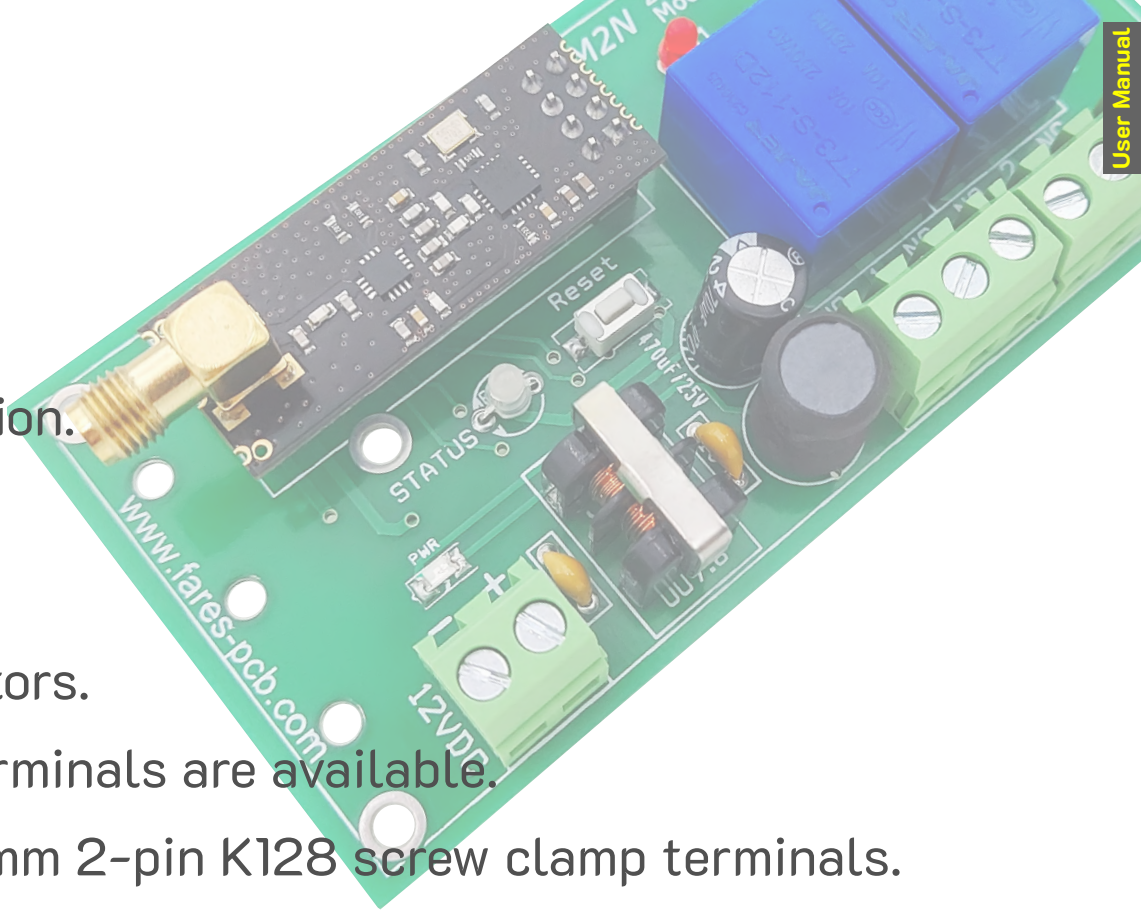
FARES PCB
For Electronic Solutions

2-Channel Wireless Relay Module

General Description

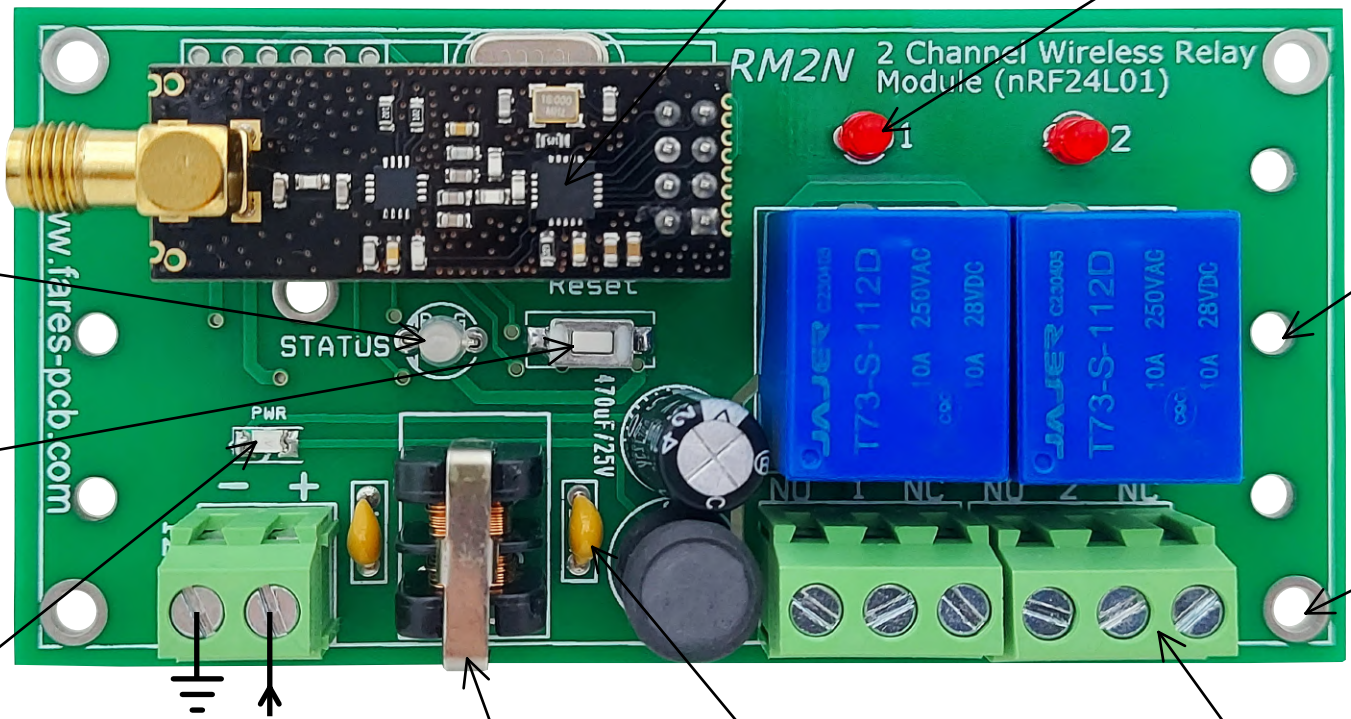
The RM2N is a 2-channel wireless relay module based on the nRF24L01+ chip from Nordic Semiconductor. The nRF24L01 module is designed to operate in the global 2.4GHz ISM frequency band and uses GFSK modulation to transmit data. The card is well-protected, filtered, and easy to install. RM2N outputs can drive loads up to 10A (resistive loads).

Features



- Based on nRF24L01+ module.
- On-board 3.3V,5V regulator.
- Power input is filtered for noise reduction.
- LED for power indication.
- Operating voltage DC12V.
- Two output relays with red LED indicators.
- Both normal open and normal close terminals are available.
- Relay outputs are available through 5mm 2-pin K128 screw clamp terminals.
- Easy configuration and test.
- Reset push button switch is included.
- DIN Rail mountable.
- Four mounting holes for easy installation.

