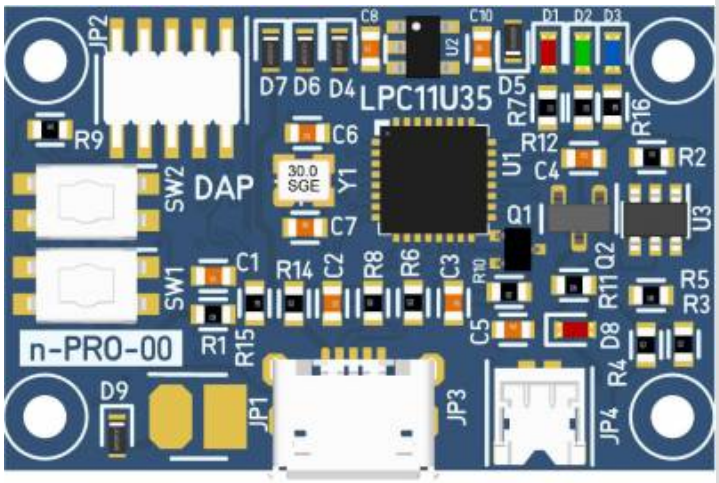
n-PRO-00

n-PRO-00 is an easy to use ARM Cortex-M0 rapid prototyping board targeting relatively less complicated control applications and power efficient applications. The form factor of n-Blocks PRO makes it perfectly suitable for seamless integration.



n-PRO-00

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License	GPL 2.0
Status	Tested
Buy at:	
Categories	
Hardware repo	Bitbucket
Firmware repo	

Overview

n-PRO-00 features LPC11U35 microcontroller from NXP. Since no cables are required, it is easy to use and can be used for rapid prototyping and proof of concept related applications. It contains a Cortex-M0 core that can operate at frequencies up to 50 MHz. The external 12 Mhz crystal provides standard serial bit rates and maximum execution speed. LPC11U35 has an on-chip ROM with In-System Programming capability which supports UART and USB flash programming. The flash API implements a simple interface to the on-board flash programming functionality and allows entry to ISP mode at any time. There is no need to write the drivers for basic interface of Human Interface Devices (HID) and Mass storage Class (MSC) devices in case of USB API development environment.

MCU Features

- Arm® Cortex-M0 processor, running at frequencies of up to 50 MHz
- Arm Cortex-M0 built-in Nested Vectored Interrupt Controller (NVIC)
- Up to 128 kB on-chip flash memory, 4 kB on-chip EEPROM data memory
- Up to 12 kB SRAM data memory, 16 kB boot ROM
- In-System Programming (ISP) and In-Application Programming (IAP)
- USB 2.0 full-speed device controller
- USARTs with fractional baud rate generation, internal FIFO, and RS-485/9 support
- 2 × SSP controllers with FIFO and multi-protocol capabilities
- I2C bus interface
- I/O Handler for hardware emulation of serial interfaces and DMA
- 54 × GPIOs with configurable pull-up/down resistors
- High-current source output driver (20 mA) on one pin
- High-current sink driver (20 mA) on true open-drain pins
- 10-bit ADC with input multiplexing among eight pins

- 4 × general purpose timers/counters
- Standard JTAG (Joint Test Action Group) test interface for BSDL
- Serial Wire Debug
- Integrated PMU (Power Management Unit)
- 4 reduced power modes: Sleep, Deep-sleep, Power-down, and Deep power-down
- Single 3.3 V power supply (2.4 V to 3.6 V)
- 4 × external interrupt inputs configurable as edge/level sensitive
- Non-maskable Interrupt (NMI) input
- Processor wake-up from Power-down mode via any interrupt
- Brownout detect with separate threshold for interrupt and forced reset
- Power-On Reset (POR)
- Crystal oscillator with an operating range of 1 MHz to 25 MHz
- 12 MHz internal RC oscillator, can be used as a system clock
- Unique device serial number for identification purposes

