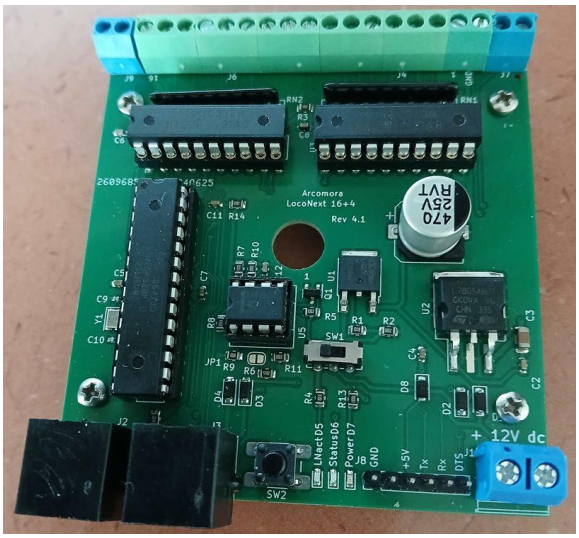
ARCOMORA

ARDUINO CONTROLLED MODEL RAILWAY

# LocoNext

## The all-round occupancy detector with LocoNet®





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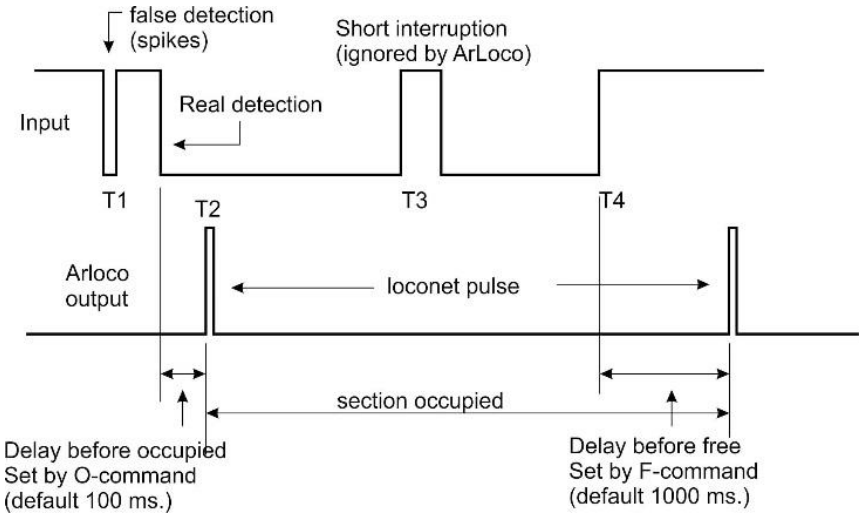
## Features LocoNext:

- 16 Channels occupancy detector
- 4 Additional channels that can be configured as input or output
- 4096 Addresses possible
- Address per channel adjustable.
- Can be used as a LocoNet buffer. Adjustable with switch.
- Uses LocoNet for communication with central unit or computer.
- Extensive debugging facilities.
- Easy to configure with your PC.
- Reset button.
- Power supply possible with external power supply (12-16V AC/DC) , LocoNet or USB
- Suitable for LocoNet-T
- Configurable on PC using Putty (terminal emulator programme)
- Connections:
    - 16 x 3.5" screw terminals for inputs
    - 4 x 3.5" screw terminals for inputs or outputs(configurable)
    - 1 x 3.5" screw terminals for ground (ground)
    - 2 x RJ12 connector for LocoNet-T
    - 1 x USB interface (CH340) for connection to PC.
    - 1 x 5" screw terminal for 12V DC power supply
- Current detection:
    - Provision against false alarms due to fault spikes
    - Provision against short power interruptions
    - Suitable for current detection with the Okkie/OkkieNext current detection boards
    - Can be directly connected to OkkieNext with a coupling board.

## Current Detection

The LocoNext is primarily intended to detect a train on a track section using current detection.
In this case, LocoNext will send a LocoNet pulse, with address information, to the control panel when an input becomes low. As a result, the section will be seen as 'occupied'.
When the input becomes high again, a LocoNet pulse will be sent again, so the section will be seen as 'free' again.
This method is primarily for current detection. In this case, the input of the LocoNext is connected to the output of a current detection circuit.



