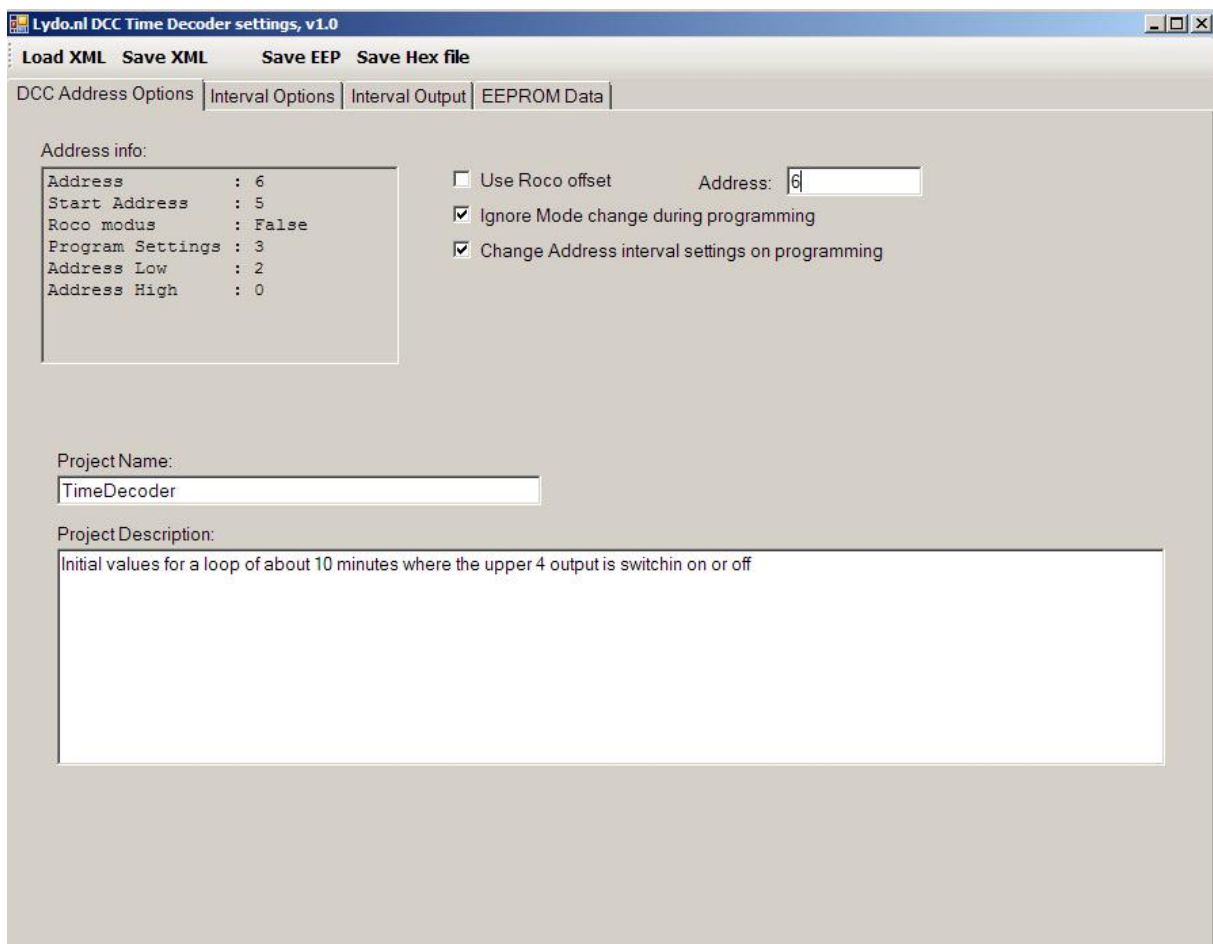


Lydo DCC Time Decoder

As an addition to the current firmware for the Lydo DIY DCC Accesory decoder ([DIY DCC Accesory decoder. – Lydo](#) or [DIY DCC Accesory Decoder, Light – Lydo](#)), there is also a special firmware for creating your own logic when to switch an output on or off. This is called the TimeDecoder firmware

The settings are stored in the EEprom, but programming via DCC is very limited. So the windows .net application TimeDecoderSettings.exe can be used to create .eep files that can be used with a programmer.

