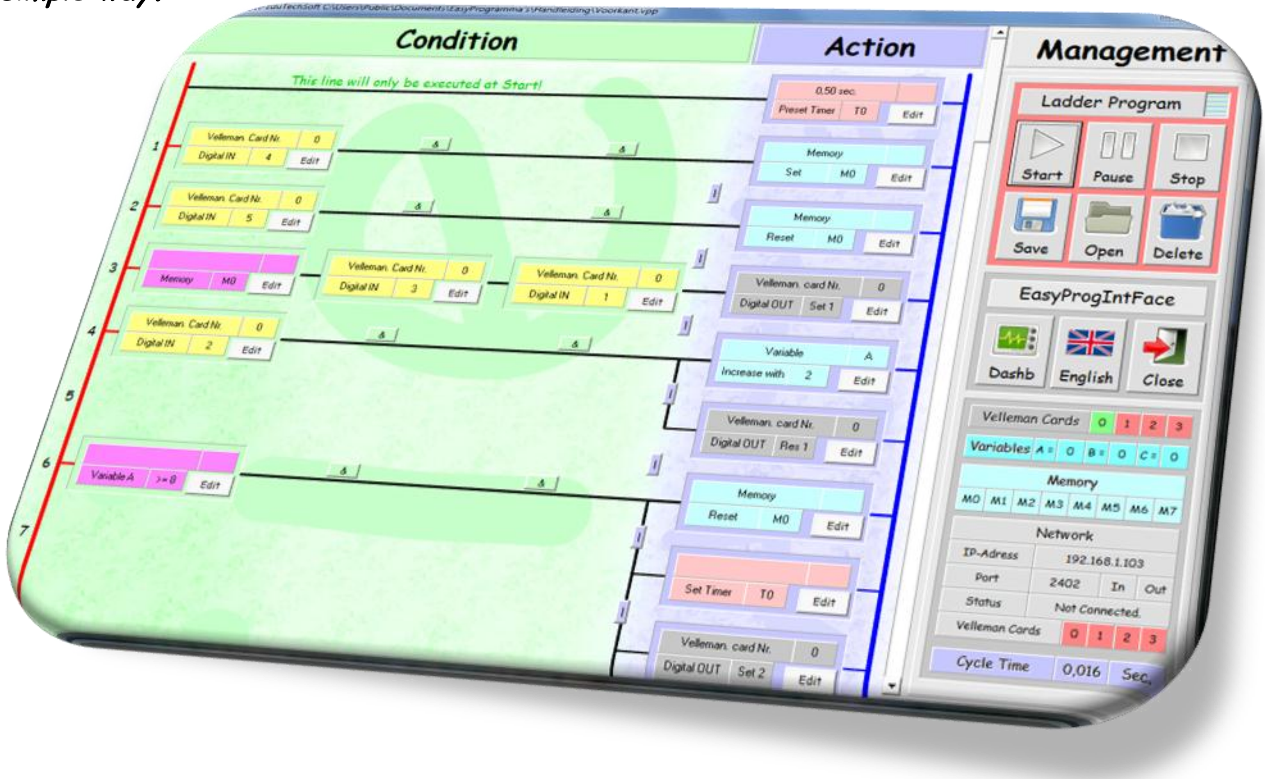
EasyProgIntFace

Using this utility, you can program the K8055 and/or the parallel interface in a simple way.



This line will only be executed at Start!

IP-Adress 192.168.1.103

Port 2402 In Out

Status Not Connected

Cycle Time 0,016 Sec.

Conditions:

Inputs Digital 1 – 5.
Inputs Analog A1 - A2 0 – 255
The inputs can be read via a network.
Each desired time per day selectable.
Timers. 0 – 7.
Memory 0 – 7.
Function-keys F1 – F8.
Variables A, B or C from 0 to 255.

Actions:

Output Digital 1 – 8.
Output Analog A1 - A2 0 - 255.
The outputs can be controlled via a network.
Preset Timers from 0,01 seconds up to 1 minute.
Set or Reset Timers.
Set or Reset Memory 0 – 7.
Set, Increase or Decrease variables A, B of C.
Sound *.WAV takes place by means of the sound card.
Some sounds are copied with the installation.

Educatieve
Technische
Software

EduTechSoft.nl

Translation checked and edited by G. Schuit.

De Meerwaarde
Geloof in elk Talent!

Contents

1. Introduction to the interface.

An interface converts or translates commands or signals. Nowadays when you want to copy a file you don't have to type commands. You can use your mouse to do so. Here the interface is Windows, it converts your mouse movements and clicks to a language the computer 'speaks'.

Another interface is the keyboard of your computer. It converts the buttons you push to electric signals the computer can understand.

The interface we are using in this manual also converts electrical signals. These signals are send and received from (output) and to (input) the computer.

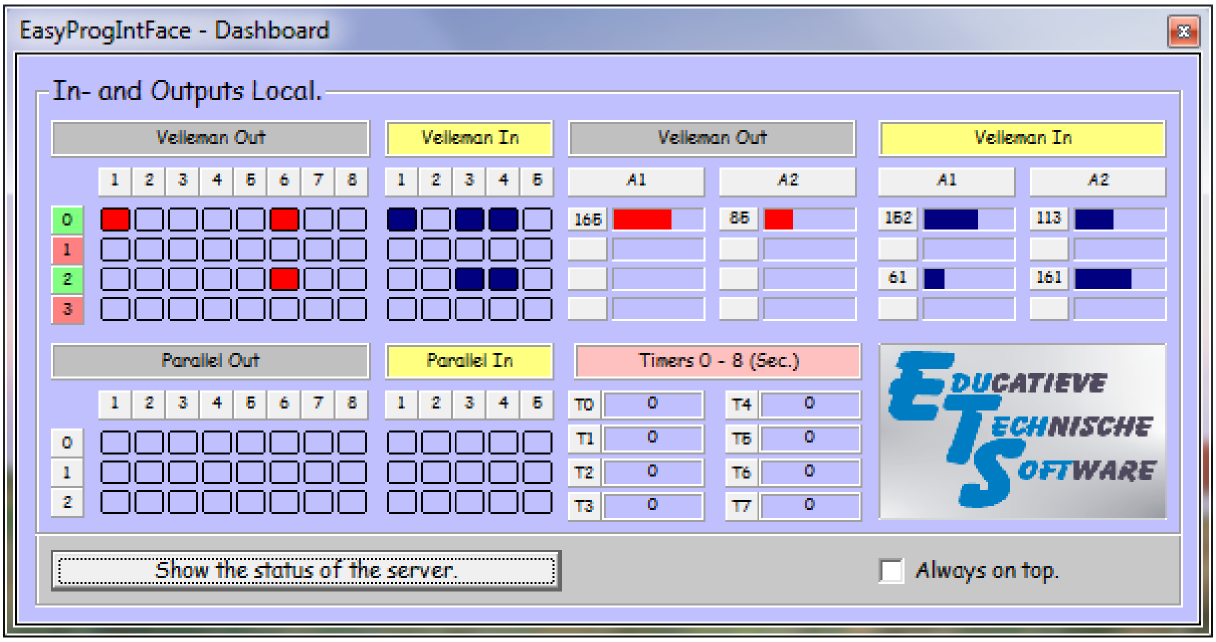
The outputs can be used to control lights, relays, valves or electric motors.

The inputs can be used to 'see' if circuits are closed, measure temperatures or light.

In this manual I use the Velleman K8055 interface card. You can connect to a maximum of 4 simultaneously to one computer. On the interface you can find…

- 5 push buttons.
- 2 analog inputs.
- 8 led's.
- 2 analog outputs.

The computer measures the values and these can be shown on the dashboard. These signals can also be used for programming. The picture below is the dashboard, it shows that…



- Digital outputs 1 and 6 of card 0 are true.
- Digital output 6 of card 2 is true.
- Digital inputs 1, 3 and 4 of card 0 are true.
- Digital inputs 3 and 4 of card 2 are true.
- Analog output A1 is 165 and analog output A2 is 85.
- Analog input A1 is 182 and analog input A2 is 113.
- Analog input of card 2 A1 is 61 and analog input A2 is 161.