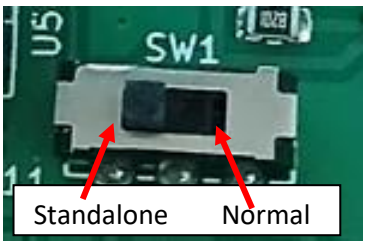

However, the LocoNext will also function when a reed switch or light barrier is used as a detection device.

To prevent false busy or free messages due to malfunctions, two time-outs have been built in.
A section is only considered occupied if it has remained at least the 'delay before occupied' time low.
This is 100 ms by default and can be adjusted with the O command.
This can prevent false reports due to crosstalk or spikes.
The spike at time T1 (see figure) is not seen by LocoNext because it is shorter than the delay before occupied time. Only at T2 is a section reported as occupied

The input is only considered 'free' if it has remained high for at least the 'delay before free' time. This is 1000 ms by default and can be adjusted with the F command. This can be used to cope with short power interruptions due to e.g. poor rail contact. The power outage at time T3 is ignored by LocoNext because it lasts shorter than the 'delay before free' time. It is not until T4 that the section is reported as free.
On an ideal track, both times should be zero.

## Standalone LocoNet

Normally, you will connect the LocoNext to a switchboard that also 'talks' to LocoNet.
To do this, you use the LocoNet-T port of the exchange.
But even if you have an exchange without LocoNet, you can use the LocoNext.
To do this, you can use the standalone option of the LocoNext.
Connect 12V DC to the appropriate screw terminal and move the slide switch to the left. The blue LED will then light up. Now you can receive LocoNet signals and send them to other LocoNet modules.
To send busy messages to the PC, you still need a LocoNet-USB interface.




PLEASE NOTE:
There should only be one LocoNext in the network with standalone LocoNet!

# Addressing

The LocoNext has 16 input ports as standard.
In addition, 4 extra input ports are possible. See below. This includes 20 addresses in total.
The 16 standard ports can be connected to the OkkieNext with a coupling board.
The total address range of the LocoNext is from address 1 to address 4096.
However, inputs of the LocoNext can be deactivated (A-command). As a result, they do not 'consume' an address. This is especially useful for module layouts where each module has to get its own LocoNext but the number of sections to be detected per module is limited.
Each LocoNext must be assigned its own Basic Address (B-command).
So, for example, if you only want to use 10 addresses from address 25, then set the base address to 25 and set ports 11 to 16 to 'not active'.
The first active port gets the base address.
The second is the basic address +1; the third base address+2, etc.

This way of working allows the LocoNext to be very flexible with the available address space.

In addition, it is possible to give each port a different address. Please note that this address is not also used on another LocoNext or ArLoco. If that address is already being used on another port, you'll get a warning. You can accept that; Then you will receive an occupancy notification at the same address for two different entrances.

If a port has not been assigned a different address, the following applies:
LocoNet Address = Port Number + Base Address – 1

