
# NFC SmartTool

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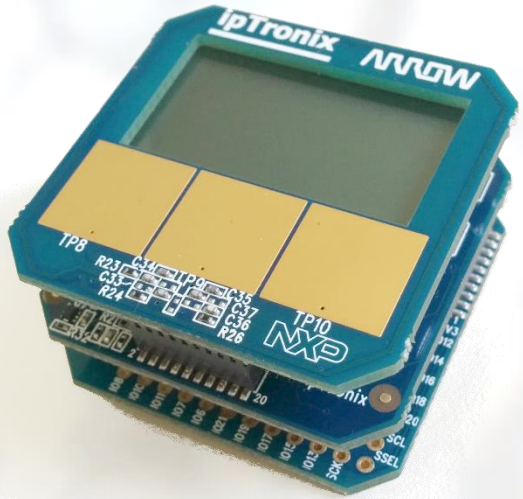
- Completely open system
  - Schematics (OrCad)
  - Layout (PADS)
  - Gerber
  - Embedded software sources
  - Android software sources
- Modular and compact design
  - 40x40x24mm
  - Three separate boards
    - Keyboard+Antenna
    - Main board
    - Breadboard + MosFET+ WiFi/BT

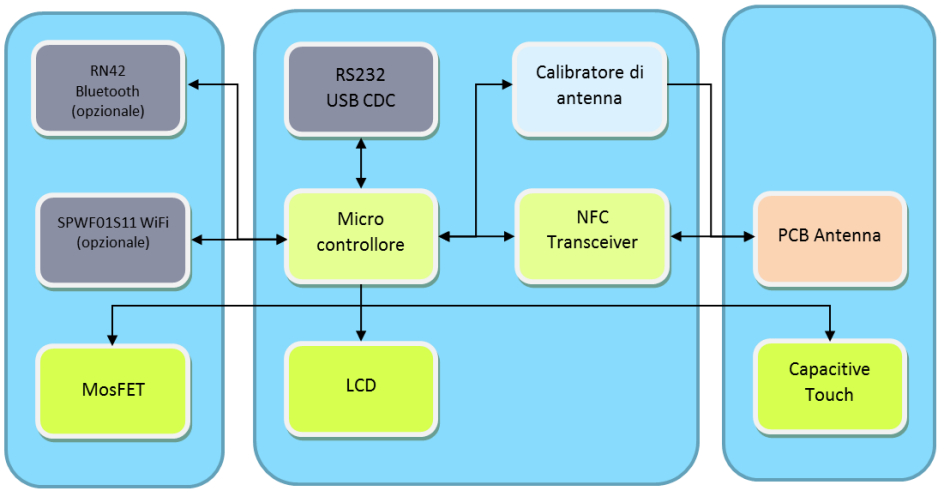


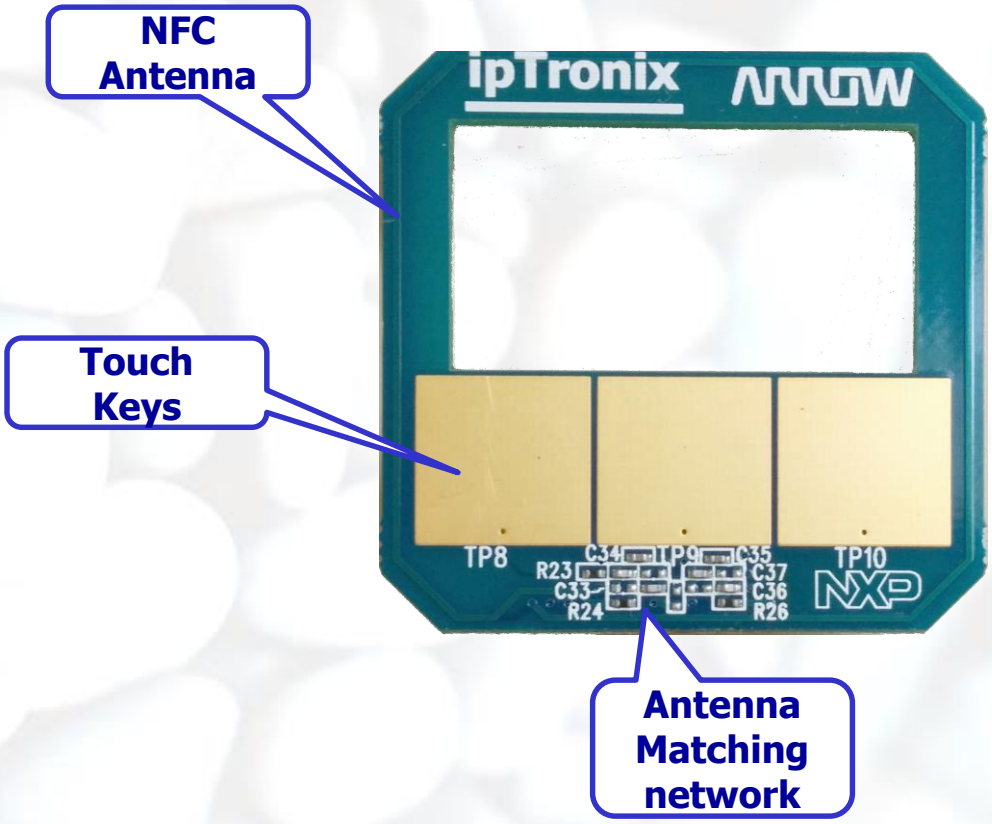
# SmartTool - Applications

- Wall mount socket compatible form factor
- Demo Software
  - Access Control (Card/NFC)
  - Micropayment (Card)
  - Smartphone Communication
- Android Smartphone Software
  - NFC card read
  - Data exchange (access control)