n-PRO-00 Features

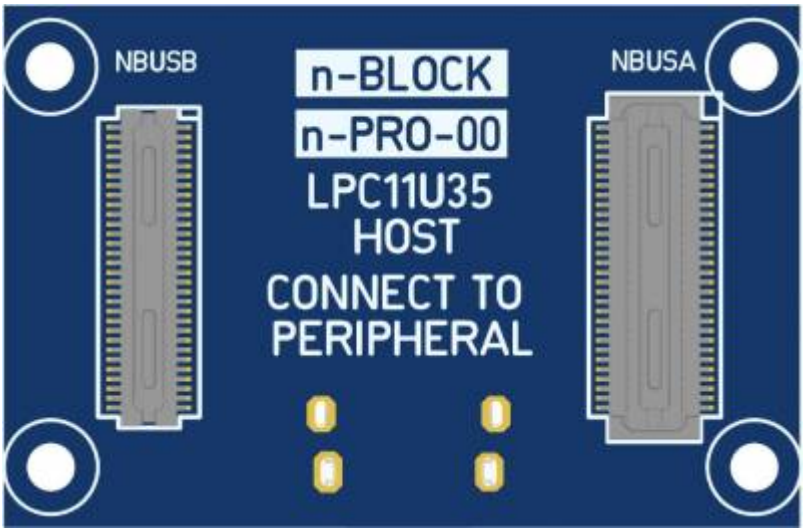
- Prototyping form-factor
- 5V USB or 4.5-5.5V supply
- Built-in USB drag 'n' drop FLASH programmer
- Reset and Bootloader enable push-buttons

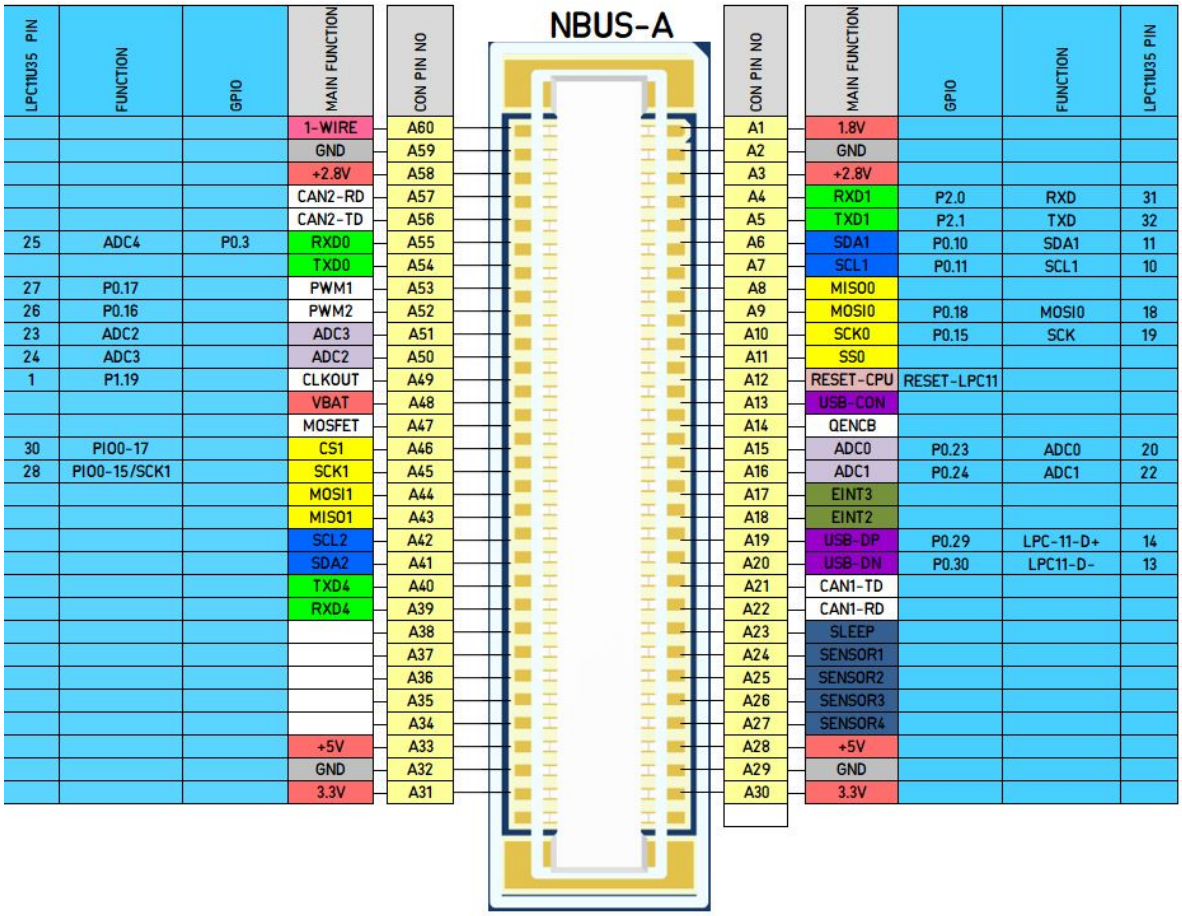
- Mbed compatibility
- Cortex debug interface connector