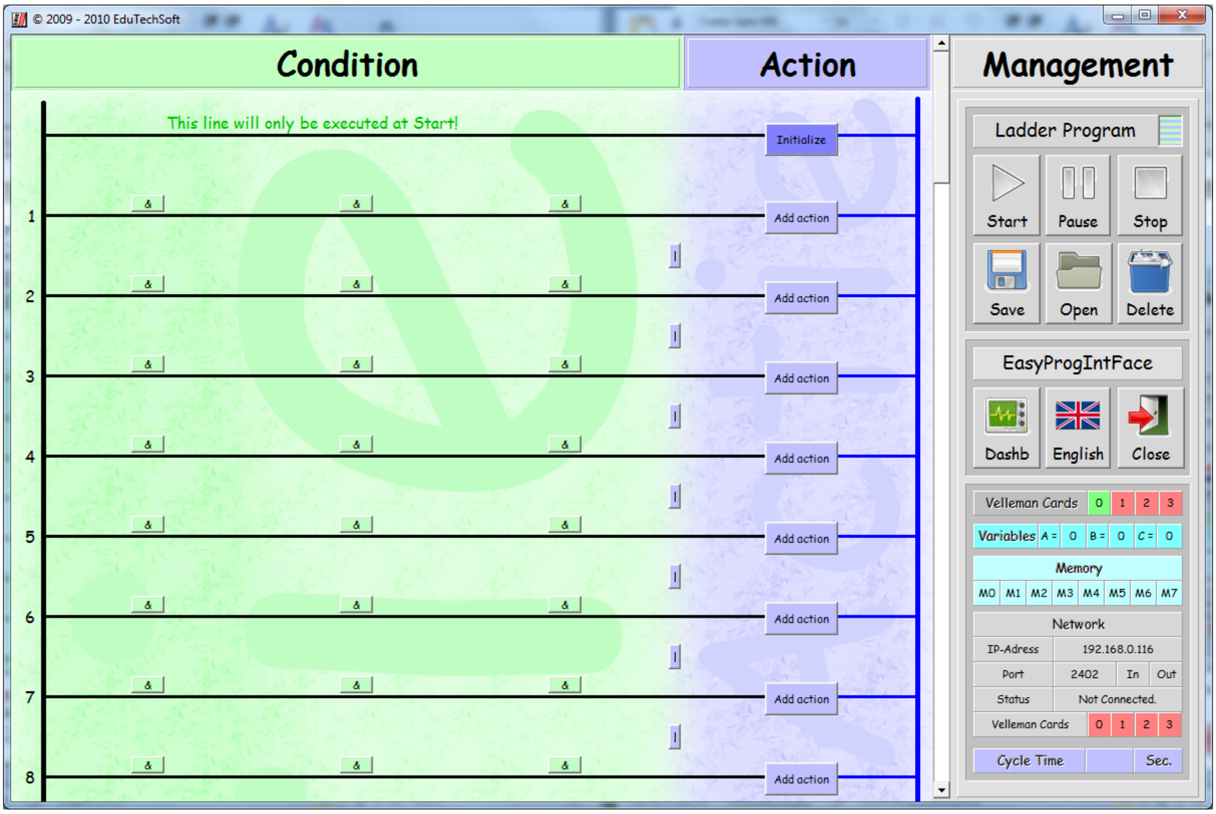
In the next paragraph you will learn how to use these values.

2. To Program.

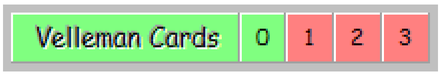
2.1 Digital Input and Output, Set and Reset...

After installation the program can be started by means of the start menu.

The picture below appears after starting the program.



If one or more Velleman cards are connected (K8055 or VM110), the connected cards should appear green in the window right at the right hand bottom of the screen.



In this case 1 card has been found. (Card 0.)

It's also possible to connect 3 parallel port interfaces. However I can't detect if they are connected.

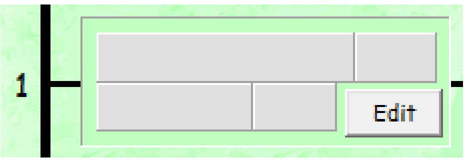
The main screen is divided in 3 columns.

Condition	Action	Program Management
Conditions (situations) are placed here. These can be True or False.	Actions that will take place when conditions are true are placed here.	For controlling the program, The settings of the conditions The settings of the actions.

By means of an example however it will become clear.

Click in the green part above, beside line 1 on &.

A condition field is then presented, as you see here. →

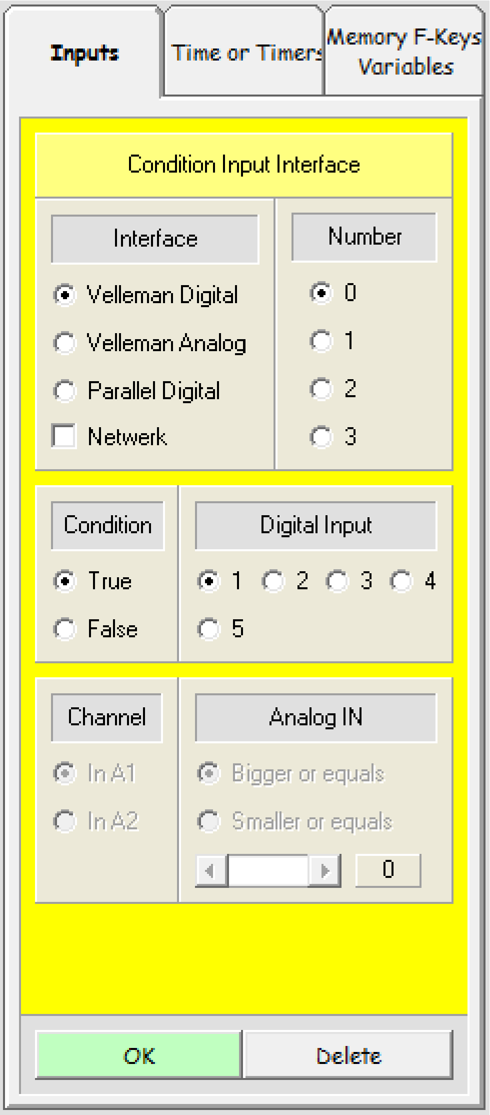


1

Edit

Click on the Edit button.

On the right side of the screen the **edit condition window** appears. You can simply adapt the condition.



Inputs | Time or Timers | Memory F-Keys Variables

Condition Input Interface

Interface
- ● Velleman Digital
- ○ Velleman Analog
- ○ Parallel Digital
- □ Netwerk

Number
- ● 0
- ○ 1
- ○ 2
- ○ 3

Condition
- ● True
- ○ False

Digital Input
- ● 1 ○ 2 ○ 3 ○ 4
- ○ 5

Channel
- ● In A1
- ○ In A2

Analog IN
- ● Bigger or equals
- ○ Smaller or equals
- 0

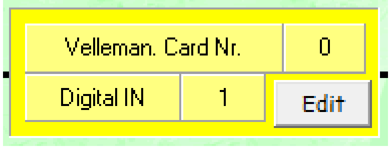
OK | Delete

At this moment the condition is…

- **Velleman digital input,**
- **Card number 0**,
- **When true,**
- **Input 1**.

When your Velleman card is on another number, you can simply edit the number by clicking and selecting the desired number under Number. (0…3)

Click OK in this window and your first condition has been programmed.



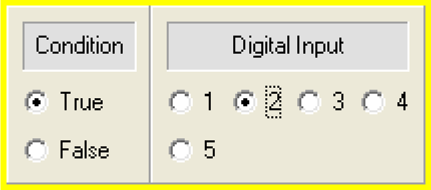
Velleman. Card Nr.	0	
Digital IN	1	Edit

The programmed condition is shown simplified in the condition field.

In words the condition is: **when of Velleman card 0, input 1 is served… (If it's True…)**

We will continue introducing another condition.

Click in line 2 & on the left side.



Condition
- ● True
- ○ False

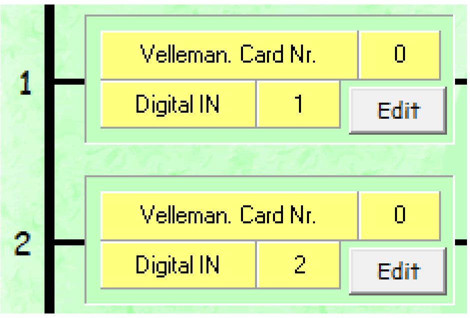
Digital Input
- ○ 1 ● 2 ○ 3 ○ 4
- ○ 5

Click Edit afterwards and only change the **Digital input number**.

The digital input number is set on **1**. Change this in **2**.

Click OK afterwards.

On the screen the conditions should be set like shown in the window here. →



1

Velleman. Card Nr.	0	
Digital IN	1	Edit

2

Velleman. Card Nr.	0	
Digital IN	2	Edit

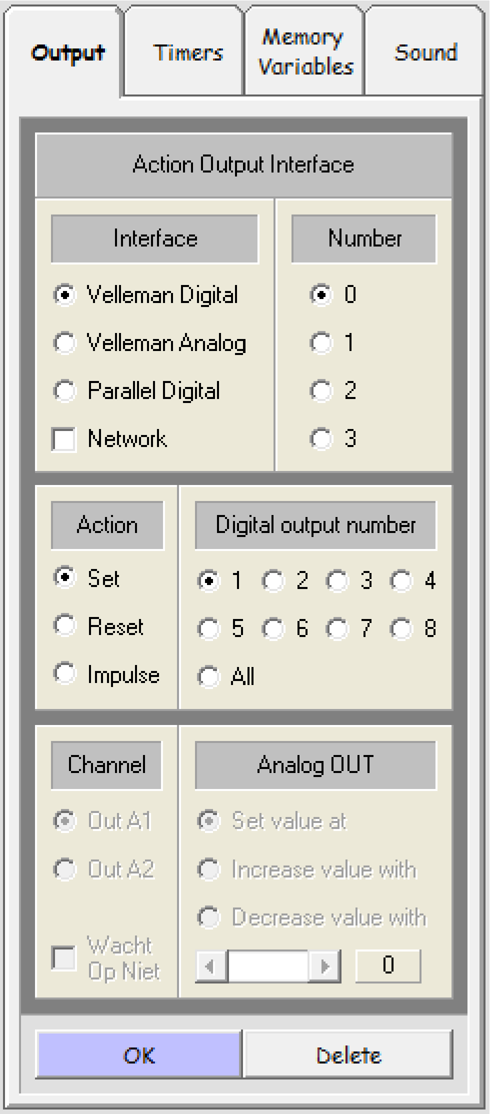
The conditions are ready. We can now indicate what has to be done when the condition is met. In other words when it is **TRUE**.