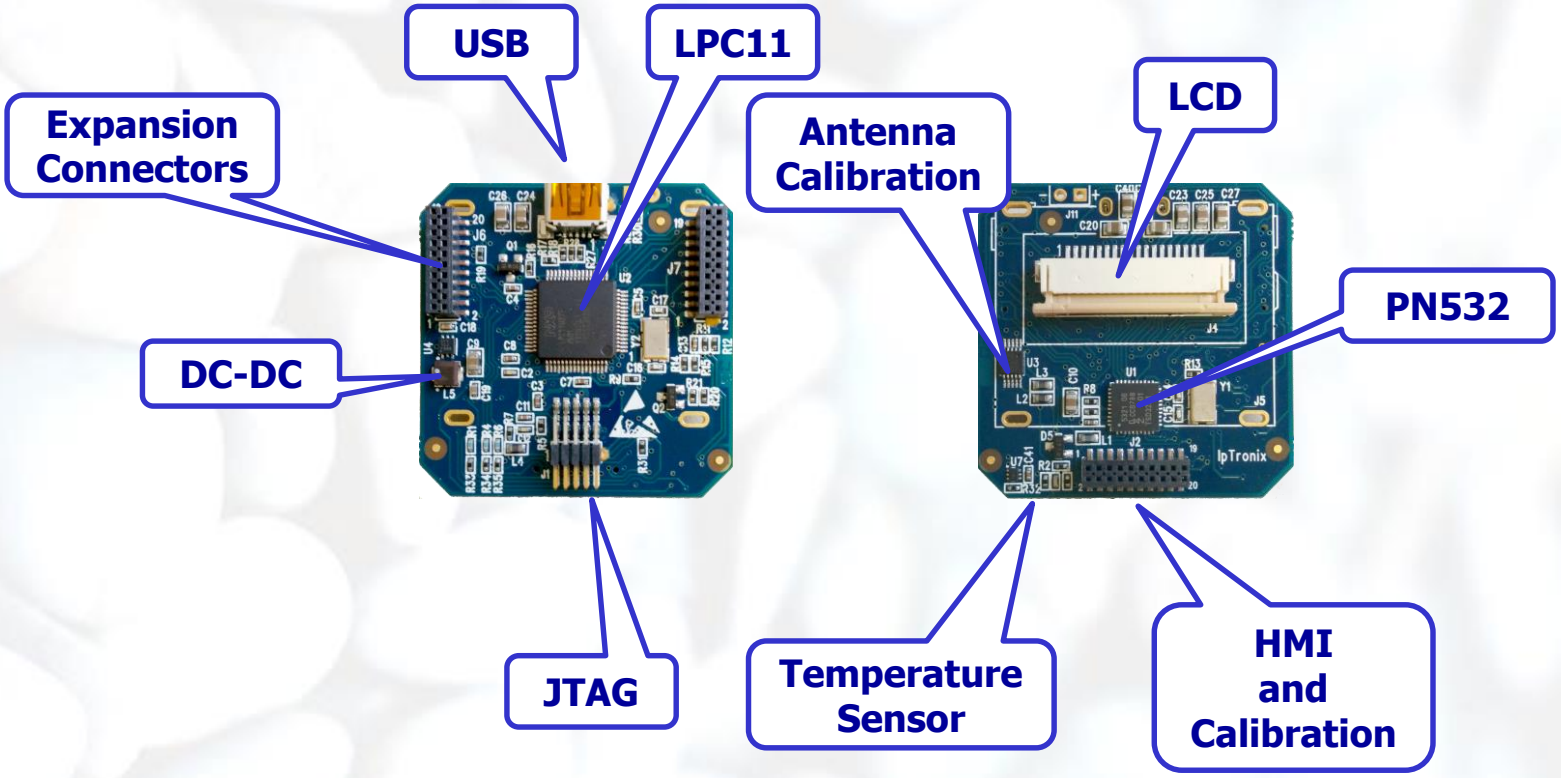
# SmartTool - Hardware

- LPC11U37
  - 128KB Flash/12KB RAM/4KB EEPROM
  - USB, USART, 2x SSP, ADC
- PN532
  - ISO/IEC 14443A/MIFARE
  - FeliCa, ISO/IEC 18092
  - ECMA 340 Peer-to-Peer
- G64128x16 (LCD)
  - 128x64 Monochrome graphical display
- RN42 (Optional)
  - Class 2 Bluetooth module (UART)
- SPWF01S11 (optional)