- On-Chip Bootloader- In-System programming (ISP) and In-application programming (IAP)
- ROM-based USB drivers - Flash updates via USB supported

Board Pinout

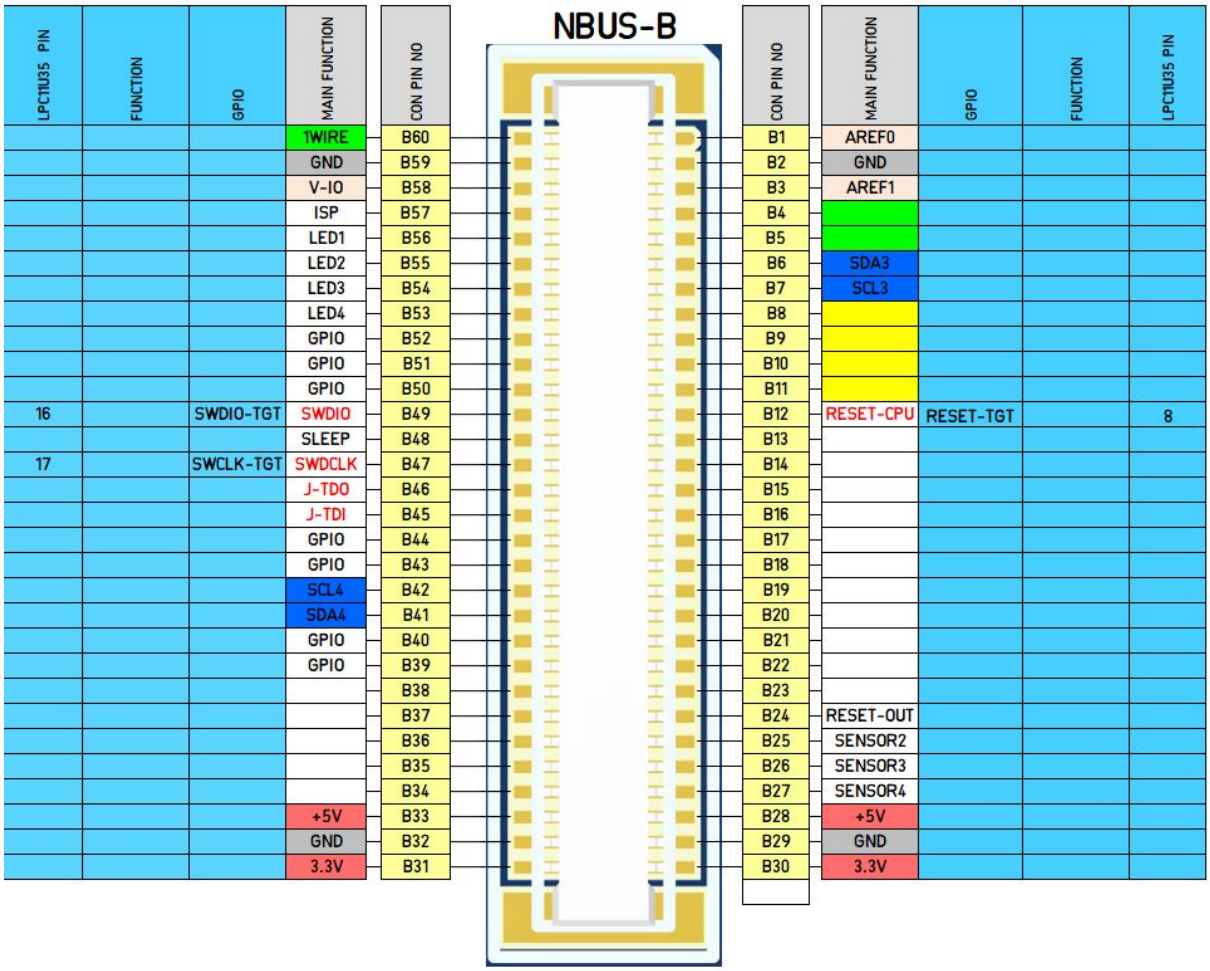
n-PRO-00 is a **HOST** board with two Hirose DF30-series 60-pin low profile connectors at bottom side, following the n-Blocks PRO form factor.