The introduction of the action happens in the blue action column..

Click on line 1 in the blue part on the button Add action.

Click in the action field on the button Edit.

On the right side of the screen you can indicate what must happen when **Input 1** of the Velleman card number 0 is true.



Interface: ● Velleman Digital ○ Velleman Analog ○ Parallel Digital □ Network

Number: ● 0 ○ 1 ○ 2 ○ 3

Action: ● Set ○ Reset ○ Impulse

Digital output number: ● 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ All

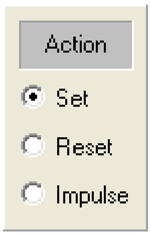
When you have set your Velleman card to number 0 you can leave the settings as they are.

Set 1 indicates that output 1 will be put on.

Click OK.

Add another action at line 2, by clicking the button

Add action followed by the Edit button

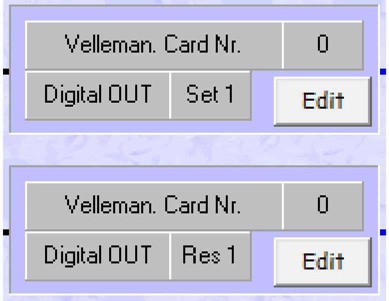


Action: ● Set ○ Reset ○ Impulse

Here you have to make some changes. Select **Reset** in the window under **Action**. The number of the output remains on 1. **Reset 1** indicates that output 1 will be put off.

Click OK.

The program is ready now.



Velleman. Card Nr.	0	
Digital OUT	Set 1	Edit
Velleman. Card Nr.	0	
Digital OUT	Res 1	Edit

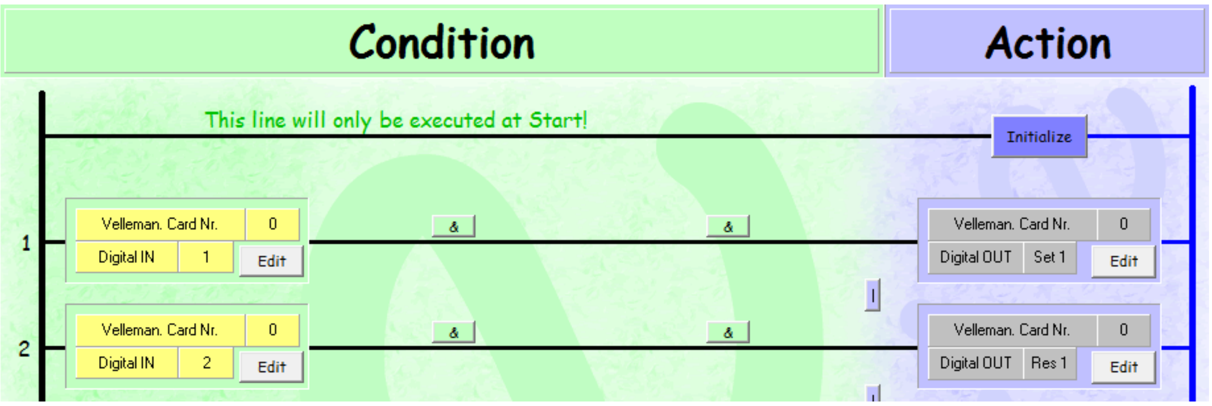
In the action column lines 1 and 2 should be set like shown in the window on the left.

Both actions are indicated in a simplified way in the window.

What the program does is indicated in the table below.

Line	Condition	Action
1	If input 1 of the Velleman card 0 is true then...➔	Put on output 1 of the Velleman card 0.
2	If input 2 of the Velleman card 0 is true then...➔	Put off output 1 of the Velleman card 0.

Below you see the program the way it should be on your screen.



If this is the case your program can be started.

To start the program click Start.

The left vertical line becomes red now and indicates a voltage. If there are no conditions the horizontal lines become red as well.

Line 1 and 2 are red, till the drawn condition and will only be red on the right side of it when the condition is true

When the program runs a simple animation ▤ is shown on the screen.

- ✓ Push the button of input 1 of the interface and output 1 will be Set. (Put on)
- ✓ Push the button of input 2 of the interface and output 1 will be Reset. (Put off)

The red lines indicate that a condition is true.

When you press both buttons simultaneously, the output is Set and Reset rapidly. It will look like a reduced light.

Click Stop to end your program.

The ladder program can be easily changed. We will start changing this program.

Click Edit in line 1 in the condition field.

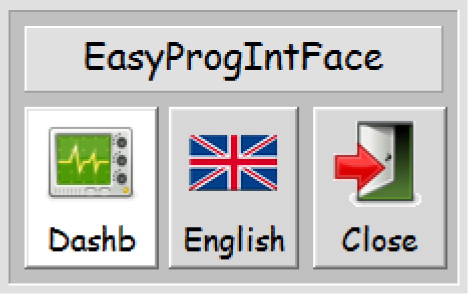
Set the input number on 5 and click OK afterwards.

- ✓ Click **Start** and check that output 1 is now only set when input 5 is being served.
- ✓ Click **Stop** to end running your program.

2.2 The dashboard.

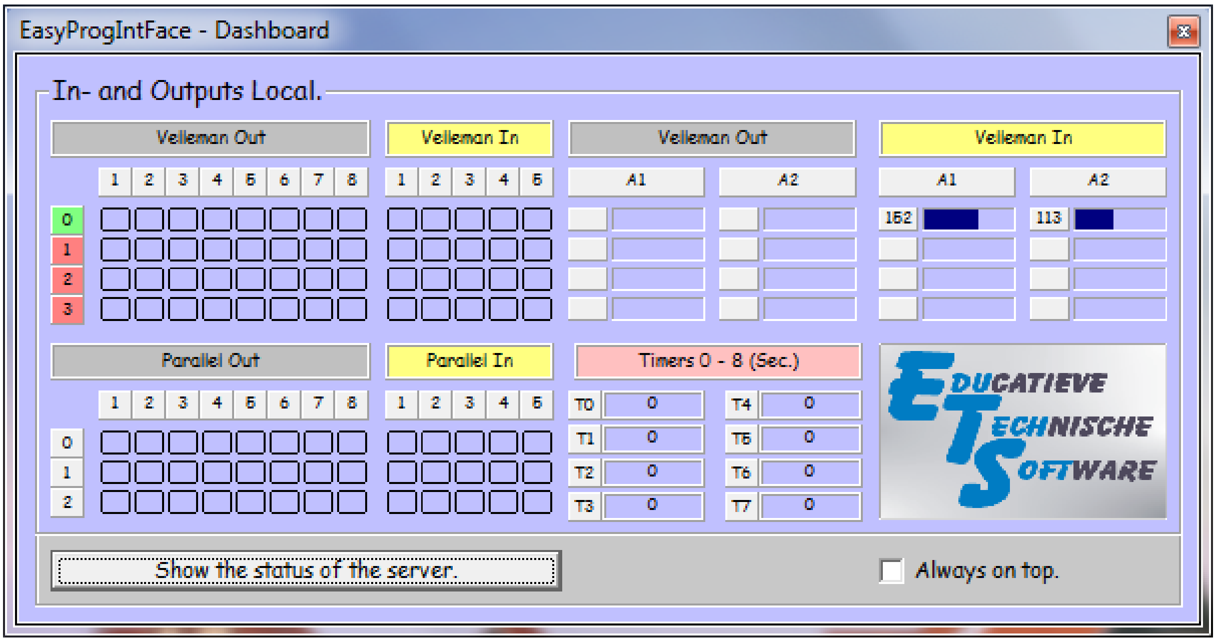
The dashboard shows you the status of the inputs and outputs on screen.

- ✓ To see it click the button **Dashb** as you can see in the window on the right.



On screen the dashboard is shown.

- ✓ Click **Start** and check that output 1 is not only set on the interface but also on screen when input 5 is being served.
  You can also see if a button is being served.
- ✓ Set and reset output 1 by pushing button 2 and 5 several times and see it works.



When ☑ Always on top. is enabled, the dashboard will be visible even if another program is started. To hide the dashboard click **Dashb** again.