Board Details



nRF24L01+

Output LED indicator

PCB mounting hole for bracket

Status LED

Reset switch

3.5mm mounting hole

Power LED indicator

Input voltage 12V

Common mode chock inductor

Filter capacitor

Output terminals

RM2N can be powered from a 12V DC power source. RM2N is protected from the reverse polarity of power. On-board DC EMI filter circuit is included to filter out high-frequency noise.

RM2N supports both nRF24L01+ and nRF24L01+ PA/LNA modules.

Bi-color LED (Green/Red) is included to indicate the different operating states.

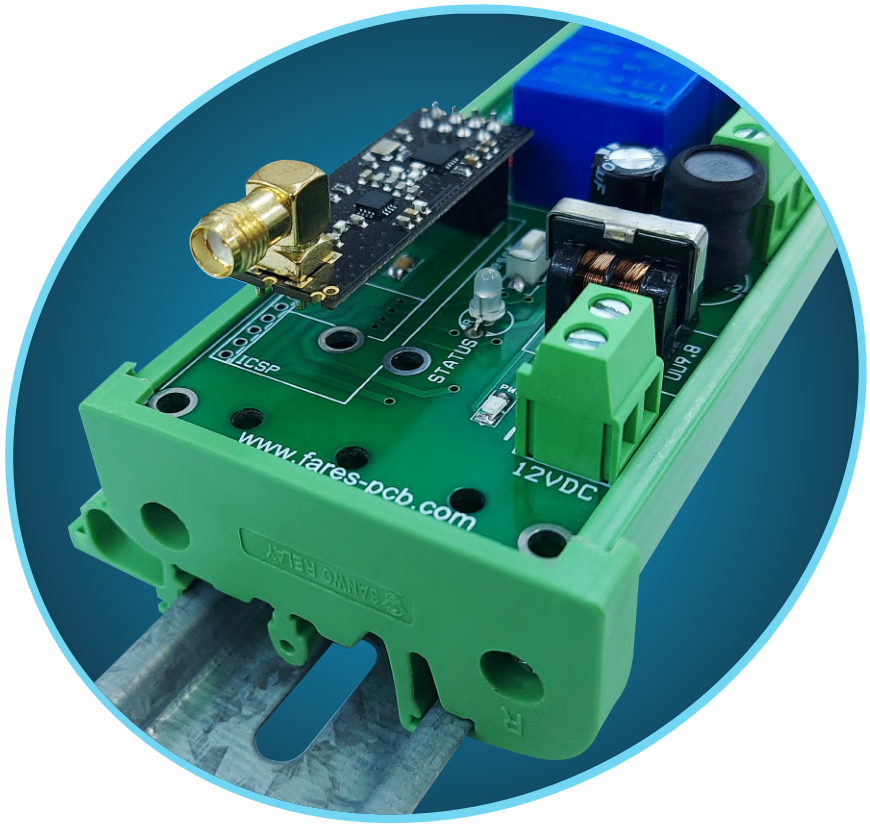
Status LED action vs operation states is shown in the table below

Status LED Color	State	Description
Green	Ready	RM2N is ready for receiving commands
Red	Active	Transmitting/Receiving
Yellow	Reset request	Reset switch is pressed
Red flash	Reset executed	Reset operation is done

All node parameters can be reset to default values using the **RESET** switch. Press the **RESET** switch until the status LED is red flashing.