This document will explain the working of the program, the possibilities and options.

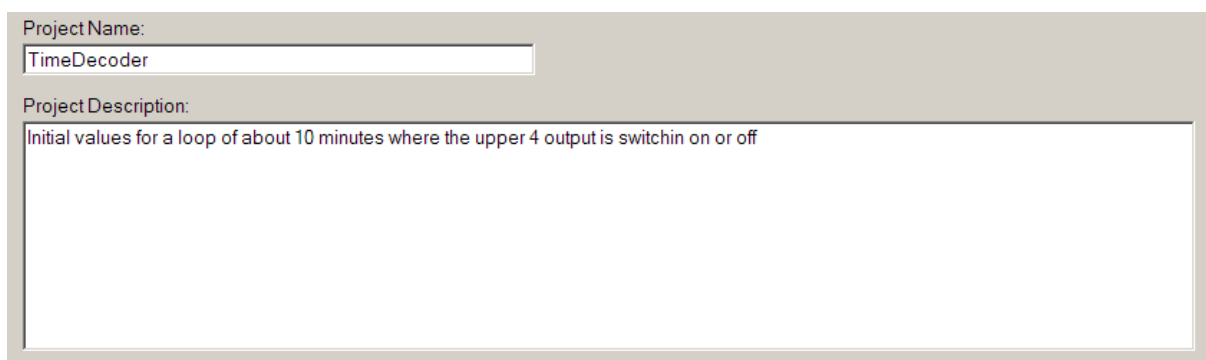


When the program is started we can see the different components:

- A toolbar with options to load or save settings and save the output files
- A tab for setting the DCC address options and providing project information
- A tab for setting the interval options
- A tab for setting the output per interval
- An info tab for showing the calculated EEprom data.

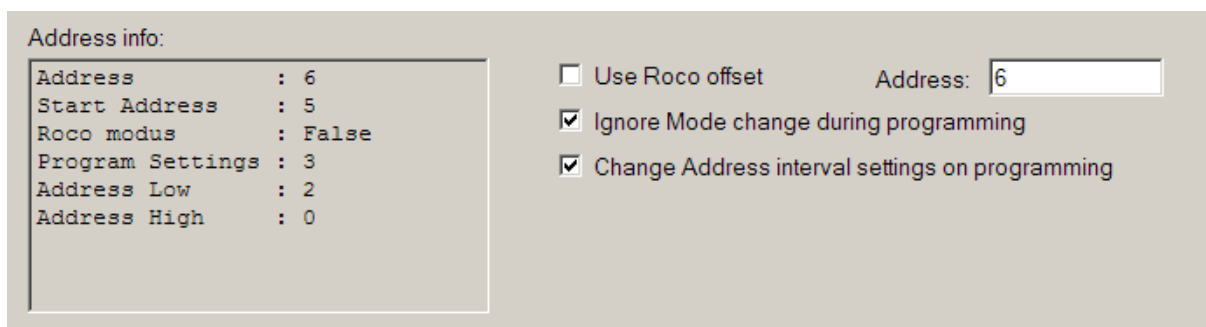
DCC Address Options

Although it is not required, for administration purposes a project name (which also defines default output files) and description can be filled in.



The screenshot shows a configuration window with two main sections. The first section is labeled "Project Name:" and contains a text input field with the value "TimeDecoder". The second section is labeled "Project Description:" and contains a larger text area with the text "Initial values for a loop of about 10 minutes where the upper 4 output is switchin on or off".

When an address is filled in, it will determine the base address (addresses are clustered per 4). There is an option to take the Roco offset into account as well.