- ✓ Hide the dashboard.
- ✓ Click **Stop** to end running your program.

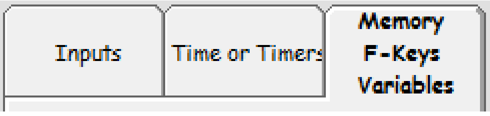
2.3 Function keys as a condition, Impulse relays.

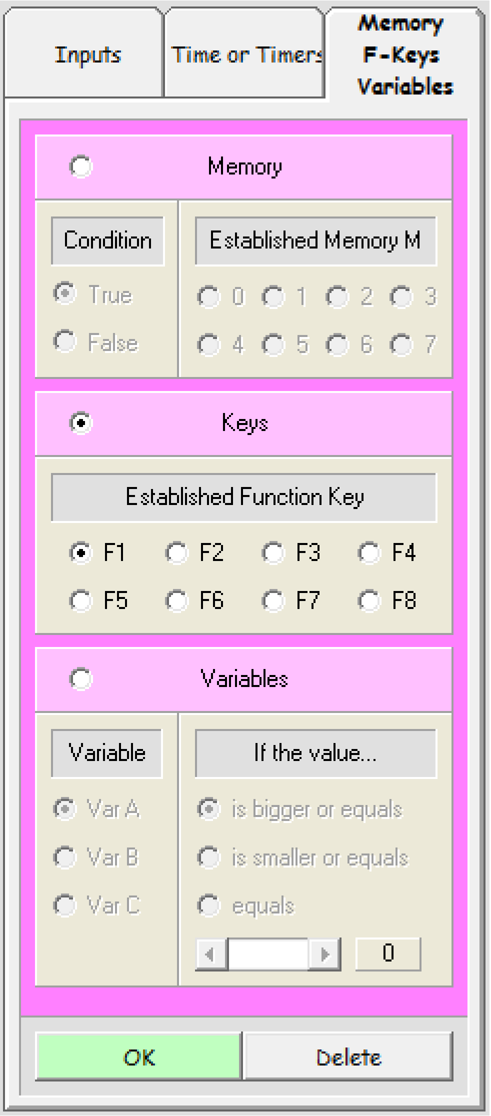
We will add another condition

Click & in **line 3** on the left side and after that click the Edit button.

We want output 8 to be Set and Reset by pushing Function Key 1 (F1)

To do so click on the tab **Memory F-keys Variables**, like shown below.





○ Memory

Condition	Established Memory M
● True	○ 0 ○ 1 ○ 2 ○ 3
○ False	○ 4 ○ 5 ○ 6 ○ 7

● Keys

Established Function Key

● F1 ○ F2 ○ F3 ○ F4
○ F5 ○ F6 ○ F7 ○ F8

○ Variables

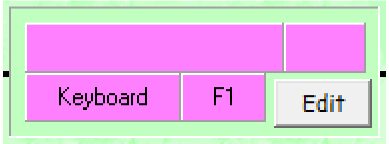
Variable	If the value...
● Var A	● is bigger or equals
○ Var B	○ is smaller or equals
○ Var C	○ equals
	0

In this window first select

● Keys

The F1 key is now automatically selected.
If desired you can select another key.

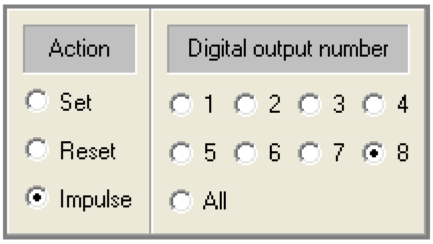
Click OK and the condition is programmed and should look like shown here below.



Click Add action in line 3 of the blue part.

Click Edit in the action field.

Change the settings like shown below

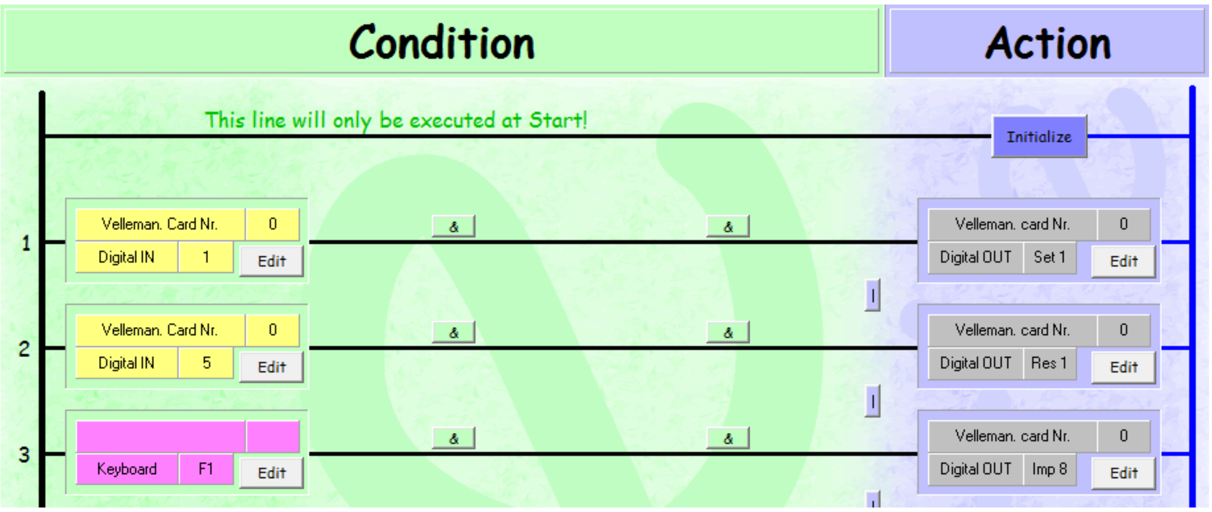


Action	Digital output number
○ Set	○ 1 ○ 2 ○ 3 ○ 4
○ Reset	○ 5 ○ 6 ○ 7 ● 8
● Impulse	○ All

An impulse means that when the condition is true the output will be inverted.

- ✓ If output 8 is false, then it will become true.
- ✓ If output 8 is true, then it will become false.

On the next page you see the program as it is meant to be.



This line will only be executed at Start!

1: Velleman. Card Nr. 0, Digital IN 1 — Velleman. card Nr. 0, Digital OUT Set 1

2: Velleman. Card Nr. 0, Digital IN 5 — Velleman. card Nr. 0, Digital OUT Res 1

3: Keyboard F1 — Velleman. card Nr. 0, Digital OUT Imp 8

Click OK and then click Start.

- ✓ *Input 5 sets output 1.*
- ✓ *Input 2 resets output 1.*
- ✓ *F1 sets or resets output 8.*

Depending on your computer there is a maximum of function keys that can be pressed and read simultaneously. Generally speaking the maximum is four.

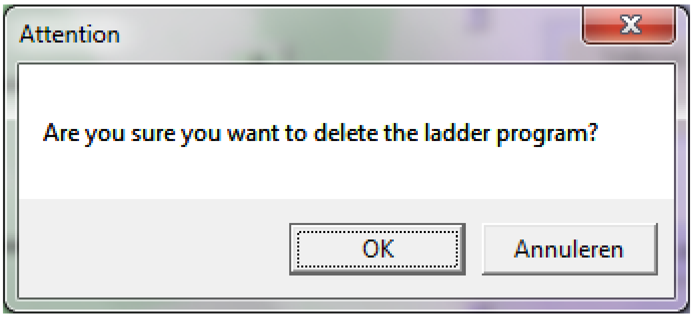
Stop the program.

Delete the program by clicking Delete.

Click OK in the window that appears and the program is deleted.

We delete the program to avoid that you get lost in the many possibilities that are offered.

In this program there is a maximum of 90 lines that can be programmed.
It will serve most uses.


Attention

Are you sure you want to delete the ladder program?

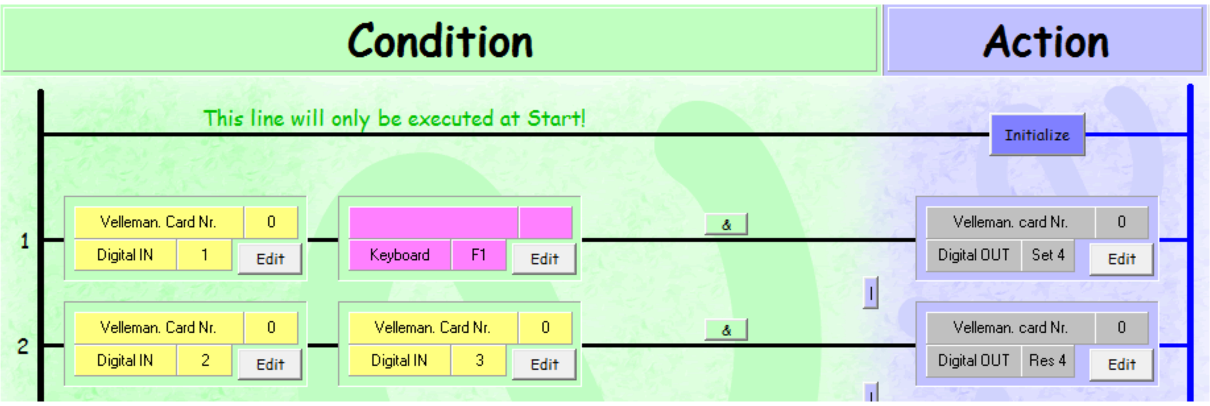
In an English version of Windows the word Annuleren will automatically be replaced by Cancel.