DIN Rail Mounting Options

PCB Bracket



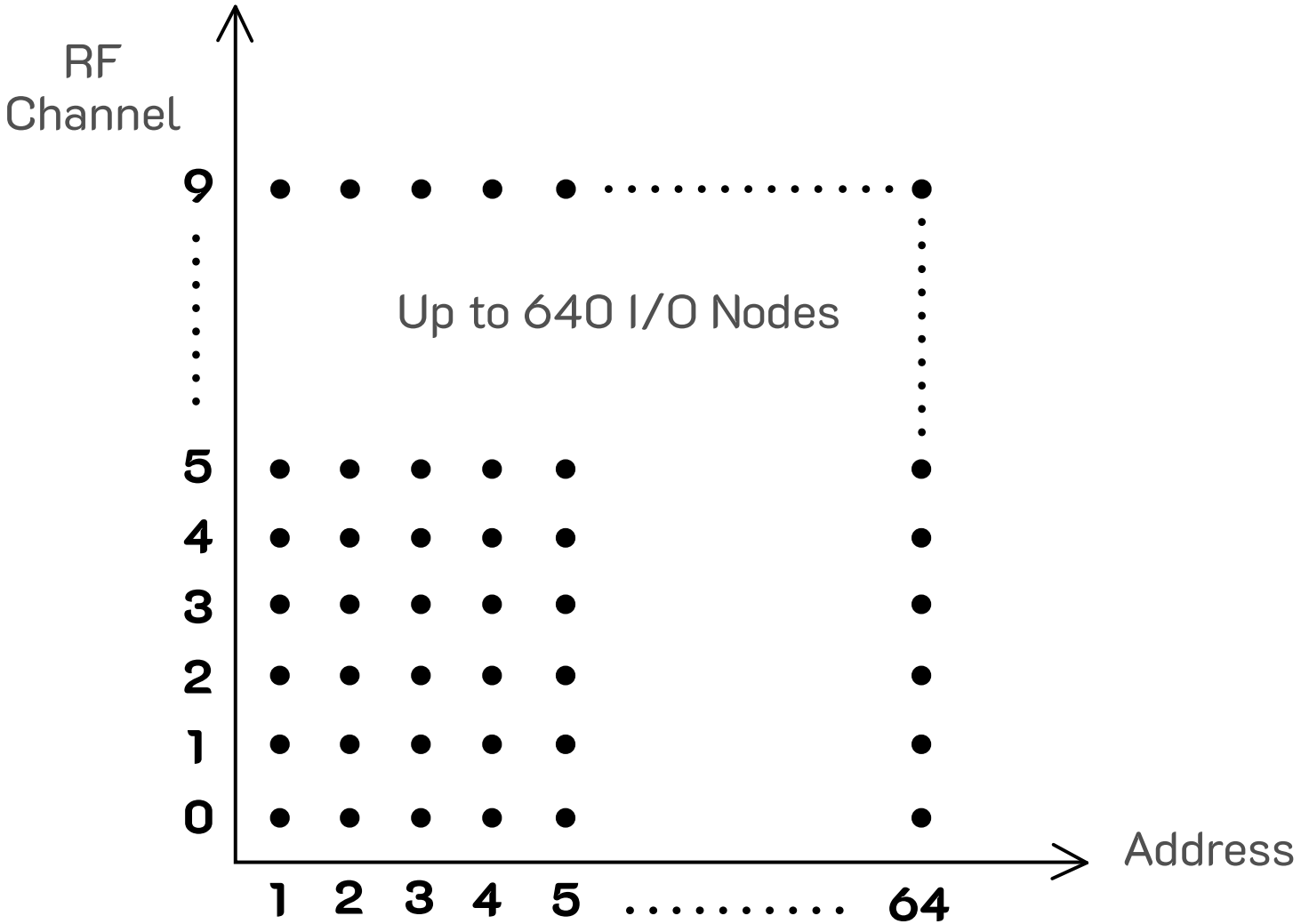
PCB Carrier

System overview

nRF wireless control system consists of three divisions

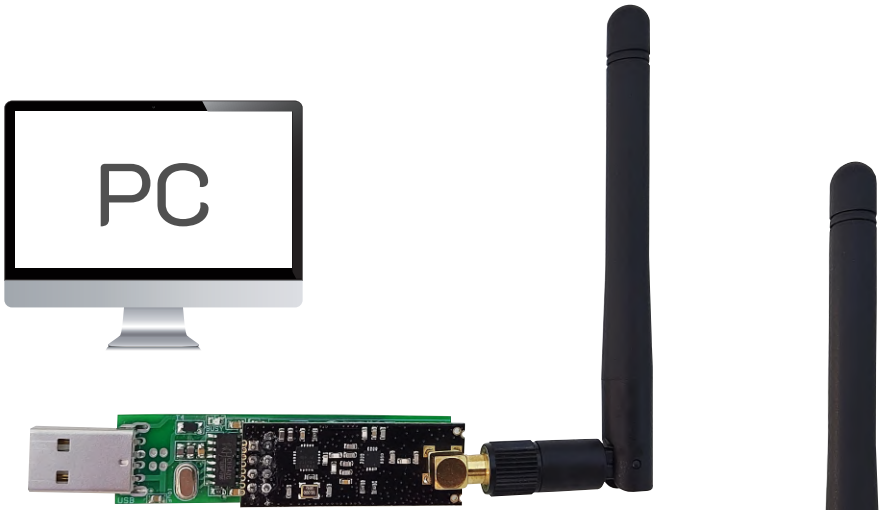
- Control device (such as PC or microcontroller).
- nRF master module which is a wireless serial-controlled module that can communicate to one or more nRF nodes.
- nRF I/O Node which is an I/O module that can control outputs and/or read inputs and can be communicated to an nRF master.

nRF I/O nodes can be controlled by an nRF master module in any micro-programmed system such as a PC, Arduino board, or microcontroller-based system. Each nRF node have a unique address and operate over a specific radio frequency band. The available addresses for nRF nodes are ranged from 1 to 64. All addresses can be reused over ten frequency channels (0-9). With a simple calculation, it can be concluded that each nRF master can control up to 640 I/O nRF nodes.



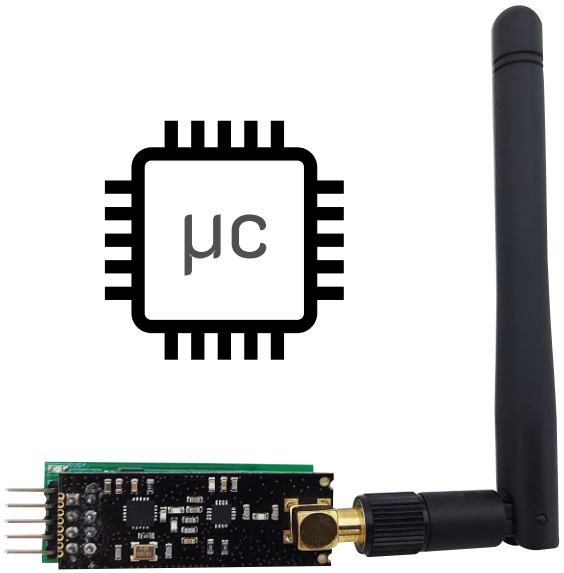
Address/RF Channel Distributing Chart