  - Serial to Wifi module

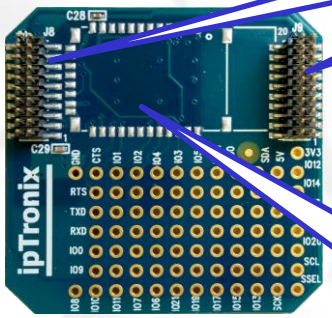


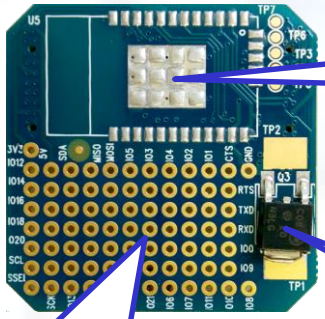

NFC Antenna
Touch Keys
Antenna Matching network
ipTronix
TP8
TP9
TP10
C34
C35
R23
C33
C37
C36
R24
R26
NXP

# Main Board

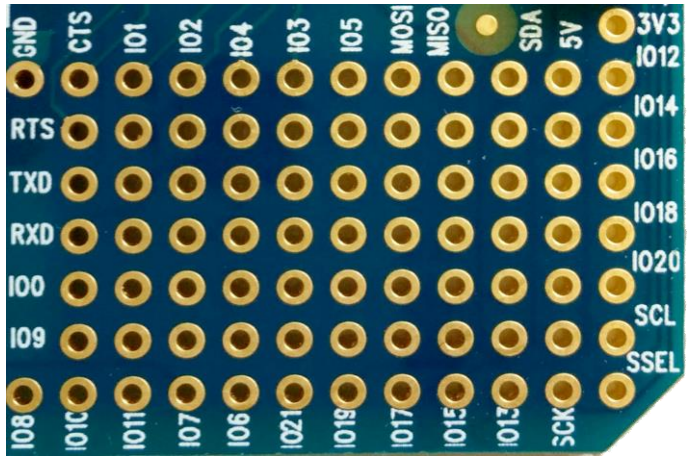

USB
LPC11
Expansion Connectors
Antenna Calibration
LCD
PN532
DC-DC
JTAG
Temperature Sensor
HMI and Calibration

