

Application Manual

2N NFC Radio Module

Introduction

A purpose of this document is to describe HW interface of 2N NFC Radio Module. The module is equipped with two radio interfaces – 125 kHz RFID (LF) and 13.56 MHz RFID (HF). The module has a programming interface (SWD), serial interface (UART) and 28 GPIOs.

Technical Data

Frequency	125 kHz / 134.2 kHz (LF), 13.56 MHz (HF)
Antenna	External, direct matched for 13.56 MHz, 480 $\mu\text{H} \pm 5\%$ for 125 kHz / 134.2 kHz
Power Supply	3.3 V +/- 5% (direct supply) or 4.2 V - 5.5 V (use of on-board voltage regulator), 250mA max. current consumption in both cases
Temp. Range	Operating: -25 °C up to +80 °C (-13 °F up to +176 °F) Storage: -45 °C up to +85 °C (-49 °F up to +185 °F)
Rel. Humidity	5% to 95% non-condensing

Electrical interface

The module footprint is depicted in Figure 1. The footprint pads are numbered from J1 to J50 are referenced within this document in such a format. Meaning of all the relevant pads is described in Table 1 below.

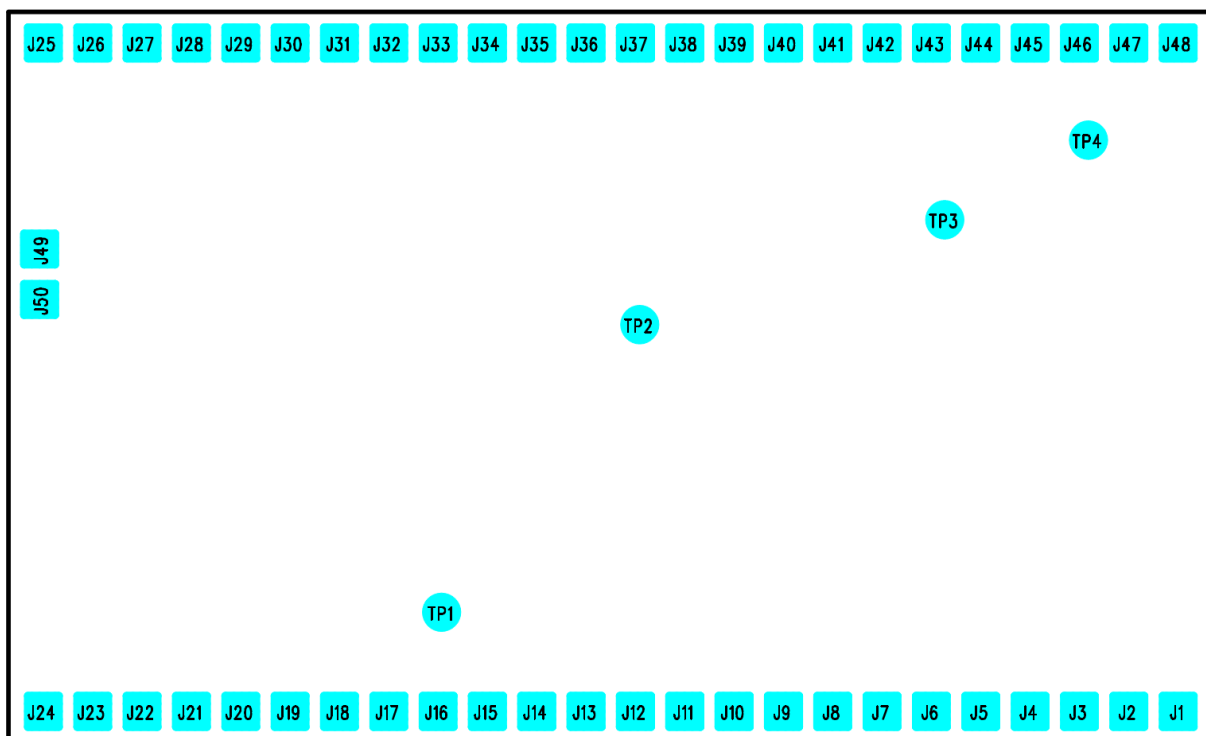


Figure 1: 2N NFC Radio Module Footprint (bottom view)