LPC11U35 PIN	FUNCTION	GPIO	MAIN FUNCTION	CON PIN NO
			1-WIRE	A60
			GND	A59
			+2.8V	A58
			CAN2-RD	A57
			CAN2-TD	A56
25	ADC4	P0.3	RXD0	A55
			TXD0	A54
27	P0.17		PWM1	A53
26	P0.16		PWM2	A52
23	ADC2		ADC3	A51
24	ADC3		ADC2	A50
1	P1.19		CLKOUT	A49
			VBAT	A48
			MOSFET	A47
30	PIO0-17		CS1	A46
28	PIO0-15/SCK1		SCK1	A45
			MOSI1	A44
			MISO1	A43
			SCL2	A42
			SDA2	A41
			TXD4	A40
			RXD4	A39
				A38
				A37
				A36
				A35
				A34
			+5V	A33
			GND	A32
			3.3V	A31

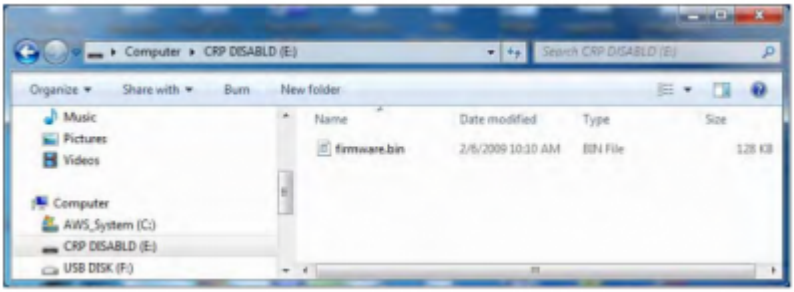
CON PIN NO	MAIN FUNCTION	GPIO	FUNCTION	LPC11U35 PIN
A1	1.8V			
A2	GND			
A3	+2.8V			
A4	RXD1	P2.0	RXD	31
A5	TXD1	P2.1	TXD	32
A6	SDA1	P0.10	SDA1	11
A7	SCL1	P0.11	SCL1	10
A8	MISO0			
A9	MOSI0	P0.18	MOSI0	18
A10	SCK0	P0.15	SCK	19
A11	SS0			
A12	RESET-CPU	RESET-LPC11		
A13	USB-CON			
A14	QENCB			
A15	ADC0	P0.23	ADC0	20
A16	ADC1	P0.24	ADC1	22
A17	EINT3			
A18	EINT2			
A19	USB-DP	P0.29	LPC-11-D+	14
A20	USB-DN	P0.30	LPC11-D-	13
A21	CAN1-TD			
A22	CAN1-RD			
A23	SLEEP			
A24	SENSOR1			
A25	SENSOR2			
A26	SENSOR3			
A27	SENSOR4			
A28	+5V			
A29	GND			
A30	3.3V			



Getting started

Blinky with mbed compiler

- With a USB cable connected, hold down the BL button and press RESET
- You should see the green USB light come on, at which point you can release the BL button
- After a few seconds a mass storage device named CRP_DISABLED will show up on your computer
- On it will be a single 64KB file, firmware.bin, that represents the contents of the flash



- Select target on mbed online compiler
- Create a blinky program like below

```
#include "mbed.h"

DigitalOut led1(P0_20);

// main() runs in its own thread in the OS
int main() {
    while (true) {
        led1 = !led1;
        wait(0.05);
    }
}
```

