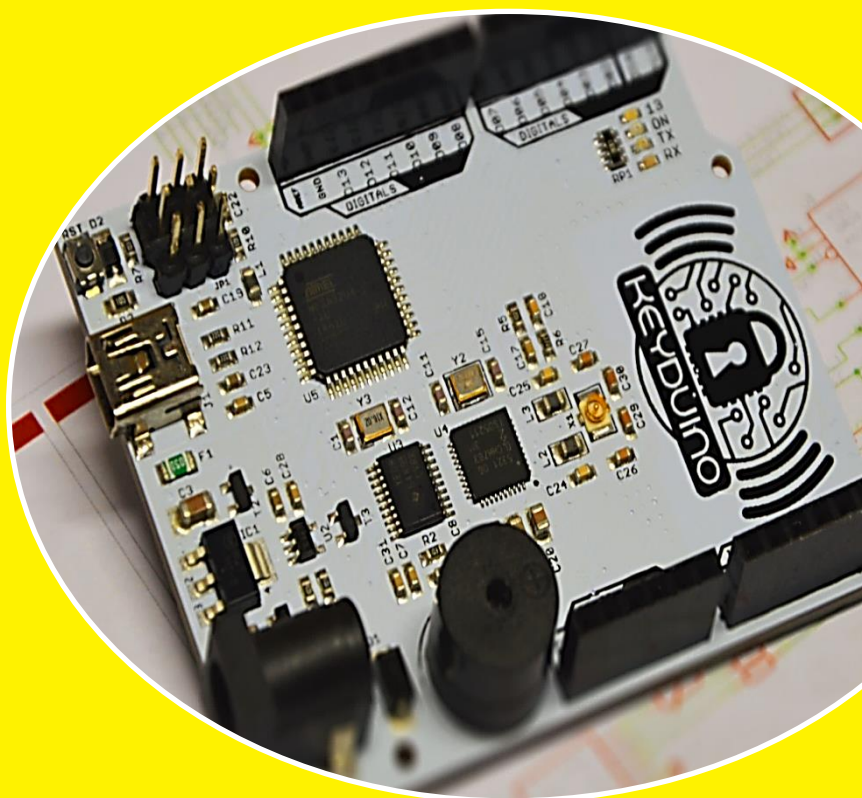# KeyDuino

FOR DUMMIES

Introduction

KeyDuino is a NFC development platform which allows quick and easy creation of prototypes. This card is not a finished product for a defined application but can be adapted to different projects while adding specific material equipment and security software.

Therefore, you should pay attention to the liability and protection of your own developments on the platform. They are utterly under your responsibility, and so is the usage of the application you will develop.

This document provides key points you will need to realize your projects.

KeyDuino is a powerful tool and we all must ensure that its use respects the values that led to its creation. By this we mean the values of a community of geeks/makers but also responsible people aiming at developing and sharing innovative projects, competences and good ideas.

Hence, don't forget that hacking attempts on systems that don't belong to you are against the spirit of KeyDuino. Moreover, remember that alone we are faster, but together we go further!

KeyDuino Team

1) Initialize your KeyDuino

Install Arduino environment

To start using and program your KeyDuino, you require the Arduino development environment (IDE). You may download it there:

https://www.arduino.cc/en/Main/Software

Current developments are made under Arduino version 1.6.5. If you are a new Arduino developer, we advise you to use that same version to avoid troubles.
Unzip the file and install Arduino.

Download KeyDuino library

To get access to KeyDuino code samples and library, you first have to download it on GitHub platform:

https://github.com/CITCEuraRFID/KeyDuino

Click the « Download ZIP » button, and once the download is complete, extract it. In KeyDuino directory, you will find different folders. Simply copy the KeyDuino subfolder and paste it in your Arduino libraries directory. The library is now installed! You can then start Arduino IDE and use it.

Getting KeyDuino Android application

We have developed an Android application to experiment exchanges with smartphones. You can find the APK file in KeyDuino directory.
We will soon add the sources in the GitHub repository too.
Remind yourself that current Apple iPhones are not compatibles with KeyDuino or NFC tags.

Install KeyDuino drivers

Connect KeyDuino board to your computer with the supplied cable. « On » LED should light.