Peripheral	Pad	Signal	Description
Power	J21, J33, J42, J48	GND	Ground
	J47	VIN	Voltage regulator power input
	J41	VREG	Voltage regulator power output
	J38	REGEN	Voltage regulator enable signal
	J40	VDD	Module power input
SWD	J25	SWCLK	SWD programming interface clock
	J26	SWDIO	SWD programming interface data
GPIO	J10	GPIO1	General purpose input/output signal
	J11	GPIO2	General purpose input/output signal
	J12	GPIO3	General purpose input/output signal
	J13	GPIO4	General purpose input/output signal
	J14	GPIO5	General purpose input/output signal
	J15	GPIO6	General purpose input/output signal
	J16	GPIO7	General purpose input/output signal
	J17	GPIO8	General purpose input/output signal
	J18	GPIO9	General purpose input/output signal
	J19	GPIO10	General purpose input/output signal
	J20	GPIO11	General purpose input/output signal
	J22	GPIO12	General purpose input/output signal
	J23	GPIO13	General purpose input/output signal
	J24	GPIO14	General purpose input/output signal
	J29	GPIO15	General purpose input/output signal
	J30	GPIO16	General purpose input/output signal
	J31	GPIO17	General purpose input/output signal
	J32	GPIO18	General purpose input/output signal
	J34	GPIO19	General purpose input/output signal
	J35	GPIO20	General purpose input/output signal
	J36	GPIO21	General purpose input/output signal
	J37	GPIO22	General purpose input/output signal
	J43	GPIO23	General purpose input/output signal
J44	GPIO24	General purpose input/output signal	
J45	GPIO25	General purpose input/output signal	
J46	GPIO26	General purpose input/output signal	
J49	GPIO27	General purpose input/output signal	
J50	GPIO28	General purpose input/output signal	
Serial interface	J27	TXD	Module serial interface transmit signal
	J28	RXD	Module serial interface receive signal
Reset	J39	RESET	Module reset signal
HF Radio	J1	HF_ANT1	13,56MHz antenna matching circuit
	J2	HF_RXP	13,56MHz antenna matching circuit
	J3	HF_TX1	13,56MHz antenna matching circuit
	J4	HF_GND	13,56MHz radio ground
	J5	HF_TX2	13,56MHz antenna matching circuit
	J6	HF_RXN	13,56MHz antenna matching circuit
	J7	HF_ANT2	13,56MHz antenna matching circuit
LF Radio	J8	LF_ANT1	125kHz antenna hot end (480uH coil)
	J9	LF_ANT2	125kHz antenna cold end (480uH coil)

Table 1: Footprint Signal Description

Radio Interfaces

LF Radio Interface

A simple air core coil with approx. 480uH inductance (+/- 5% tolerance) works in a role of antenna for 125kHz radio part. The connection between module and antenna should be short with minimal inductance (a twisted pair of wires is recommended).

HF Radio Interface

The electrical schematic of HF radio part is shown below in Figure 2. The module is connected to a 1uH air core coil via matching network. The distance between NFC module and matching network must be shortest possible and no more than 50mm. The connection between matching network and antenna must be short with low impedance. A twisted pair of 18 or 20 AWG wires is required.

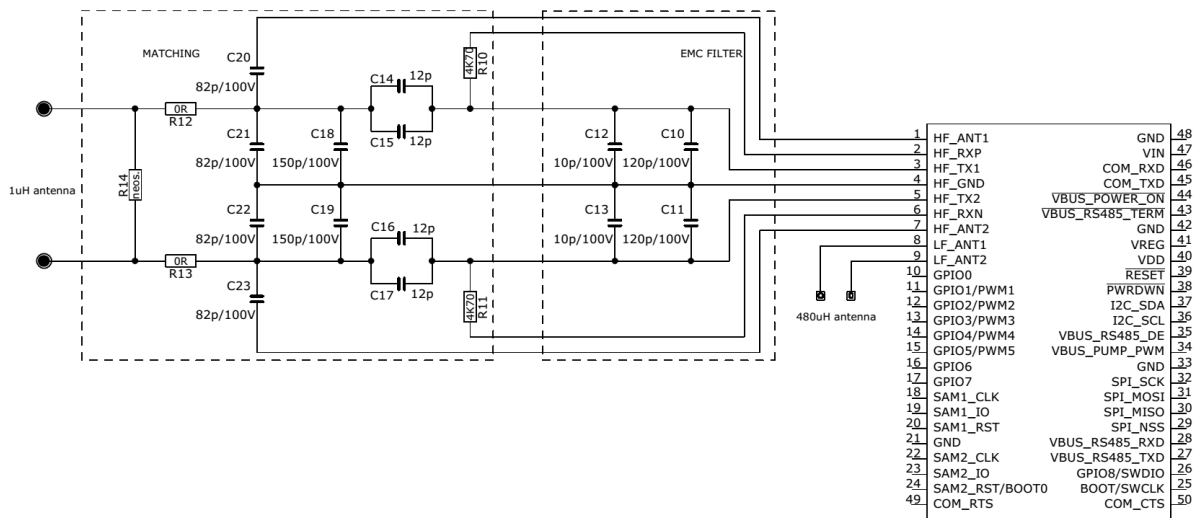


Figure 2: 2N NFC Radio Module HF radio part matching network electrical schematics

FCC statements:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IC Statements:

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme avec Industrie Canada exempts de licence standard RSS (s). Son fonctionnement est soumis aux deux conditions suivantes: (1) cet appareil ne doit pas provoquer d'interférences et (2) cet appareil doit accepter toute interférence, y compris celles pouvant causer un mauvais fonctionnement de l'appareil.

Health Canada RF Exposure Warning Statement

This device complies with Health Canada's Safety Code. The installer of this device should ensure that RF radiation is not emitted in excess of the Health Canada's requirement. Information can be obtained at http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct/index-eng.php

Cet appareil est conforme avec Santé Canada Code de sécurité 6. Le programme d'installation de cet appareil doit s'assurer que les rayonnements RF n'est pas émis au-delà de l'exigence de Santé Canada. Les informations peuvent être obtenues:
http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct/index-fra.php