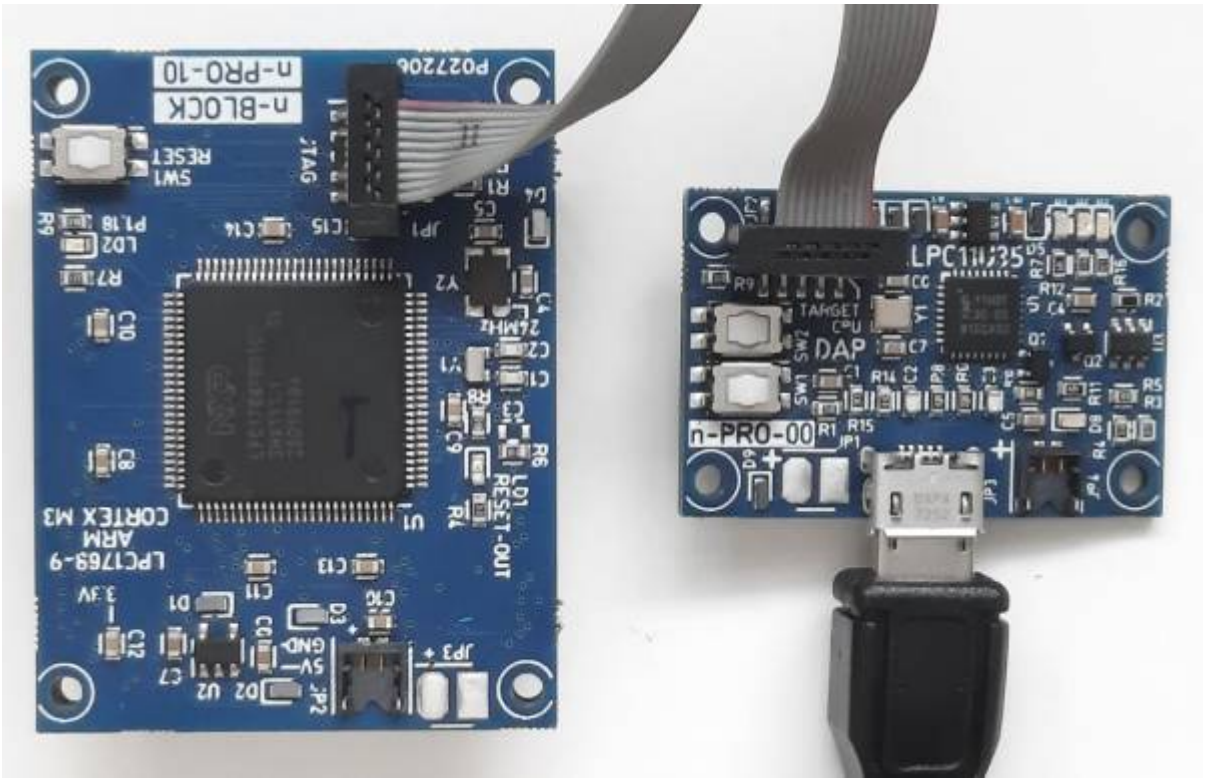
- Delete the existing firmware.bin file, and replace it with the .bin file you downloaded from the mbed compiler.
- Press RESET again, and the board will now be running your code.

USB Serial Port

- To use the debug serial port of the LPC11U35 to emulate a serial port over USB see the example here.

Using n-PRO-00 as drag n drop programming tool

The 10-pin JTAG connector available on board, is to program a target ARM-Cortex board (Not the n-PRO-00 LPC11U35 Microcontroller).



To be able to use the n-PRO-00 as programming tool we first need to program it with one of the binaries below:
Once the CMSIS-DAP firmware is programmed to n-PRO-00 LPC11U35 Flash memory, it appears as a USB disk.
Now we are ready to drag n drop the binary for the target board to the USB disk.

LPC1768/LPC812

- LPC11U35-Firmware for communicating with LPC1768 (Does not create virtual serial port)
- SWDAP-LPC11U35 NXP LPC1768 PREBUILD IMAGE (Creates a virtual serial port)

LPC1114FN28

- Firmware LPC1114FN28 (Firmware to use n-DAP with the non-SMD LPC1114FN28 DIP-28)

nRF51822

- Seeed studio wiki Arch BLE
- Seeed studio wiki File:Lpc11u35 nrf51822 if mbed.bin.zip
- Bootloader for BLE mbug

NXP K64F

- https://os.mbed.com/platforms/SWDAP-LPC11U35/NXP K64F
- https://os.mbed.com/media/uploads/chris/lpc11u35_swdap_k64f_if_crc.bin bin

CMSIS-DAP Interface Firmware

- CMSIS-DAP Interface Firmware

References

- LPC11U35 Datasheet
- https://os.mbed.com/platforms/EA-LPC11U35/
- https://www.embeddedartists.com/products/lpc11u35-quickstart/

Related articles in this Wiki

- n-pro-00

RF, CPU, nblock, BLE, nsensorRF

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Address: Cork Institute of Technology Campus, Bishopstown, Cork

Phone: (021) 433 5560