FARES PCB provides both USB-controlled and Serial-controlled nRF master modules as well. USB types A and B are available for flexibility. USB-controlled nRF master module is suitable for PC systems whereas serial-controlled module is more suitable for microcontroller-based systems. USB-controlled master module needs installing CH340 driver to be recognized. Communication baud rate is 115200 bps for both master types.



USB-controlled master (type A)

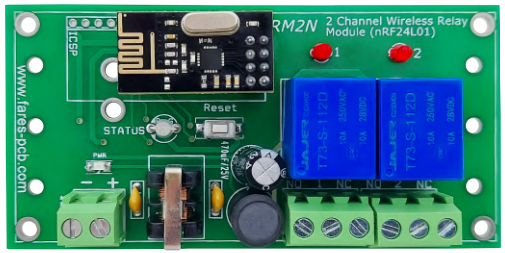
USB-controlled master (type B)



Serial-controlled master

FARES PCB provides a variety of I/O nRF nodes that vary according to the number of inputs and outputs. Some nodes contain only outputs, some contain only inputs, and some contain both.

Some of available nRF nodes



2-Channel Relay Module (nRF24L01)

4-Channel Relay Module (nRF24L01)

8-Channel Relay Module (nRF24L01)

Node Configuration

nRF Node Controller is a software developed by FARES PCB to configure and test nRF nodes.

nRF Node Controller program features:

1-Auto detects master module over USB ports.