The screenshot shows a configuration window with two main sections. The first section is labeled "Address info:" and contains a table of settings:

| | |
|------------------|---------|
| Address | : 6 |
| Start Address | : 5 |
| Roco modus | : False |
| Program Settings | : 3 |
| Address Low | : 2 |
| Address High | : 0 |

The second section contains three checkboxes and an "Address:" input field. The "Address:" field has the value "6". The checkboxes are:

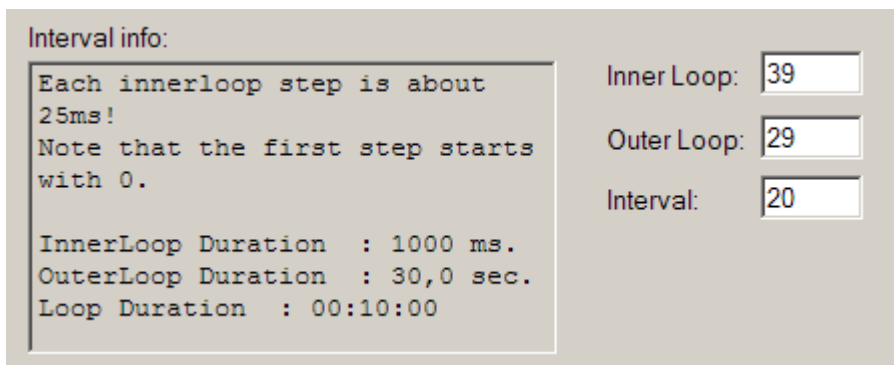
- Use Roco offset
- Ignore Mode change during programming
- Change Address interval settings on programming

Note that addresses can later be changed via the programming button again. But the programming settings have effect on what it can change. In this case, we do not want to change the behavior of the decoder when a new address is programmed via the "Ignore Mode change" setting. For the other firmware this mode change is needed to change it's behavior, but here we would like to disable it.

Also we can set the option to change interval settings during programming. This is needed when we want to assign one address (out of the 4 of the base address) to use switch the decoder on or off. In this case, we can have 4 separate decoders with the same base address, all working independed.

Interval Options

The decoder works with an innerloop (each step takes about 25 milliseconds) and outerloop that determines the time of an interval. Note that there is an offset of 1 because the loopsteps start at 0. After each interval period, we will move to the next interval.



Interval info:

```
Each innerloop step is about 25ms!  
Note that the first step starts with 0.  
  
InnerLoop Duration : 1000 ms.  
OuterLoop Duration : 30,0 sec.  
Loop Duration : 00:10:00
```

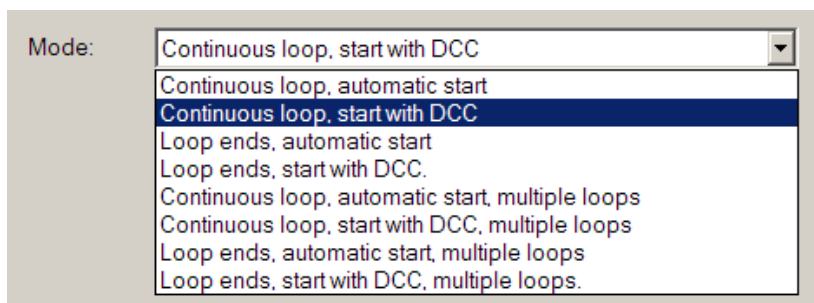
Inner Loop: 39
Outer Loop: 29
Interval: 20

On each interval period, the output is set to a new value. The amount of selected intervals (maximum 100) and interval period determine the total time for one loop.

In this example the total time is about 10 minutes in which we will see 20 different output configurations.

Via the mode setting, we can set the behavior of a loop:

We can set if we want to stop at the end of the last interval or run continuously in a loop. We can also set if the decoder starts automatically or only with a DCC command.