2.4 The AND function.

Often there is more than just one condition to fulfill before an action is allowed to be true. The AND function will be used for that. An AND function is programmed on one line.

In the next program Output 1 is only Set when Input 1 AND the Function key F1 are both true.

Set the actions and conditions on line 1 and 2 as shown below.



1:
Velleman. Card Nr. 0 · Digital IN 1
Keyboard F1
Velleman. card Nr. 0 · Digital OUT Set 4

2:
Velleman. Card Nr. 0 · Digital IN 2
Velleman. Card Nr. 0 · Digital IN 3
Velleman. card Nr. 0 · Digital OUT Res 4

When ready start the program.

- ✓ *Output 4 will only be Set when Input 1 AND F1 are true.*
- ✓ *Output 4 will only be Reset when Input 2 AND Input 3 are true.*

Test if both sentences are true!

Stop the program.

Delete the program by clicking Delete .

2.5 The NOT (True/False) function.

It is true that when you read this you're NOT sleeping. The word NOT means the opposite.

The opposite of Yes is No, the opposite of No is Yes.
In other words **Not Yes is No!**

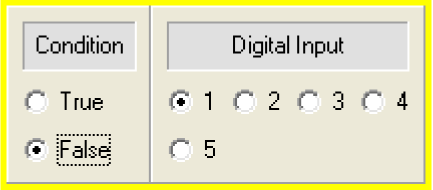
A machine can only be put on when you do **NOT** press the **STOP** button.

In this program the **NOT** is reflected by the words **True** or **False**.

Click & in the green part above beside line 1.

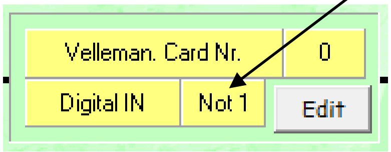
Click on the Edit button, so you can modify the condition.

In the **edit condition window** you can select **True** of **False** as you can see in the window on the right.
Click **False**. In the condition field you can see that the word **Not** appears before the input number.



Condition
○ True
● False

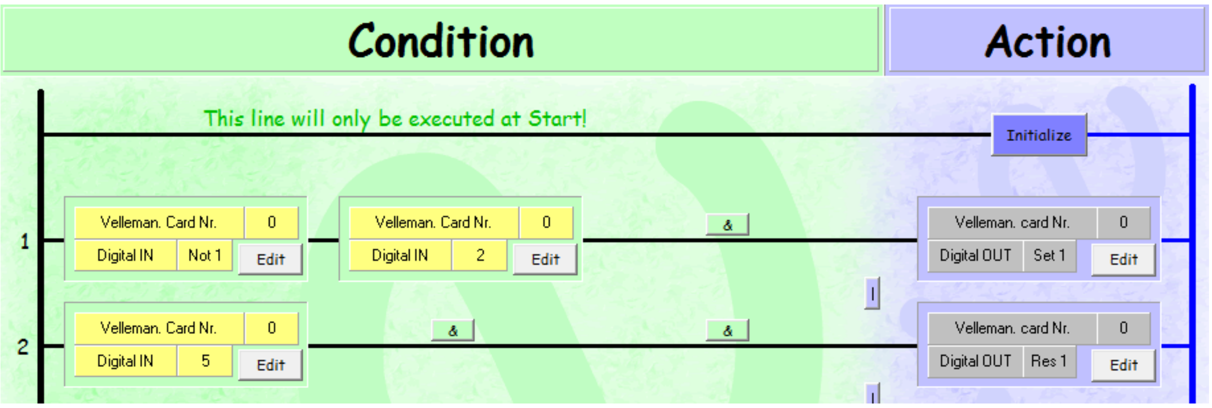
Digital Input
● 1 ○ 2 ○ 3 ○ 4
○ 5



Velleman. Card Nr. 0
Digital IN Not 1

So you can easily see that the condition is **NOT INPUT 1**.

Finish the program by making the conditions and actions as indicated below.



Condition | Action

This line will only be executed at Start!

1
Velleman. Card Nr. 0 — Digital IN Not 1 — Edit
Velleman. Card Nr. 0 — Digital IN 2 — Edit
&
Velleman. card Nr. 0 — Digital OUT Set 1 — Edit

2
Velleman. Card Nr. 0 — Digital IN 5 — Edit
&
&
Velleman. card Nr. 0 — Digital OUT Res 1 — Edit

Start the program.

- ✓ *Output 1 cannot be set as long as Input 1 is true.*
- ✓ *Output 1 can only be set when Input 1 is NOT true.*

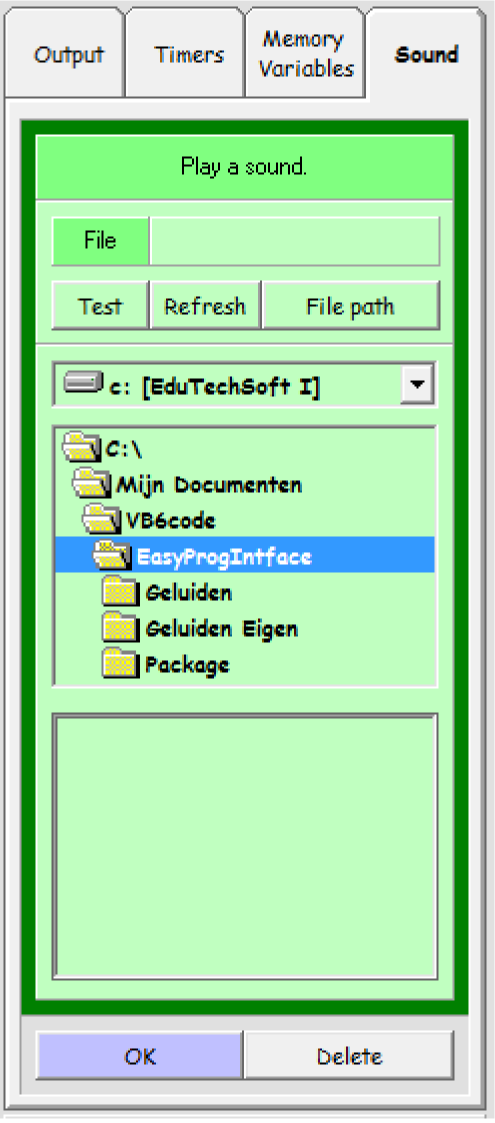
Stop the program.

Delete the program by clicking Delete .

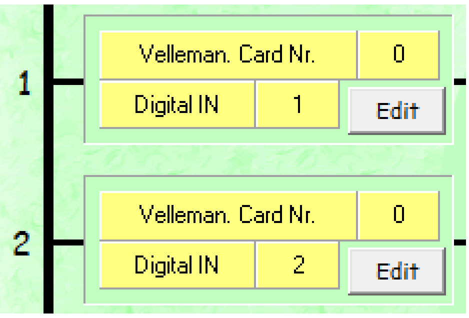
2.6 Play Sound.

With sounds you can easily get attention if necessary. Most of the time a siren means alarm. You can connect a siren at the output of the interface using a relay.

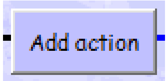
The sounds we're using here are played by the soundcard of your computer. You'll have to make sure that the speakers or headphones are connected.



Set the conditions at line 1 and 2 as shown below.

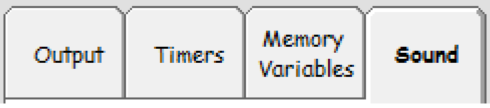


1	Velleman. Card Nr.	0
	Digital IN	1
2	Velleman. Card Nr.	0
	Digital IN	2

Click  at line 1 in the blue area.

Click the button in the action field.

Then select the tab **Sound**.

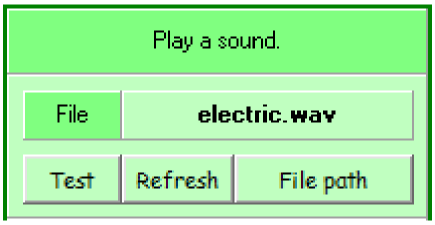


The tab page **Sound** is shown. Here you can select another drive, but now it's not necessary to do so.

The folder that is selected is the folder where the program was started.

Select the folder **Geluiden** (Dutch for sounds) by double clicking it. Then select one of the underlaying folders. (for example **Effecten**)

In the bottom window there should be a list of sound files. Only sound files with the extension WAV[1] are shown.



File: **electric.wav**

Select one of the files in the lowest window by clicking it. That name is shown at the top of the window and in the action field.