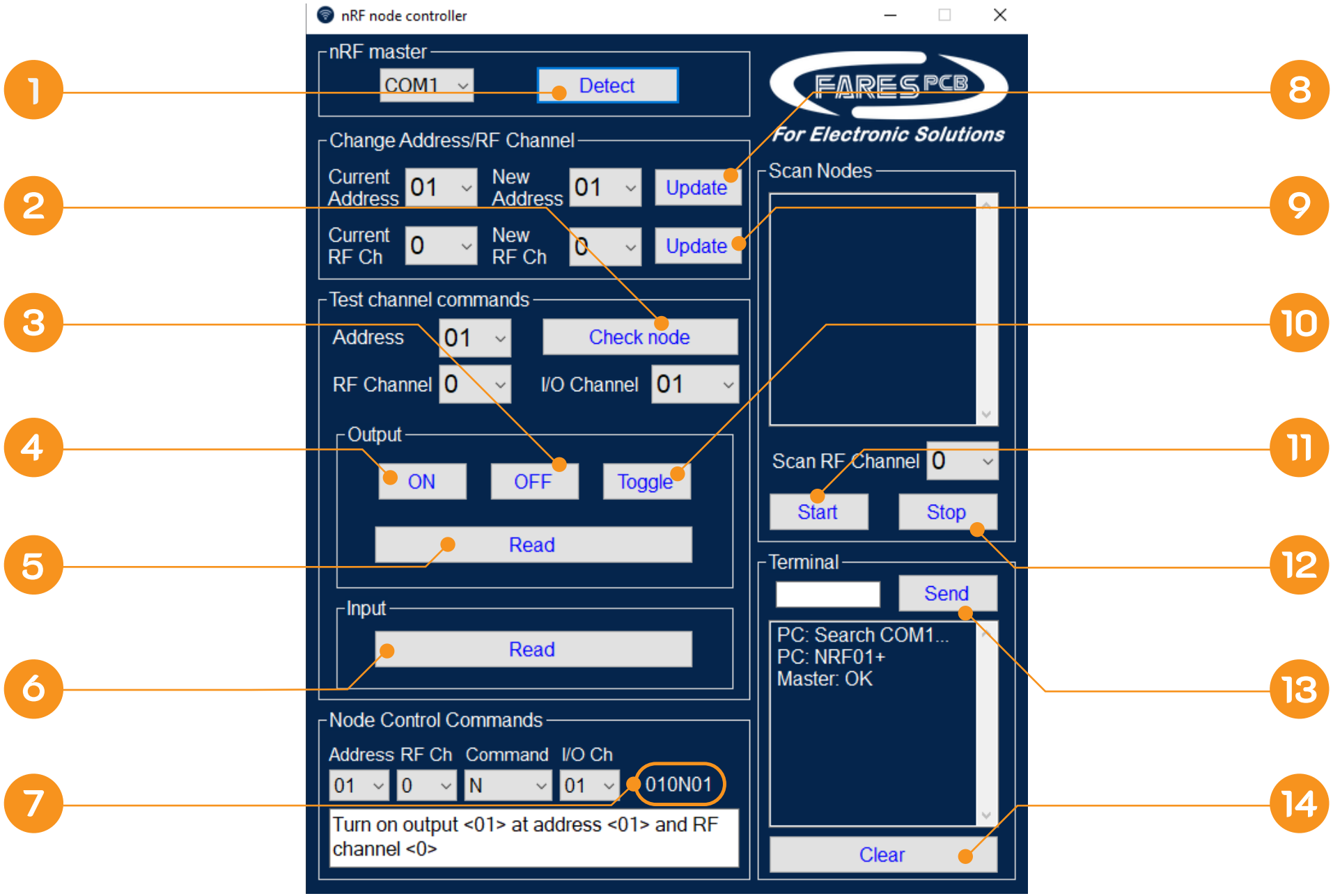
2-Scan all available nRF nodes in range.

3-Set node address.

4-Set RF channel.

5-Test all I/Os of nRF nodes in range.

6-Apply commands to nRF nodes.


nRF node controller
nRF master
COM1
Detect
Change Address/RF Channel
Current Address
01
New Address
01
Update
Current RF Ch
0
New RF Ch
0
Update
Test channel commands
Address
01
Check node
RF Channel
0
I/O Channel
01
Output
ON
OFF
Toggle
Read
Input
Read
Node Control Commands
Address RF Ch Command I/O Ch
01
0
N
01
010N01
Turn on output <01> at address <01> and RF channel <0>
FARES PCB
For Electronic Solutions
Scan Nodes
Scan RF Channel
0
Start
Stop
Terminal
Send
PC: Search COM1...
PC: NRF01+
Master: OK
Clear
1
2
3
4
5
6
7
8
9
10
11
12
13
14

1 - Auto detect master over all USB ports.

2 - Get node information.

3 - Turn off selected output channel.

4 - Turn on selected output channel.

5 - Read selected output channel.

6 - Read selected input channel.

7 - Click to send command.

8 - Change to new address.

9 - Change to new RF channel.

10 - Reverse status of selected output channel.

11 - Start searching for all available nodes.

12 - Stop searching for all available nodes.

13 - Send text.

14 - Clear terminal contents.

How to configure new nRF I/O node module

In a large-scale nRF wireless control system, each nRF node must have a unique address within the same RF band. nRF node comes pre-configured to the default address and RF channel. The default address is 01 and the default RF channel is 0.

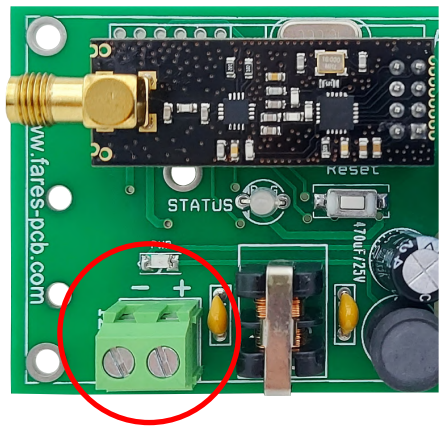
nRF node address and RF channel can be reset to default values by pressing **Reset** button and holding it for 5 seconds.