Mode:

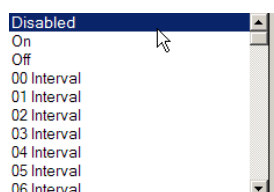
- Continuous loop, start with DCC
- Continuous loop, automatic start
- Continuous loop, start with DCC
- Loop ends, automatic start
- Loop ends, start with DCC.
- Continuous loop, automatic start, multiple loops
- Continuous loop, start with DCC, multiple loops
- Loop ends, automatic start, multiple loops
- Loop ends, start with DCC, multiple loops.

The last 4 options are for using multiple loops.

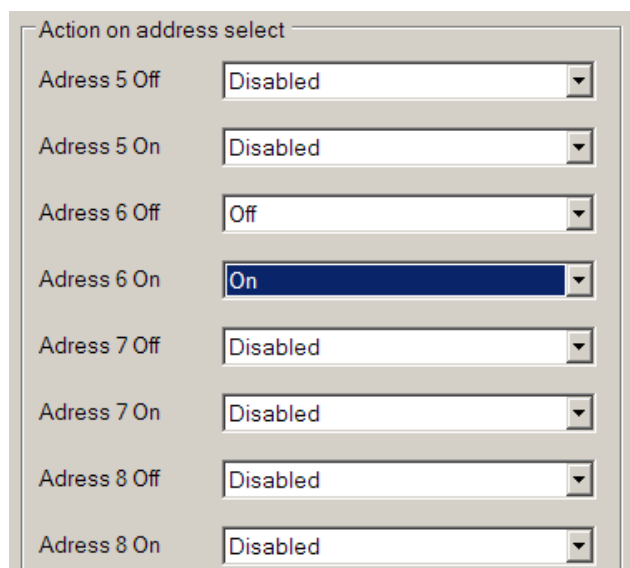
When the interval size is set to 20, we have space for 5 loops (max 100 intervals). In this mode, it is possible to start a different loop (and therefore output) with a DCC command.

We can also set the behavior of for each command within the set base address. Note that setting the "Change address interval settings on programming" option in the previous tab, would result in a setting like this. Only one address has the option on or off, all others are disabled.

Note that the actions do not only contain on/off/disabled but also a setting for each interval (0 to 99). This way we can set via DCC to start at a specific interval of a provided loop. Or (when multiple loops are used) start at another loop.



- Disabled
- On
- Off
- 00 Interval
- 01 Interval
- 02 Interval
- 03 Interval
- 04 Interval
- 05 Interval
- 06 Interval



Action on address select

| | |
|--------------|----------|
| Adress 5 Off | Disabled |
| Adress 5 On | Disabled |
| Adress 6 Off | Off |
| Adress 6 On | On |
| Adress 7 Off | Disabled |
| Adress 7 On | Disabled |
| Adress 8 Off | Disabled |
| Adress 8 On | Disabled |

Interval Settings

Here we can see the output for the different intervals:

| | Interval Nr. | O7 | O6 | O5 | O4 | O3 | O2 | O1 | O0 | Value |
|---|--------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-----------|
| ▶ | 0 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 015, 0x0F |
| | 1 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 031, 0x1F |
| | 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 159, 0x9F |
| | 3 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 191, 0xBF |
| | 4 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 175, 0xAF |
| | 5 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 047, 0x2F |
| | 6 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 111, 0x6F |
| | 7 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 127, 0x7F |
| | 8 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 127, 0x7F |
| | 9 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 255, 0xFF |
| | 10 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 127, 0x7F |
| | 11 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 095, 0x5F |
| | 12 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 031, 0x1F |
| | 13 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 015, 0x0F |
| | 14 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 079, 0x4F |
| | 15 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 111, 0x6F |
| | 16 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 127, 0x7F |
| | 17 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 063, 0x3F |
| | 18 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 047, 0x2F |
| | 19 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 015, 0x0F |

This example will result in a loop where Output 0-3 are always on and O4-7 are on or off at different times.

Note that we can select multiple cells and set them at the same time with the space bar.