# Daughterboard



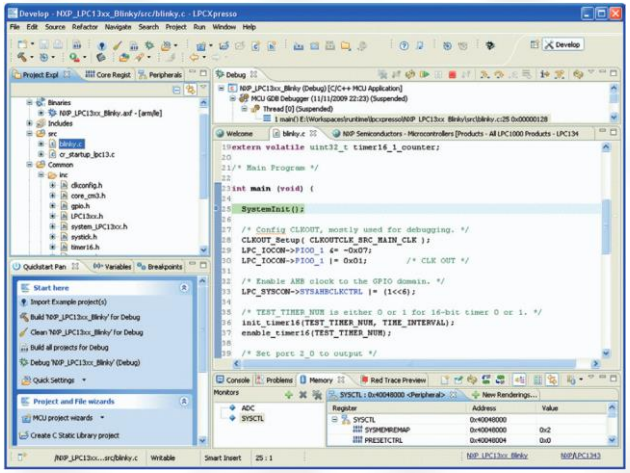




Breadboarding Area



# Development environment

- LPCXpresso (IDE)
  - Completely free
  - Maintained by NXP
  - Eclipse based

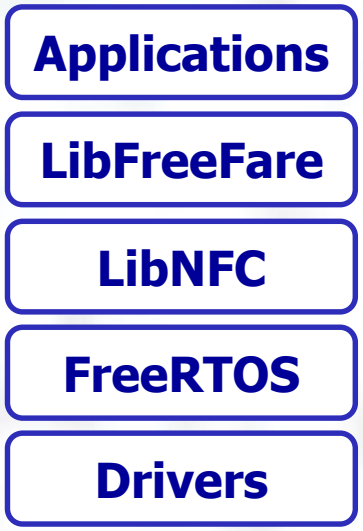


- LPCLink/LPCLink2
  - eval board + JTAG
  - Low cost

# Software - Architecture

- Open source based
  - FreeRTOS
  - LibNFC
  - LibFreeFare


- Open source benefits
  - Non viral licenses (LGPL)
  - Completely free
  - Community supported



# Software - LibNFC+LibFreeFare

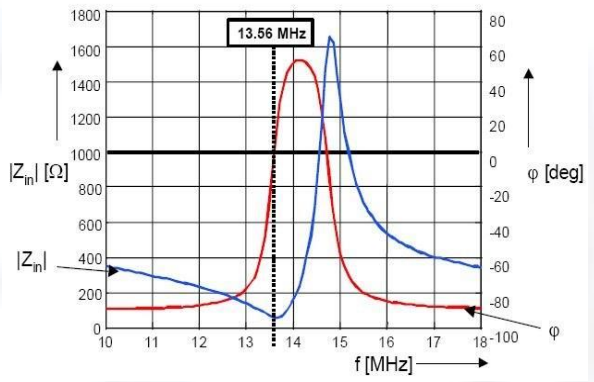
- Hardware abstraction layer (HAL)
  - Easy transceiver interchangeability
- Multistandard
  - ISO14443A/B, FeliCa, Jewel/Topaz
  - DESFire, Mifare Classic, Mifare UL
- Cross platform
  - windows/linux/osx/android/embedded
- LPC11x porting
  - Greatly reduced memory requirements to fit smaller microcontrollers

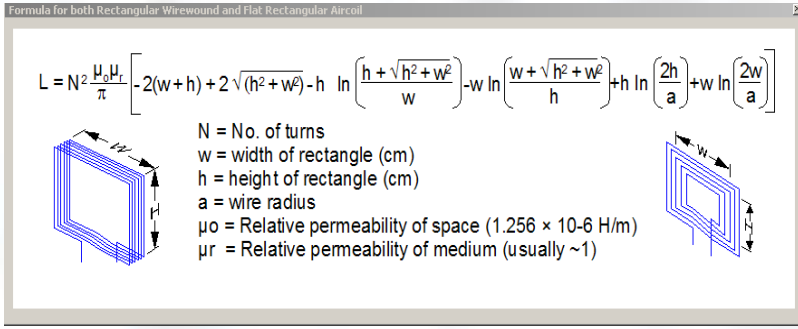
# Software - applications

- Embedded applications
  - Authentication
  - Vending
  - NDEF IO
  - Antenna Calibration
- Android Application
  - Type 4 tag read/write

# SmartTool – Antenna Calibration

- Antenna design and calibration is a challenge
  - Kit includes extensive documentation to support antenna design
  - Included antenna calibration software
    - Shows resonance antenna frequency
    - Helps to quickly determine matching network components
    - Can be used to calibrate antennas on customer boards



# Documentation

- Extensive bundled documentation
  - About 90 pages reference manual
  - Description of open source library customizations
  - Application description and source code walkthrough
- Hardware
  - Schematics and PCB source files
  - Gerbers
  - BOM (Arrow Design in kit)


Thank you