To assign a new address and/or RF channel to nRF node using nRF node Controller software follow the next steps:

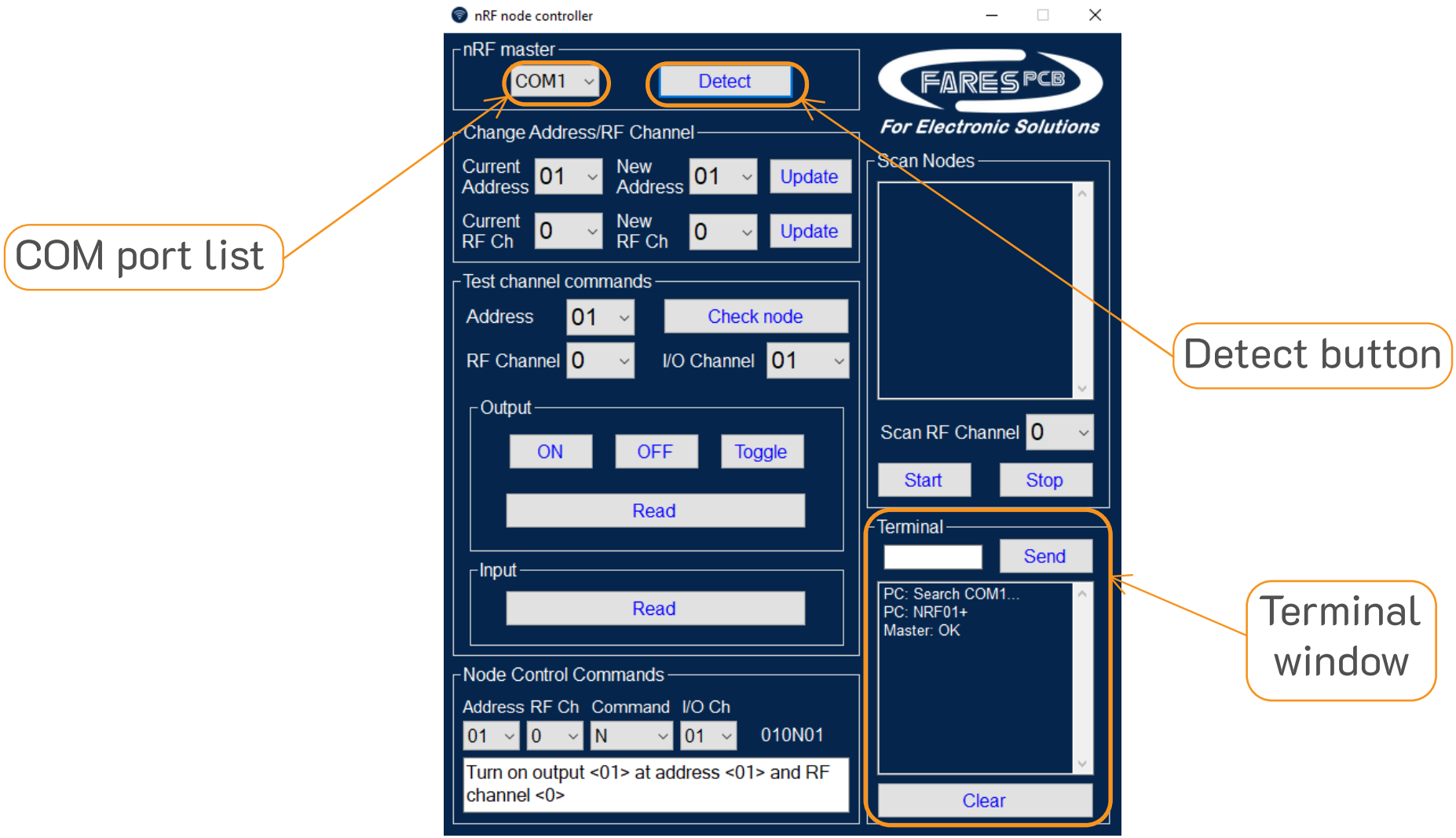
1 – Plug the nRF master module into the PC.

2 – Connect nRF node to 12VDC power source.

3 – Open nRF node controller software. The program will automatically start searching master module overall available USB ports.