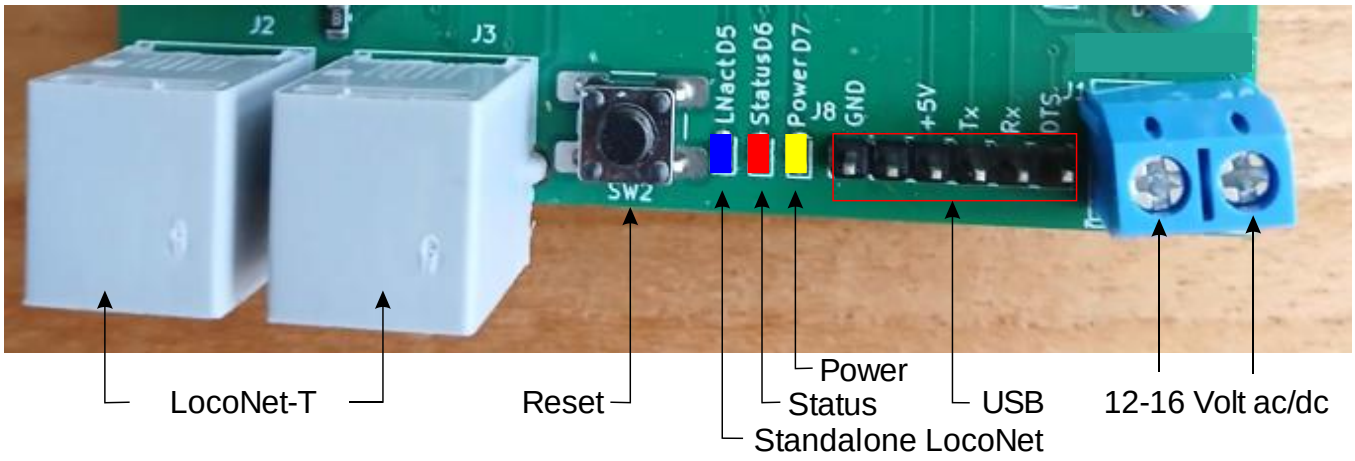
# Four additional ports

The LocoNext also has 4 additional ports (port numbers 17-20).
These ports can be set as a normal input port just like ports 1-16.
Then you have 20 detection ports on the LocoNext.

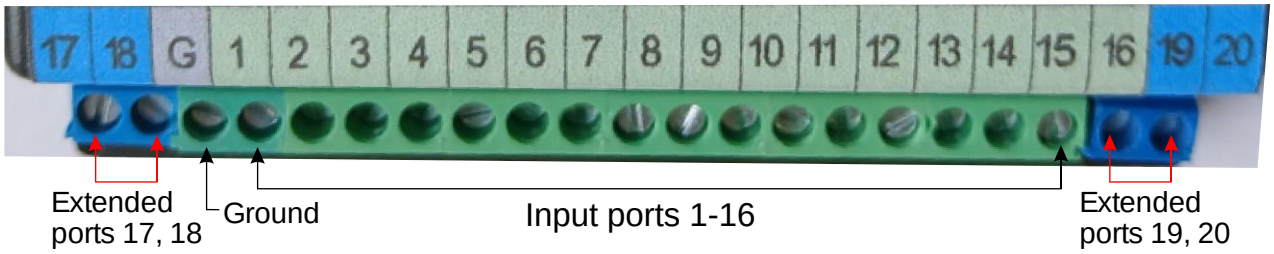
### Output port

But you can also define them as an output port.
An output port can be linked to an input port of another LocoNet/ArLoco by giving both the same LocoNet address.
If a train is seen on the input (= low of the input) then the output port will also become low (or high in case of inversion). As long as the train is in the detected section, the output will remain active.
By connecting an output to an input port of the DCCNext, multiple accessories can be controlled over one LocoNet cable.
Keep in mind that an input can not only be triggered by current detection, but also with, for example, a (momentary) switch, reed contact or light gate.

# Connections




The USB interface (CH340) must be connected to an USB port on the PC. This also allows the LocoNext to be supplied with power. This interface must be ordered separately!
The 12 Volt may always be connected. Then the 12 Volt of LocoNet-T is not charged.
However , it **must** be connected when using standalone LocoNet.
This will supply power to the other LocoNext and/or ArLoco's via the LocoNet cable.




The ***Ground*** must be connected to the ground of the module that provides the input signals.
Usually this will be a current detection module such as the Okkie or OkkieNext.
This can also be done via a ground loop.
A (momentary) switch can be placed directly between the input port and the ground port.

Replacing the green input ports with a Dupont strip of 18 pins is also possible. A coupling PCB can then be inserted into this for direct connection to the OkkieNext.

# Configuring LocoNEXT

Once all the software has been installed correctly and the LOCONEXT is connected, the configuration can begin.
To do this, click on the shortcut *'LOCONEXT'*.

PLEASE NOTE:

- End each numeric entry with <enter>.
- All one-letter commands do NOT need to be terminated with <enter>.
- For most inputs, the existing value does not change if you only <enter>. The existing value is then in parentheses.
- In the configuration state, the status LED will be continuously on on the LocoNext.
- In the operating state, this LED is off.
- For the numeric keypad, make sure the NumLock is turned on.
- You can enter both uppercase and lowercase letters.
- Use only the Backspace key to correct

A command can now be entered.
The very first time you start up the LOCONEXT, or after a complete reset, the I-command is automatically activated. (See I-command).
Various default values are set.
At every start of the configuration, an overview of the configuration will automatically be displayed.