- **Windows**

For Microsoft Windows :

http://www.visualmicro.com/post/2012/06/02/Arduino-Leonardo-Windows-Hardware-USB-Installation-Guide.aspx

- **Linux**
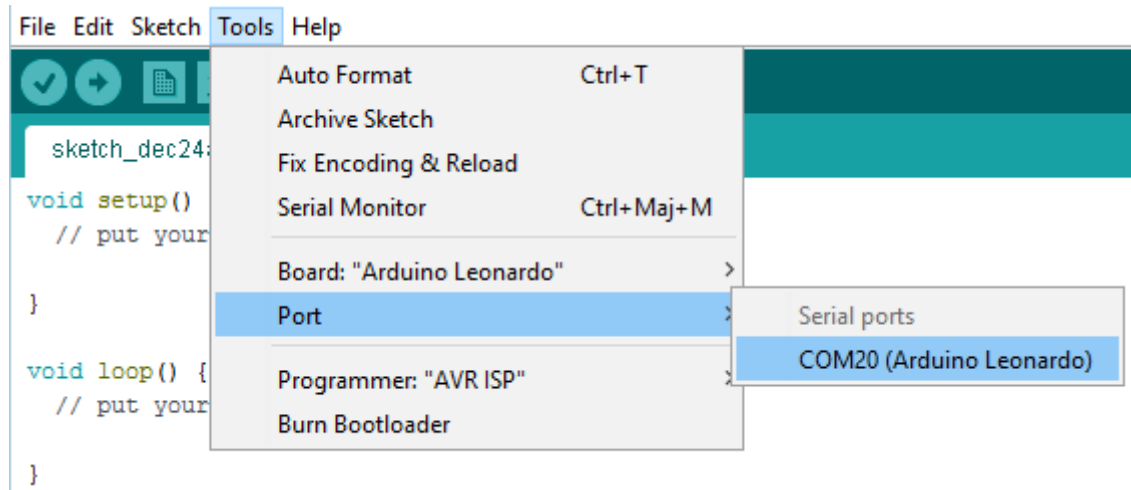
Connect the board. That's all.

- **Mac OS**

The first time you connect the board on a Mac OS system, the « Keyboard Setup Assistant » should open. Just shut the window, you don't have anything to configure.

2) Get started with your KeyDuino

Identify a tag

In the IDE, select the port your board is plugged to. The board should be identified as a Arduino Leonardo.

Hopefully, the default sketch on the board will allow to read NFC tags and display its ID.
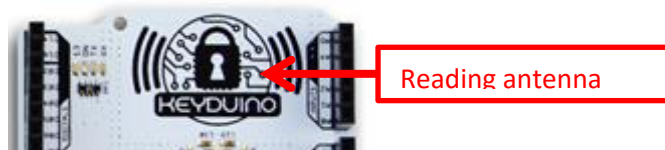To get the informations, click on « Serial Monitor » button.

For this example, your selected baudrate must be 115200 Bauds. By default, if you just downloaded the IDE, it will probably be 9600 ; just change it in the Serial Monitor. Now, take the supplied NFC tag and approach it from KeyDuino antenna ; you should hear a « bip » sound when the board detects it.
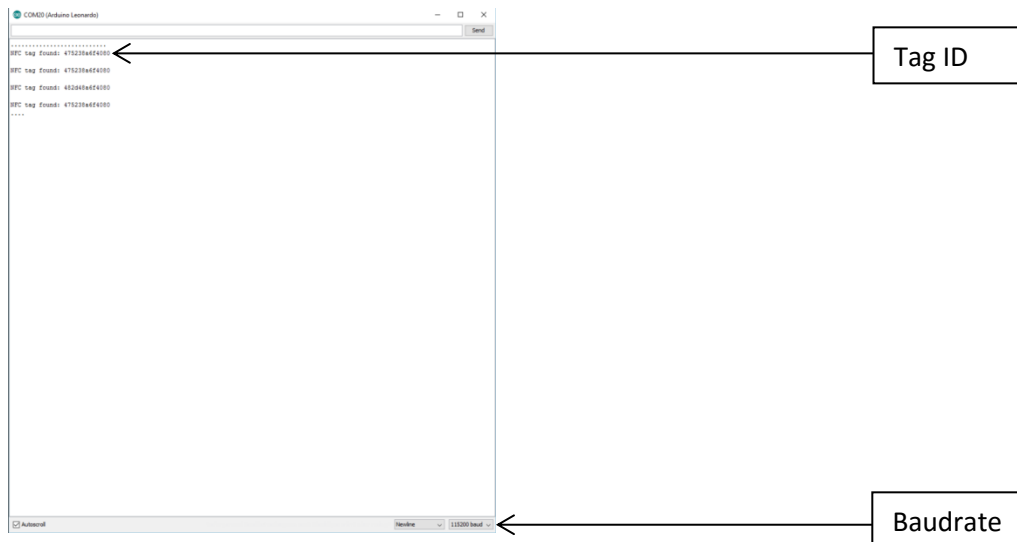
Reading antenna