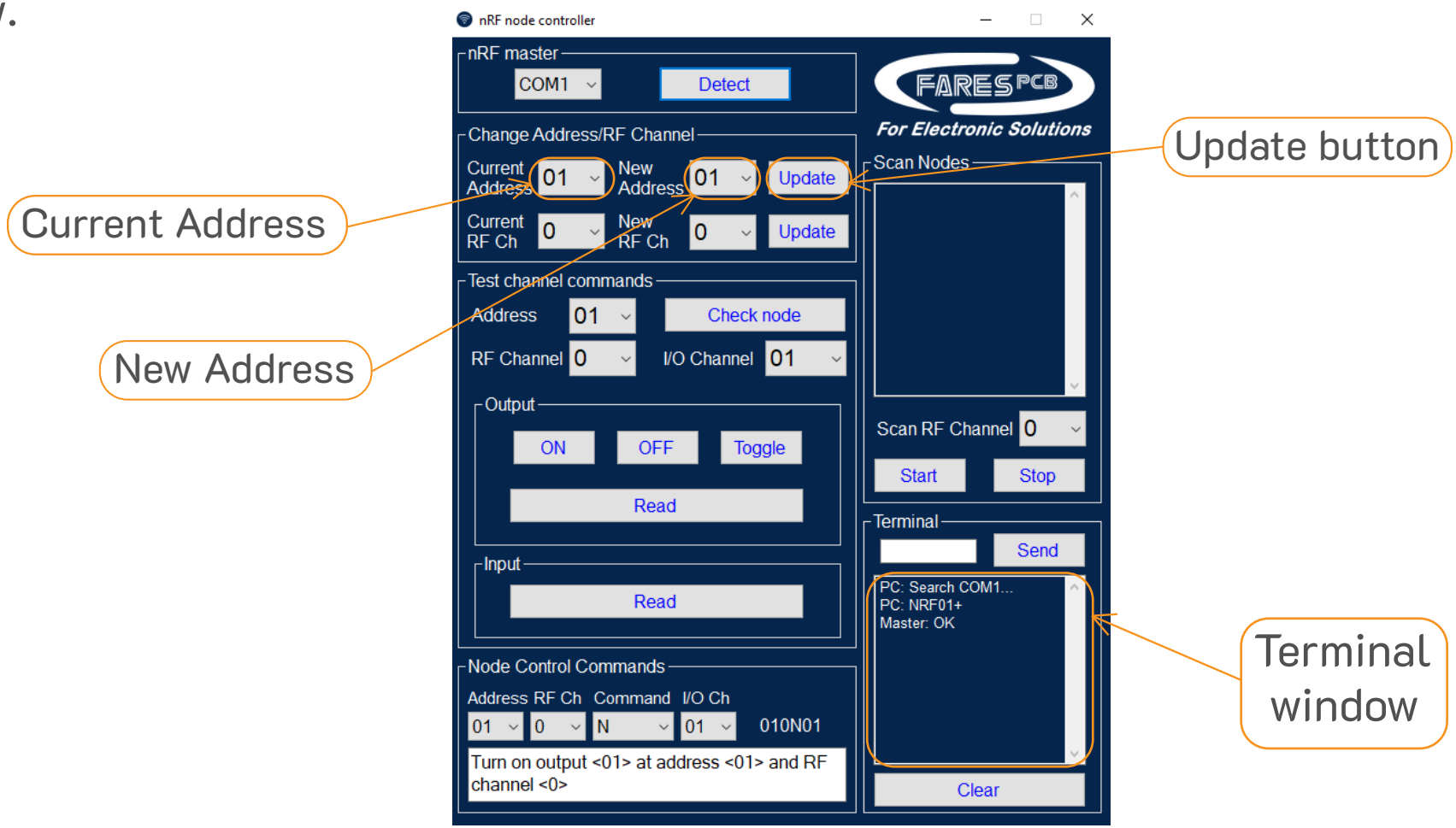


the results of search process are shown in the terminal window. If it fails to detect a master module try to click **Detect** button.



4 – Select the current address of nRF node (01 for fresh node) and select the required new address (range from 01 to 64).

5 – Click **Update** button. The result of address changing is shown in the terminal window.



6 – Repeat Steps 4-5 to change the RF channel of nRF node.

To get node access information for an unknown node follow the next steps

1 – Plug the nRF master module into the PC.

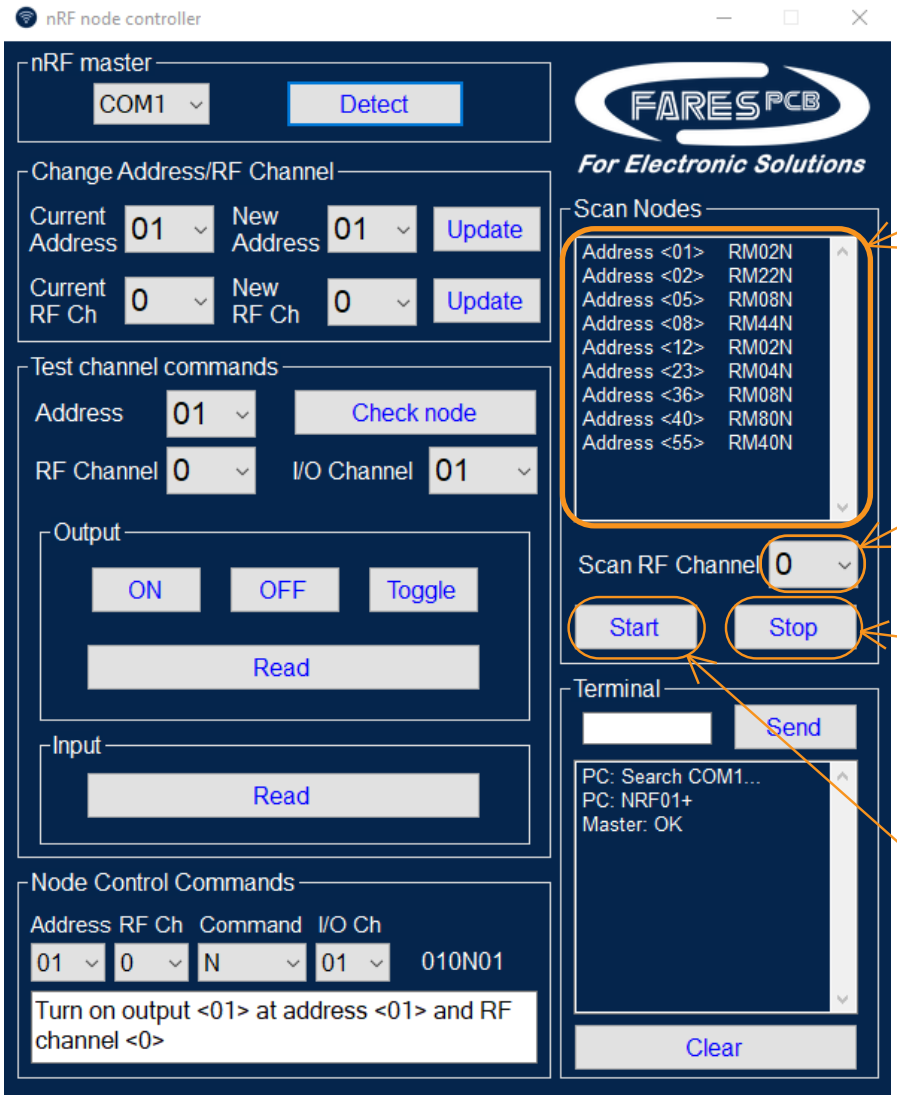
2 – Connect unknown nRF node to 12VDC power source.