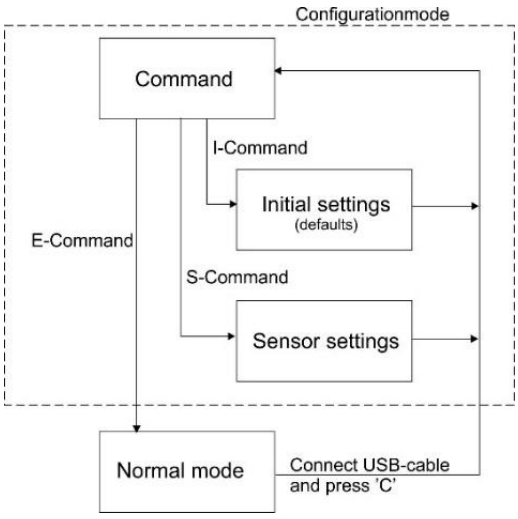
## The commands

The LocoNext, like the Mardec and Arsigdec, has two states. The configuration mode and the operating mode. The configuration mode has general commands, Port commands and 'Initial settings'.
By entering a ? (question mark) gives an overview of the available commands.

```
Specify Action (B/D/E/I/R/P/S/?/): ?

B = Base Address
P = Port settings
I = Initial settings
D = Debug mode on/off
S = Show All ports
R = Reset LocoNext
E = Exit to normal mode

Specify Action (B/D/E/I/R/P/S/?/):
```




Each command consists of a single letter and does not need to be terminated with <enter>.
The letters are based on the English description of the function of each command.

Note: The status LED is always on in configuration mode. In Normal mode, it is off and flashes briefly when sending LocoNet signals.

## I-Command (Initial settings)

The I-command adjusts all default settings. There is no submenu, but all settings are requested one after the other. These are the following institutions.

- Enter the administrative number of the LocoNext.
- The basic address. Also as a separate B-command.
- Default port inversion. By default, a low (= 0 Volt) signal is seen as 'busy'. However, if a light barrier is used where the light beam is interrupted by the train, it will give off a high signal (= 5 Volts). By using inversion, LocoNext will see a high signal as occupied.
  This command is also available as an I-command per port.
- The '*delay before occupied*' time.
  Default: 1000 ms.
  This can vary from 1 to 3000 msec.
- The '*delay before free*' time.
  Default: 1000 ms. This can vary from 1 to 3000 msec.

```
Specify Action (B/D/E/I/R/P/S/?/): i

Specify number for this LocoNext
Enter value from 1 to 100 (1):
This is your LocoNext #1

Set Base Address for this LocoNext
Enter value from 1 to 4077 (1): 1000
Base Address set to 1000

Default Inversion set to NOT Inverted
Change inversion ? Y/N (N=default) :

Default Inversion set to NOT Inverted

Specify delay before setting occupied (msec)
Enter value from 0 to 1000 (100):
delay before setting occupied 100 milliseconds

Specify delay before setting free (msec)
Enter value from 0 to 3000 (100):
delay before setting free 100 milliseconds
```

## B-Command (Base Address)

The separate B-command can also be used to set the basic address.
See also the section on Addressing.

```
Specify action (B/D/E/I/R/S/V/?): B

Set Base address for this ArLoco
Enter value from 1 to 250 (54): 25
Base address set to 25
```

## R-Command (Reset)

The R-command resets all the settings of the LocoNext.
After this, the program will start again.

```
Specify action (B/D/E/I/R/S/V/?): R

Are you sure you want to clear all settings? Y/N: Y
ABSOLUTELY sure? Y/N:
```

## E-Command (Exit)

The E-command switches to operating mode. LocoNext will now report every detected train.
There is no need to disconnect the USB cable.
To return to the configuration state, when removed plug in the USB cable and press the 'C' key.