You can play the sound by double clicking it or by clicking as you see on the left.

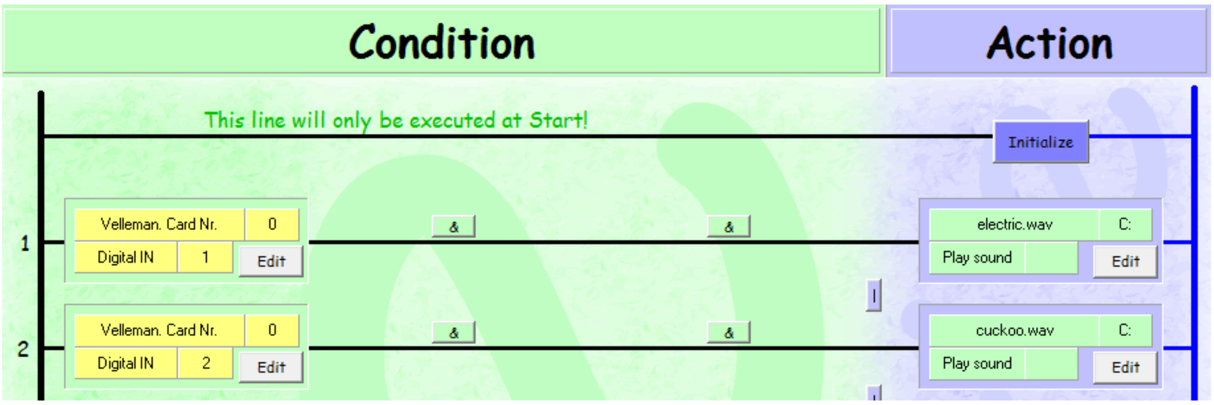
[1] .WAV & .MP3 & .PCM & .VOC are all extensions of music or sound files.
This program can only play .WAV files.

Don’t use this program as a media player, it’s not intended to be used like one.

Click OK to close the window.

Add another sound at line 2.

Your program should look a bit like the window shown below.



1 Velleman. Card Nr. 0 Digital IN 1 Edit — electric.wav C: Play sound Edit

2 Velleman. Card Nr. 0 Digital IN 2 Edit — cuckoo.wav C: Play sound Edit

Click Start and test the program.

- ✓ By pushing **Input 1** the selected sound of line 1 is played.
- ✓ By pushing **Input 2** the selected sound of line 2 is played.

Add two sounds at lines 3 and 4 that can be activated by the F5 and F6 function keys.

The sound shouldn’t be too long, otherwise the program will lose its speed.

Stop the program.

Delete the program by clicking Delete .

2.7 Analog output.

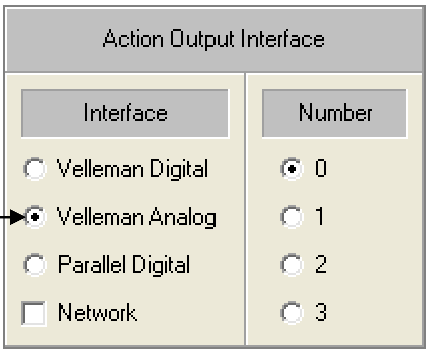
The USB Velleman cards have 2 analog inputs and outputs. In this chapter we'll find out how to use them. From now on there will only be a short and simplified description of what to do.

Set the next conditions in the condition field at line 1 and 2

Line 1: **Input 1** of the Velleman card.
Line 2: **Input 2** of the Velleman card.

Set the next action in the **action field** at line 1

"**Velleman Analog**", as you can see here.

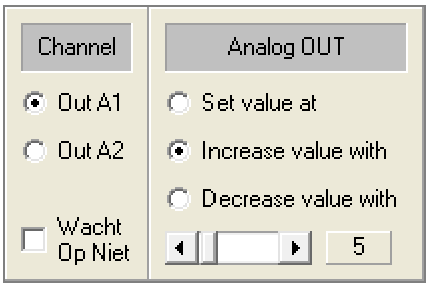


Action Output Interface

Interface	Number
○ Velleman Digital	● 0
● Velleman Analog	○ 1
○ Parallel Digital	○ 2
□ Network	○ 3

Then select in the window below…

"**Out A1**" (Out analog 1)
"**Increase value with**"
Use the scroll bar to set the value at **5**.



Channel	Analog OUT
● Out A1	○ Set value at
○ Out A2	● Increase value with
	○ Decrease value with
□ Wacht Op Niet	5

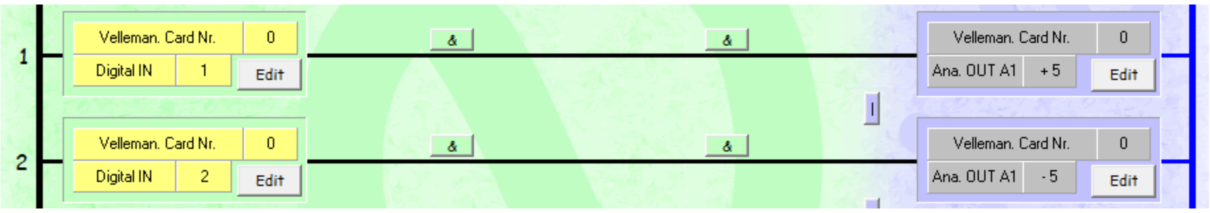
This action will have the following effect.
When the condition is True, the value on the analog output A1 will be increased by 5.

To set the analog output on a certain value you can use the option "**Set value at**" and set the desired value with the scroll bar.

Set the next action in the action field at line 2.

"**Velleman Analog**"
"**Out A1**"
"**Decrease value with**"
Use the scroll bar to set the value at **5**.

Below you can see the program as it is intended.



1 Velleman. Card Nr. 0 / Digital IN 1 Edit — & — & — Velleman. Card Nr. 0 / Ana. OUT A1 +5 Edit

2 Velleman. Card Nr. 0 / Digital IN 2 Edit — & — & — Velleman. Card Nr. 0 / Ana. OUT A1 -5 Edit

Start the program and have a look at what happens when you push the button of input 1. You may also push the button for some seconds.

As long as input 1 is true, with each cycle[2] the value at output A1 will be increased by 5, until a maximum of 255. You can see this by looking at the led-light PWM1 on the Velleman card, that will light up more and more intensely. By pushing button 2 you decrease the value.

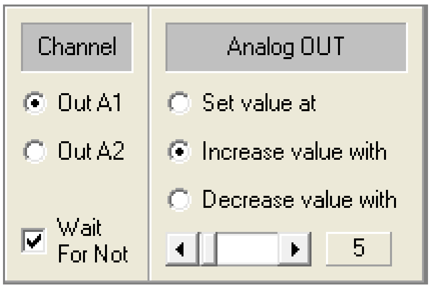
By pushing 1 and 2 simultaneously the value won't change because +5 and -5 make zero change.

The speed of a cycle depends on the speed of your computer and the time needed to communicate with the K8055. If it goes too fast or too slow you can always change the value of the step size. In this case increase and decrease 5.

[2] The program constantly runs from line 1 to 90. A cycle is one 1 to 90 run.

The speed of increasing or decreasing of the analog output is very dependent on the speed of the computer and eventually the speed of the network connection.

For this reason the option '**Wait for Not**' is available.



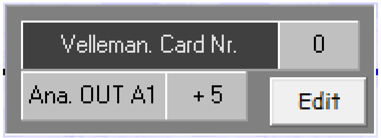
Channel	Analog OUT
● Out A1	○ Set value at
○ Out A2	● Increase value with
	○ Decrease value with
☑ Wait For Not	◀ ▶ 5

the program.

Edit the action in line 1 and 2.

In both lines mark '**Wait For Not**'.

In the action field the background is painted darker as you can see in the picture on the right.



Velleman. Card Nr.	0	
Ana. OUT A1	+ 5	Edit

By enabling 'Wait For Not' the increase will not go on continuously. Every cycle the program waits for the NOT of the associated condition.

Start the program and see what's happening when serving input 1. Even when you serve input 1 for a longer time, the analog value will increase only once

Input 1 has to be released before the increase of the value will take place.

2.8 Analog inputs.

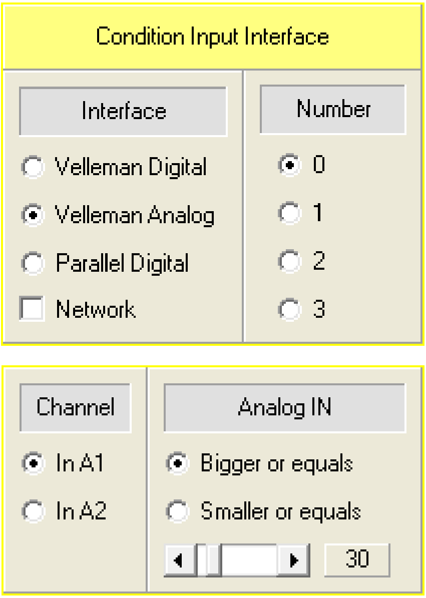
Set the next condition at line 3 of the condition field.