3 – Select scan RF channel number 0.

4 – Click **Start** button to start scanning for all available nRF node addresses in 0 RF channel band.

5 – Detected node addresses will appear in the scan window.

6 - If no nodes are detected repeat steps 3-5 for the next RF channel.



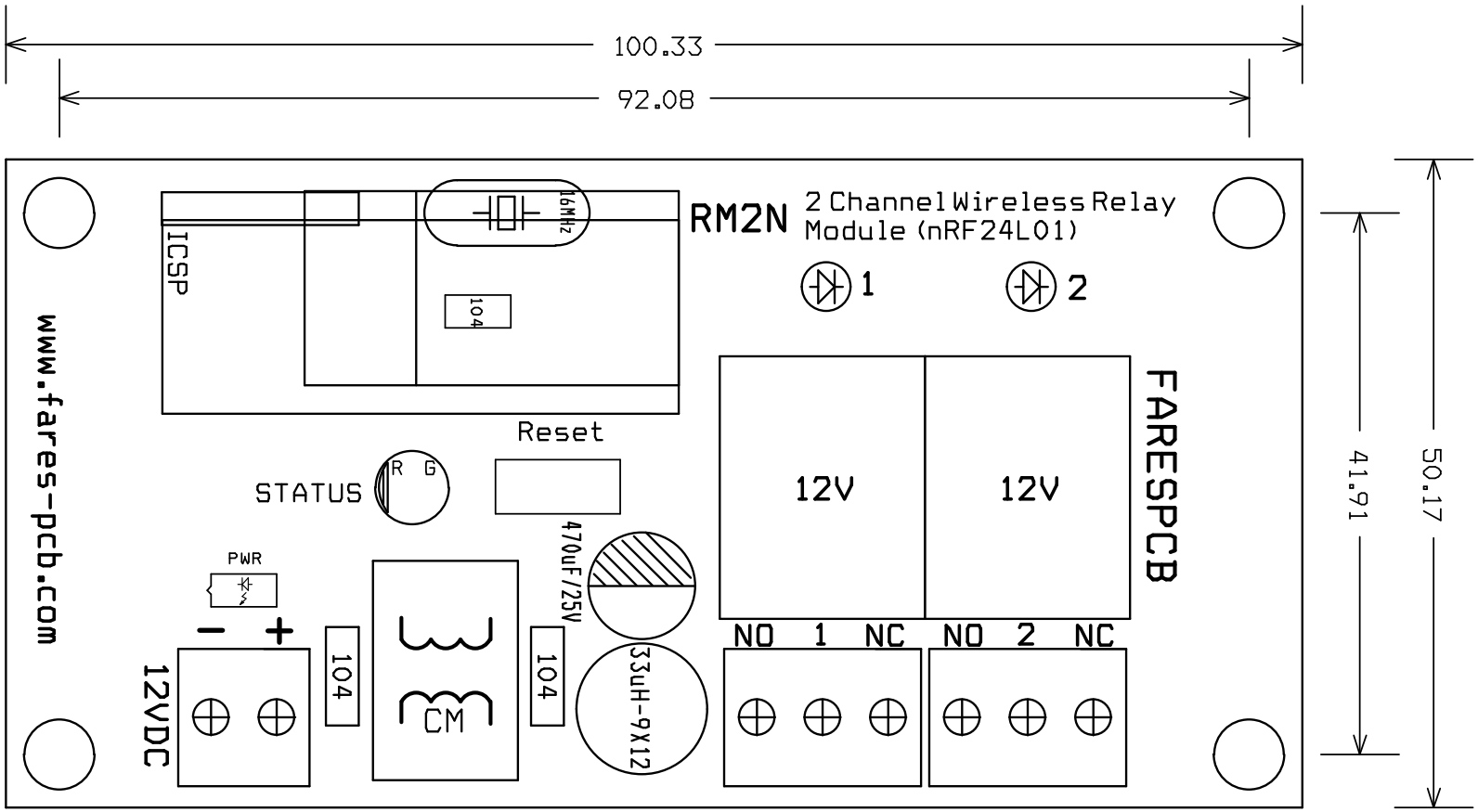
Scan window

RF channel to be scanned

Start scan operation

Stop scan operation

Mechanical Dimensions Diagram



All dimensions are in mm

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