Tag ID

Baudrate

(Optionnal) Connecting the antenna

If you ordered a separate antenna, connect it like shown on the schematic below. You should hear a « click ».
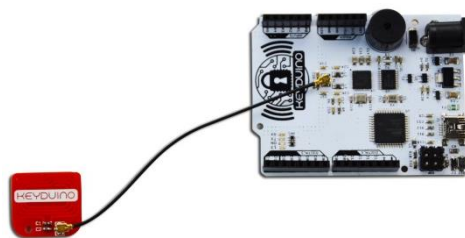
Advice:

- Try to not bend the cable
- Don't connect and disconnect the cable too often for it is quite fragile. Take care of it.
- Avoid putting it through metallic material
- Like integrated antenna, do not put it in contact with metal
  - Use plastic screws rather than metallic ones to fix the antenna
  - Note that superglue and double-sided tape work fine!

You are now ready to use your KeyDuino!

Annexe 1 : schematics

Annexe 2 : layout

TOP

KeyDuino NORMAL V5.1
Designed by Pierre CHARLIER
In collaboration with the CITC EURARFID
& in partnership with NFC RING
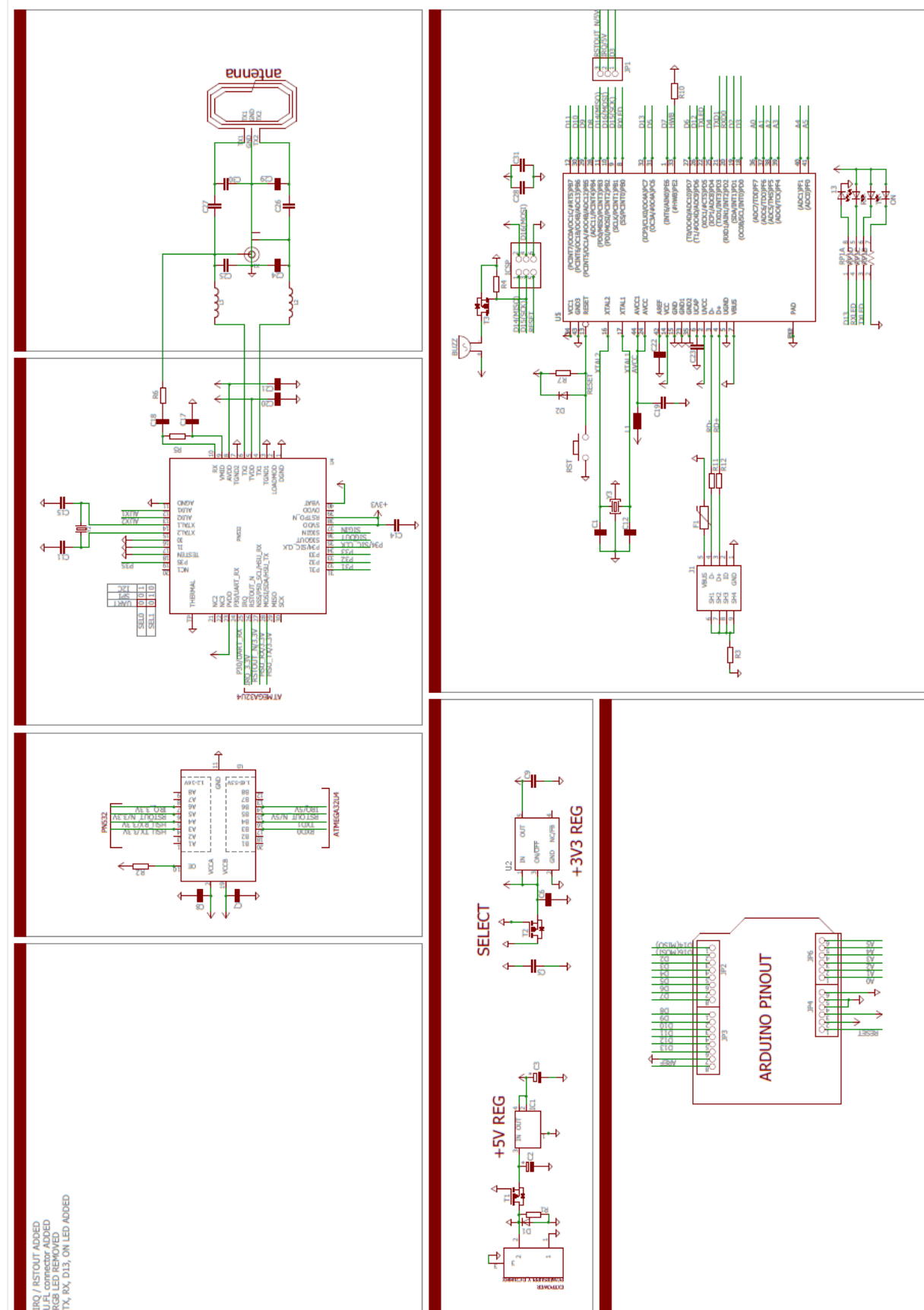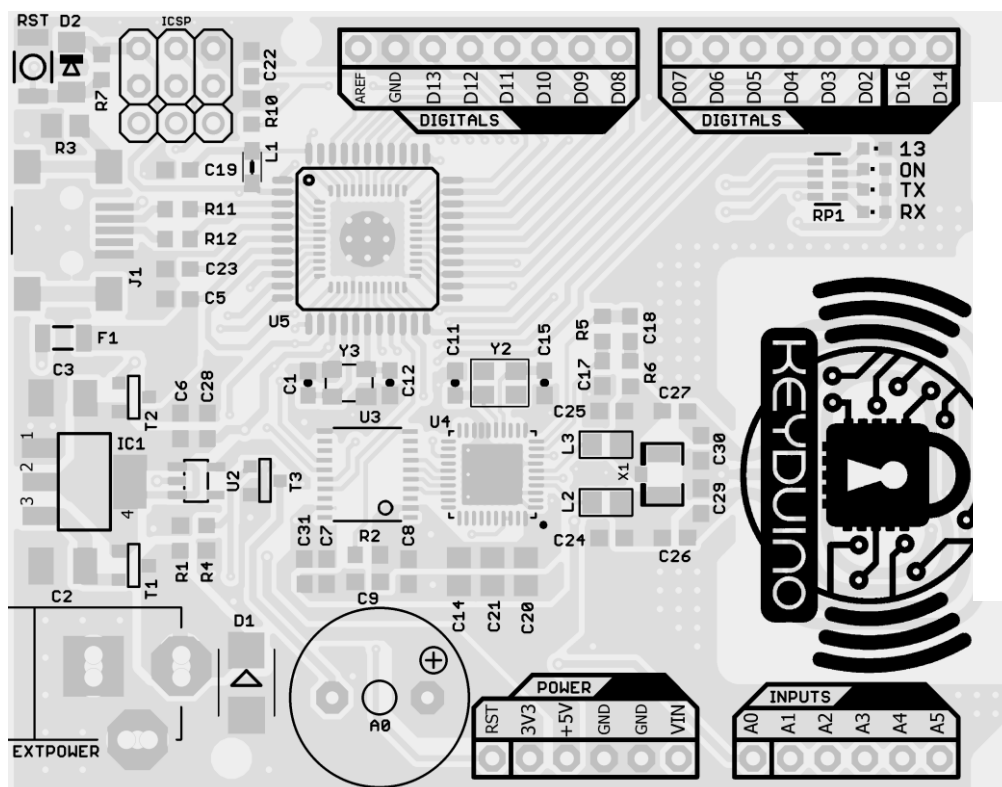
BOTTOM