## S-Command (Show)

The S command shows the settings of all ports.

```
Specify Action (B/D/E/I/R/P/S/?/): s

Delay before setting occupied (msec): 100
Delay before setting free (msec): 100

Default Inversion set to NOT Inverted

Base Address: 1000

Input port settings:
port 1  set to Active,    Address 1000, not inverted
port 2  set to Active,    Address 1001, not inverted
port 3  set to Active,    Address 1002, not inverted
port 4  set to Active,    Address 1003, not inverted
port 5  set to Active,    Address 1004, not inverted
port 6  set to Active,    Address 1005, not inverted
port 7  set to Active,    Address 1006, not inverted
port 8  set to Active,    Address 1007, not inverted
port 9  set to Active,    Address 1008, not inverted
port 10 set to Active,    Address 1009, not inverted
port 11 set to Active,    Address 1010, not inverted
port 12 set to Active,    Address 1011, not inverted
port 13 set to Active,    Address 1012, not inverted
port 14 set to Active,    Address 1013, not inverted
port 15 set to Active,    Address 1014, not inverted
port 16 set to Active,    Address 1015, not inverted

Extended port settings:
port 17 set to Active,   type Output, Address 1016, not inverted
port 18 set to Active,   type Output, Address 1017, not inverted
port 19 set to Active,   type Output, Address 1018, not inverted
port 20 set to Active,   type Output, Address 1019, not inverted
```

## D-Command (Debug)

With the D command you can turn the debug mode on and off. In debug mode, you can show every change of a port in the operating state.

## P-Command (Port)

A number of port settings can be set with the P command.
By entering a question mark, the sub commands are shown.

The following sub commands are available.

```
Specify Action (B/D/E/I/R/P/S/?/): p

Which port do you want to set?
Enter value from 1 to 20: 5
port 5  set to Active,    Address 1004, not inverted

Specify Action for port 5 (L/A/I/?): ?

L = Set Loconet Address
A = Set Active or Inactive
I = Set Inversion on/off
V = View settings
<enter> or X = Update settings

Specify Action for port 5 (L/A/I/?):
```

## L-Command (LocoNet address)

With the L-command, you can give a port a unique address from 1 to 4096.

If a port already had a different address, address 0 can reset the address to the value corresponding to the base address.

If the address is already being used on another port, you will receive a warning. You can accept that. Then you will receive an occupancy notification at the same address for two different ports.

```
Set LocoNet Address for port 8
Enter value from 0 to 4096 (1007): 1010
WARNING: Addres 1010 already in use on port 11
Is that OK? Y/N [N] y

LocoNet Address for port 8 set to 1010
```

## I-Command (Inversion)

The I-command can be used to switch the inversion of the port.

## A-Command (Active)

With the A command, a port can be activated or deactivated. An inactive port will not be used. By making a number of ports inactive, more addresses become available for other LocoNext's.

If an input port is set to inactive, it will ask if the higher port numbers should also be set to inactive. That's useful if you don't want to use some of the ports.

```
Which port do you want to set?
Enter value from 1 to 20: 6
port 6  set to Active,    Address 1005, not inverted

Specify Action for port 6 (L/A/I/?): a

port 6 set to not active
Set input ports 7 to 20 also InActive Y/N [N] ?
```

When a port is set to active again, it gets the address it had before. It also asks if all other inactive input ports should be reset to active.

```
Which port do you want to set?
Enter value from 1 to 20: 10
port 10 set to INactive,  Address 1009, not inverted

Specify Action for port 10 (L/A/I/?): a

port 10 set to Active
Set all other inactive input ports active again. Y/N [N] ?
```

# OkkieNext4x4

The OkkieNext 4x4 is a current sensing module with 16 inputs for 16 track sections and 16 outputs for connection to a LocoNet encoder such as the ArLoco or LocoNext module.
The inputs and outputs are electrically separated by optocouplers.

The OkkieNext4x4 has 4 groups, each with 4 inputs and its own Common entrance.
That way, you have 4 independent groups for current detection.
By placing jumpers, the groups can be combined into groups of 4, 8, 12 or 16 inputs.
The OkkieNext4x4 is designed for use in a standard Arcomora box and is technically identical to two regular Okkie's.