

Pseudorandom frequency generator for frequency hopping

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In the firmware code is inserted an array of 50 elements (named RF_channel) corresponding to 50 frequencies:

the first frequency is 902,75MHz and the others are

$$F_i = 902,75 + i * 500 \text{ KHz}$$

where i is the index of the array ($0 \leq i \leq 49$)

Each time a transmission command start, one of the 50 frequencies is selected using the Pseudorandom number generator routine described below and the RF wave is switched on.

Pseudorandom number generator routine (prng()):

```
if (r==0 || r==1 || r==0xFFFFFFFF) r=rprime;
r = (9973*(~r)) + (y % 701);
y = r>>24;
i = y % 50; //i is the index of RF_channel array
```

where rprime=9001, y = 0 at boot time and the seed – initial value of r – is the lower part of a ms clock timer at the first scanning time or the reader serial number.

Every transmission is maximum $T_{\text{singleTX}} = 150\text{ms}$ long. At the end of every transmission the RF is switched off and an other carrier wave is chosen using prng() routine; the RF is switched on and an other transmission start and so on until a tag is found or the command timeout (T_{cmd}) ends.

The command timeout T_{cmd} is a parameter of every transmission command, it's $T_{\text{cmd}} \geq T_{\text{singleTX}}$ and it's set by the user.