Annexe 3 : BOM (Bill Of Material)

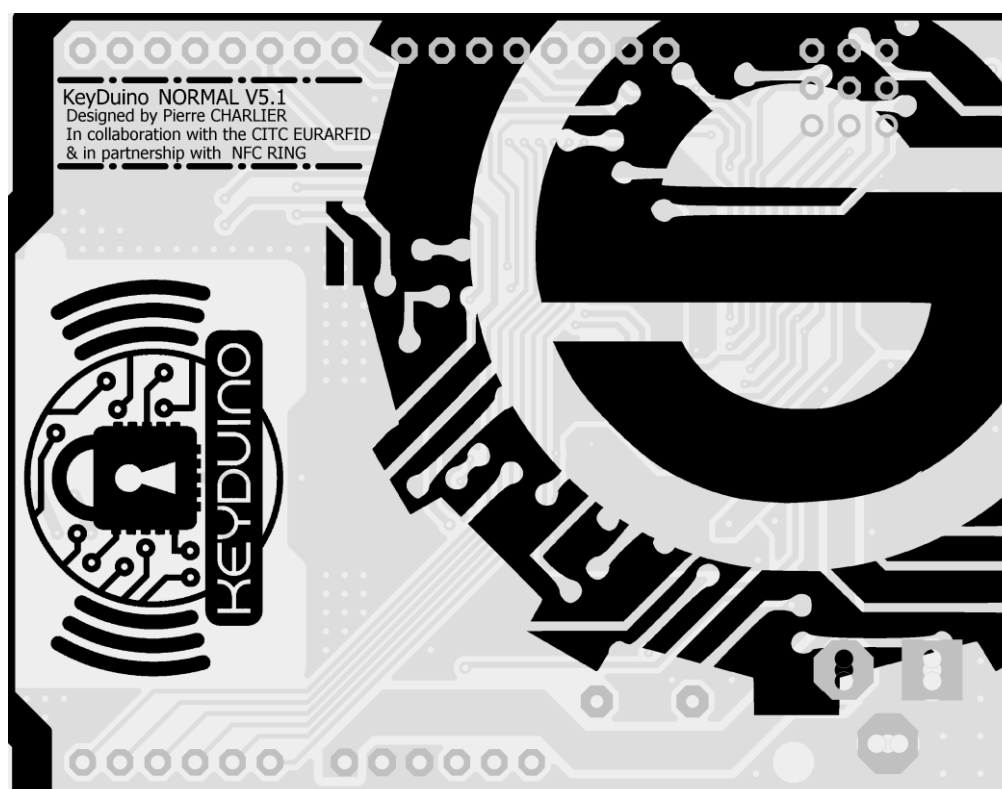| Part	QTY	Value	Device	Package	Description	REF
CAPACITOR						
C1, C11, C12, C15	4	22pF	C-EUC0603	C0603	Capacitor	capacitor 0603 22pF
C24, C25	2	220pF	C-EUC0603	C0603	Capacitor	capacitor 0603 220pF
C26, C27	2	2200pF	C-EUC0603	C0603	Capacitor	capacitor 0603 2200pF
C18	1	1nF	C-EUC0603	C0603	Capacitor	capacitor 0603 1nF
C29, C30	2	1,2nF	C-EUC0603	C0603	Capacitor	Capacitor 0603 1,2nF
C5, C7, C8, C17, C22, C28, C31	7	100nF	C-EUC0603	C0603	Capacitor	capacitor 0603 100nF
C6, C9, C19, C23	4	1uF	C-EUC0603	C0603	Capacitor	capacitor 0603 1uF
C21	1	100nF	C-EUC0805	C0805	Capacitor	capacitor 0805 100nF
C14, C20	2	10uF	C-EUC0805	C0805	Capacitor	capacitor 0805 10uF
C2	1	10uF	CPOL-EUSMCB	SMC_B 1206	CAPACITOR	SMC_B 1206 10uF
C3	1	22uF	CPOL-EUSMCB	SMC_B 1206	CAPACITOR	SMC_B 1206 22uF
RESISTOR						
R11, R12	2	22	R-EU_R0603	R0603	RESISTOR	RESISTOR 0603 22
R5	1	1.0K	R-EU_R0603	R0603	RESISTOR	RESISTOR 0603 1K
R6	1	2.7K	R-EU_R0603	R0603	RESISTOR	RESISTOR 0603 2,7K
R1, R2, R4, R7, R10	5	10K	R-EU_R0603	R0603	RESISTOR	RESISTOR 0603 10K
R3	1	1M	R-EU_R0805	R0805	RESISTOR	RESISTOR 0805 1M
RP1	1	330	RES4NT	RES4NT	4 Resistor Array	4 Resistor Array 330
INDUCTOR						
L1	1	MH2029-300Y	WE-CBF_0805	805	SMD EMI Ferrite	MH2029-300Y
L2, L3	2	560nH	INDUCTOR0805	0805@1	Inductors	inductor 560nH 0805
DIODE & FUSE						
D1	1	M7	DIODE-SMB	SMB	DIODE	SMB M7 (leonardo)
D2	1	CD1206-S01575	DIODE-MINIMELF	MINIMELF	DIODE	CD1206-S01575