"**Velleman Analog**", as you can see here.

Then select in the window below…

"**In A1**"
"**Bigger or equals**"
Use the scroll bar to set the value at **30**.

This condition will have the following effect.
The condition is **True** when the value at the analog input A1 equals 30 or more.



Condition Input Interface

Interface	Number
○ Velleman Digital	● 0
● Velleman Analog	○ 1
○ Parallel Digital	○ 2
□ Network	○ 3

Channel	Analog IN
● In A1	● Bigger or equals
○ In A2	○ Smaller or equals
	30

Close the condition window.

Set the next condition at line 4 of the condition field.

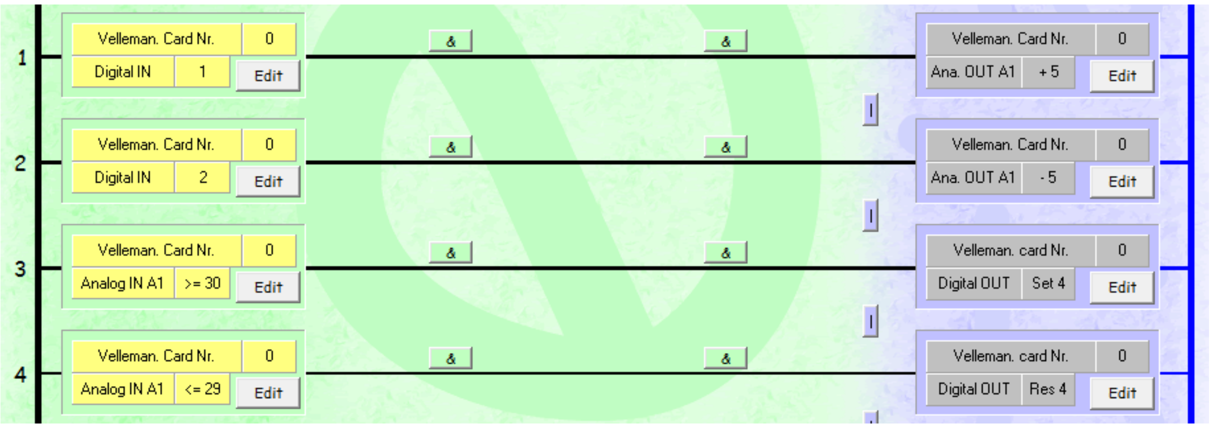
"**Velleman Analog**"
"**In A1**"
"**Smaller or equals**"

Use the scroll bar to set the value at **29**.

Set the next actions in the Action field.

Line 3: Set Output 4 of the Velleman card.
Line 4: Reset Output 4 of the Velleman card.

Compare your program with the program in the window below.



Line	Condition		Action	
1	Velleman. Card Nr. 0	Digital IN 1	Velleman. Card Nr. 0	Ana. OUT A1 + 5
2	Velleman. Card Nr. 0	Digital IN 2	Velleman. Card Nr. 0	Ana. OUT A1 - 5
3	Velleman. Card Nr. 0	Analog IN A1 >= 30	Velleman. card Nr. 0	Digital OUT Set 4
4	Velleman. Card Nr. 0	Analog IN A1 <= 29	Velleman. card Nr. 0	Digital OUT Res 4

Start the program and test if the following lines are true.

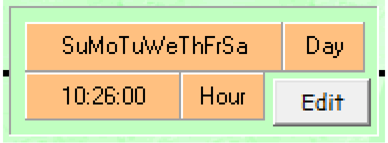
- ✓ *When the value of the analog input A1 equals or is bigger than 30, Output 1 of the Velleman card is Set (Line 3)*
- ✓ *When the value of the analog input A1 equals or is smaller than 29, Output 1 of the Velleman card is Reset. (Line 4)*

The value at the analog inputs can be adjusted with a small screw driver. Always ask the teacher how to adjust it.

Stop and delete the program after testing.

2.9 Time and Day's settings.

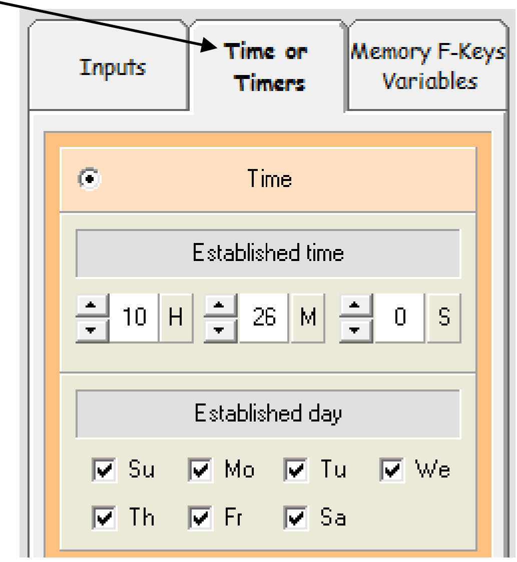
It is possible to use a day or a time of the week as a condition. When that condition is True it creates a pulse.



With this pulse you can activate all kinds of different actions.

At line 1 add a condition and then Click **Edit**.

Click the tab "**Time or Timers**", as shown here.



By using the spin buttons you can set the desired time. H = Hours, M = Minutes, S = Seconds.

In the window "**Established day**" you can select the days that will be used for the condition.

At this moment all days of the week are selected. Every day at 10:26:00 the condition will be **True** for a moment.

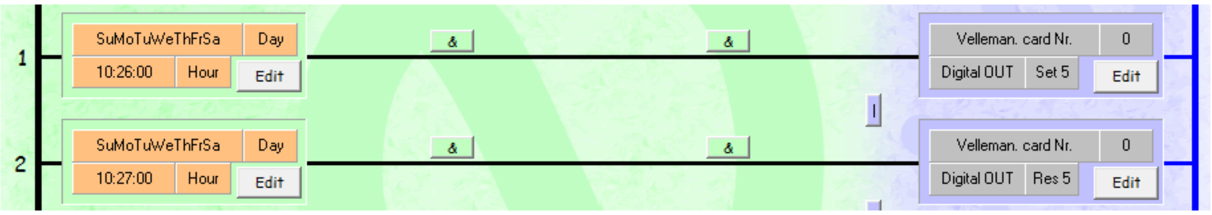
Set the time at the real time now + 5 minutes and close the condition window.

Add at line 2 a condition and then Click **Edit**.

Set the time at the time used in line 1 and add 6 minutes, then close the condition window.

Set the following action in line 1
Set Velleman Output 5.
Set the following action in line 2
Reset Velleman Output 5.

The program might look as the window shown below.



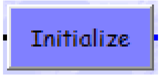
Start the program and check if it works as intended.

- ✓ When the time set in line 1 is true, Output 5 will be Set.
- ✓ When the time set in line 2 is true, Output 5 will be Reset.

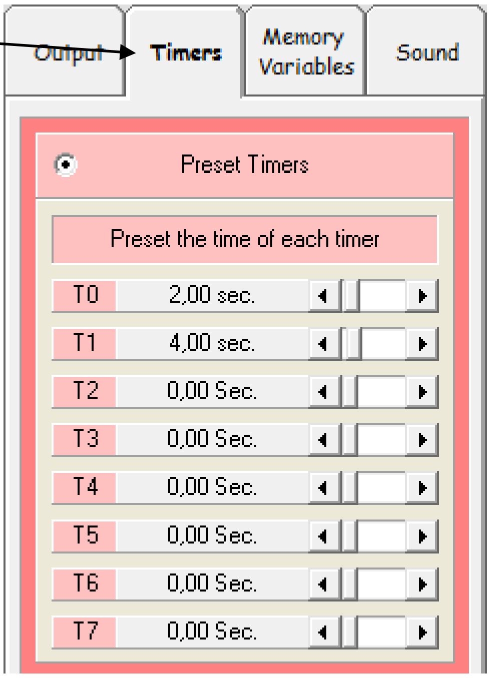
Usually you can open the clock in Windows by clicking the time at the right hand bottom of the screen.

2.10 Timers

Timers are being used for short returning time events. For example you can use it for flashing an output of the interface. The first line in de ladder diagram is intended to be used for setting the timers at desired times. The action set in this line will only be executed once if the program is started.

In the line at the top click  Initialize and then click Edit.

Click the tab **Timers** as shown here.



○ Preset Timers

Preset the time of each timer

T0	2,00 sec.
T1	4,00 sec.
T2	0,00 Sec.
T3	0,00 Sec.
T4	0,00 Sec.
T5	0,00 Sec.
T6	0,00 Sec.
T7	0,00 Sec.

Eight timers are available. With the scroll bar you can **Preset** each one.

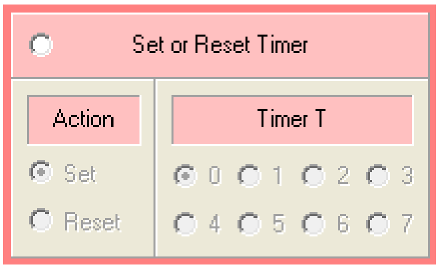
Set **T0** at **2 seconds**.
Set **T1** at **4 seconds**.