F1	1	500mA	PTCSMD	PTC-1206	Resettable Fuse PTC	FUSE 0805 500mA
CONNECTOR & MECHANICAL						
ICSP	1	ICSP	PINHD-2X3	2X03	PIN HEADER	
JP1	1		PINHD-1X3	1X03	PIN HEADER	
JP2	1		PINHD-1X8CLEANBIG	1X08-CLEANBIG	PIN HEADER	
JP3	1		PINHD-1X8CLEANBIG	1X08-CLEANBIG	PIN HEADER	
JP4	1		PINHD-1X6CB	1X06-CLEANBIG	PIN HEADER	
JP6	1		PINHD-1X6CB	1X06-CLEANBIG	PIN HEADER	
X1	1		ANTENNA_U.FL	U.FL	U.FL Antenna Connector	u.FL connector
J1	1	USB-MINI-B%C	USB-MINI-B%C	USB-MINI-B_2		
EXTPOWER	1	POWERSUPPLY_DC21MMX	POWERSUPPLY_DC21MMX	DC-21MM		
RST	1	RESET	PB157	157SW	SKRKAEE010	157SW
BUZZ	1	F/QMX	F/QMX	F/QMX		F/QMX (3,3v)
LEDs						
RX	1		LEDCHIPLED_0603	CHIPLED_0603	LED	0603 LED yellow
TX	1		LEDCHIPLED_0603	CHIPLED_0603	LED	0603 LED RED
ON	1		LEDCHIPLED_0603	CHIPLED_0603	LED	603 LED green
13	1		LEDCHIPLED_0603	CHIPLED_0603	LED	603 LED blue
IC						
U1	1	ATMEGA32U4-XUAU	ATMEGA32U4-XUAU	TQFP44-PAD	ATMEGA32U4-XUAU	ATMEGA32U4-XUAU
U2	1	LP2985-33DBVR	LP2985-XXDBVR33	SOT23-DBV	ULTRALOW-POWER REGULATORS	LP2985-33DBVR
IC1	1	NCP1117ST50T3G	MC33269ST-3.3T3	SOT223	Regulator 800 mA	NCP1117ST50T3G
U3	1		TXB0108PWR	TSSOP20	8-Bit Bi-Directional Level Shifter	TXB0108PWR
U4	1	PN532	PN532	HVQFN40-6X6	PN532 – NFC controller	PN532
CRYSTAL						
Y2	1	27.12MHz	CRYSTALTHIN	CRYSTAL_3.2X2.5	Crystals	7B-27,1200MAAJ-T
Y3	1	16MHz KX-7	CRYSTAL-3.2-2.5	CRYSTAL-3.2-2.5		16MHz KX-7
MOSFET						
T1	1	PMV48XP	PMOSSOT23	SOT-23	MOS FET	PMV48XP
T2	1	FDN340P	PMOSSOT23	SOT-23	MOS FET	FDN340P
T3	1	BSS123	PMOSSOT23	SOT-23	MOS FET	BSS123