Close the window.

Add **F1** at line 3 as a condition.
Add **F2** at line 4 as a condition.
Add **F3** at line 5 as a condition.
Add **F4** at line 6 as a condition.

The function keys will be used to **Set** or **Reset** the timers.

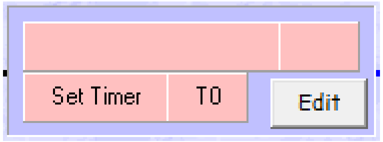
To do so, add an action in line 3 and select **timers**.



○ Set or Reset Timer

Action	Timer T
● Set	● 0 ○ 1 ○ 2 ○ 3
○ Reset	○ 4 ○ 5 ○ 6 ○ 7

Select "**Set of Reset Timer**"
Select "**Set**"
Select "**Timer T0**"

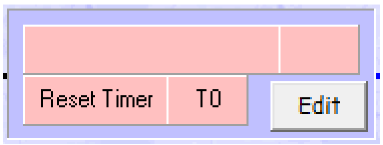


Set Timer T0

Close the action input window.

Add an action in line 4 and select **timers**.

Select "**Set of Reset Timer**"
Select "**Reset**"
Select "**Timer T0**"

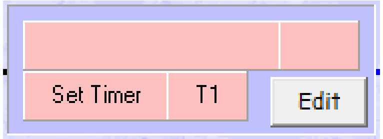


Reset Timer T0

Close the action input window.

Add an action in line 5 and select **timers**.

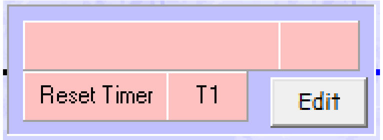
Select **"Set of Reset Timer"**
Select **"Set"**
Select **"Timer T1"**



Close the action input window.

Add an action in line 6 and select **timers**.

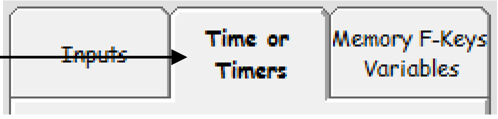
Select **"Set of Reset Timer"**
Select **"Reset"**
Select **"Timer T1"**



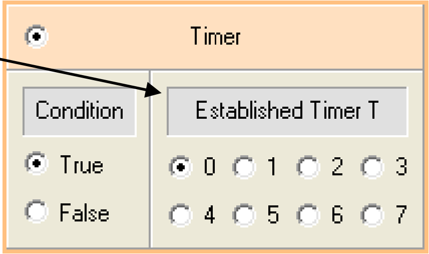
Close the action input window.

Finally we will indicate at lines 7 and 8 what the timers T1 and T2 should do.

Add a condition at line 7, edit it and set the tab to **Time or Timers**.

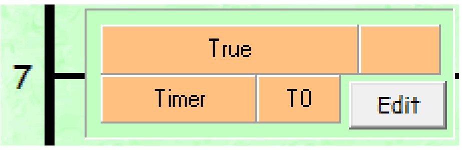


Set Timer 0 as shown here.



In this manner select **True** and **T0**.

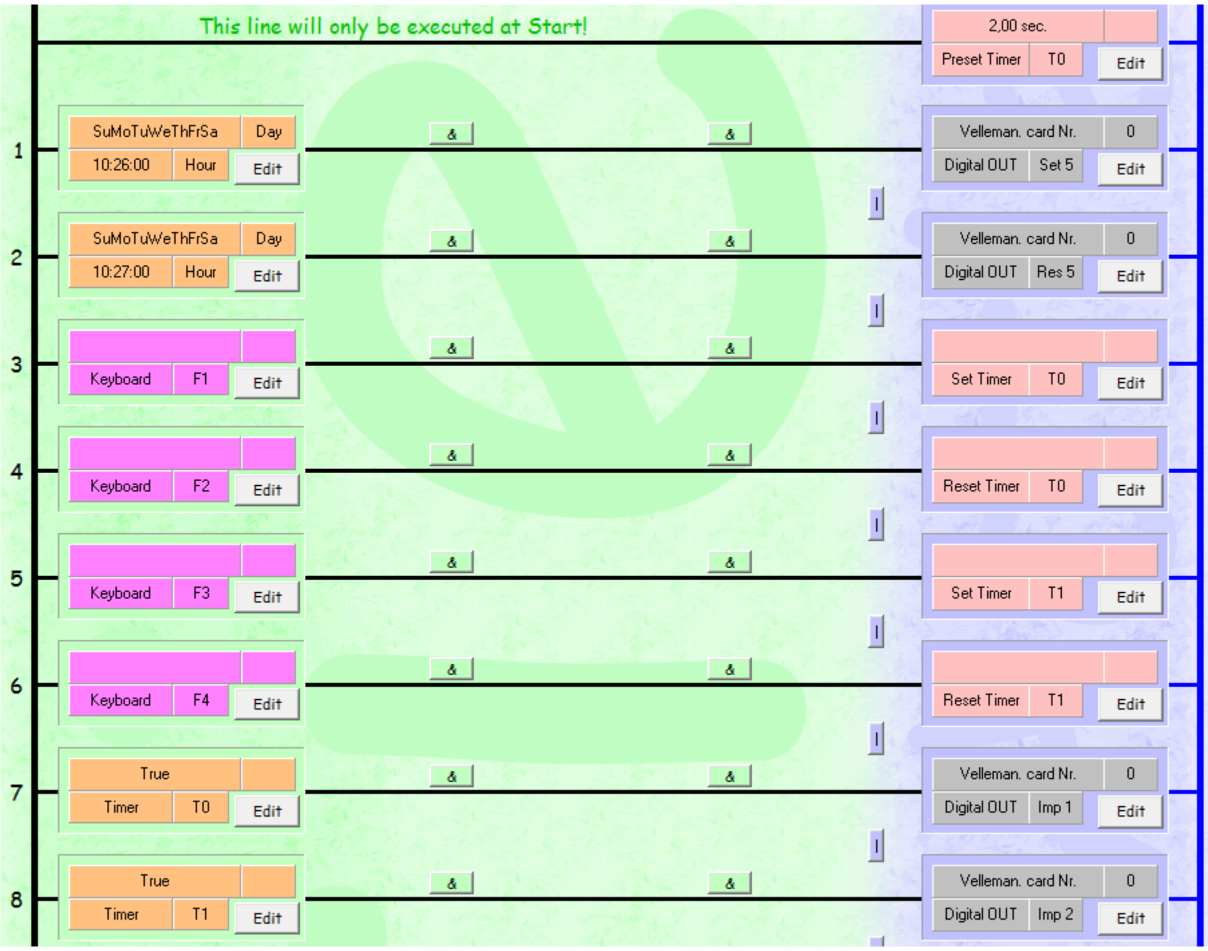
Close the edit condition window and the condition of line 7 should look as shown in the window below.



Add a condition at line 8 and set it like line 7, but now with the settings **True** and **T1**

Add an action on line 7 Velleman **Impulse output 1**.
Add an action on line 8 Velleman **Impulse output 2**.

Your program should look like the program on the next page.



	This line will only be executed at Start!			2,00 sec. Preset Timer T0 Edit
1	SuMoTuWeThFrSa Day 10:26:00 Hour Edit	&	&	Velleman. card Nr. 0 Digital OUT Set 5 Edit
2	SuMoTuWeThFrSa Day 10:27:00 Hour Edit	&	&	Velleman. card Nr. 0 Digital OUT Res 5 Edit
3	Keyboard F1 Edit	&	&	Set Timer T0 Edit
4	Keyboard F2 Edit	&	&	Reset Timer T0 Edit
5	Keyboard F3 Edit	&	&	Set Timer T1 Edit
6	Keyboard F4 Edit	&	&	Reset Timer T1 Edit
7	True Timer T0 Edit	&	&	Velleman. card Nr. 0 Digital OUT Imp 1 Edit
8	True Timer T1 Edit	&	&	Velleman. card Nr. 0 Digital OUT Imp 2 Edit

Start the program…

- ✓ *When you push F1 Timer 0 will be activated.*
  This timer will give a signal every 2 seconds.
  Because output 1 is set as impulse it will blink.
- ✓ *When you push F2 Timer 0 will be deactivated.*
- ✓ *When you push F3 Timer 1 will be activated.*
  This timer will give a signal every 4 seconds.
  Because output 2 is set as impulse it will blink.
- ✓ *When you push F4 Timer 1 will be deactivated.*
- ✓ *Because an impulse is used, the outputs will be set and reset every 4 en 8 seconds!*
  Pulses are generated every 2 and 4 seconds as you can see on the screen.

Lines 1 and 2 are still active. The selected time determines whether output 5 will be set or reset. You can double the speed of a Timer by using the same timer set to false.

Stop the program.

Delete the program by clicking Delete .

2.11 Variables.

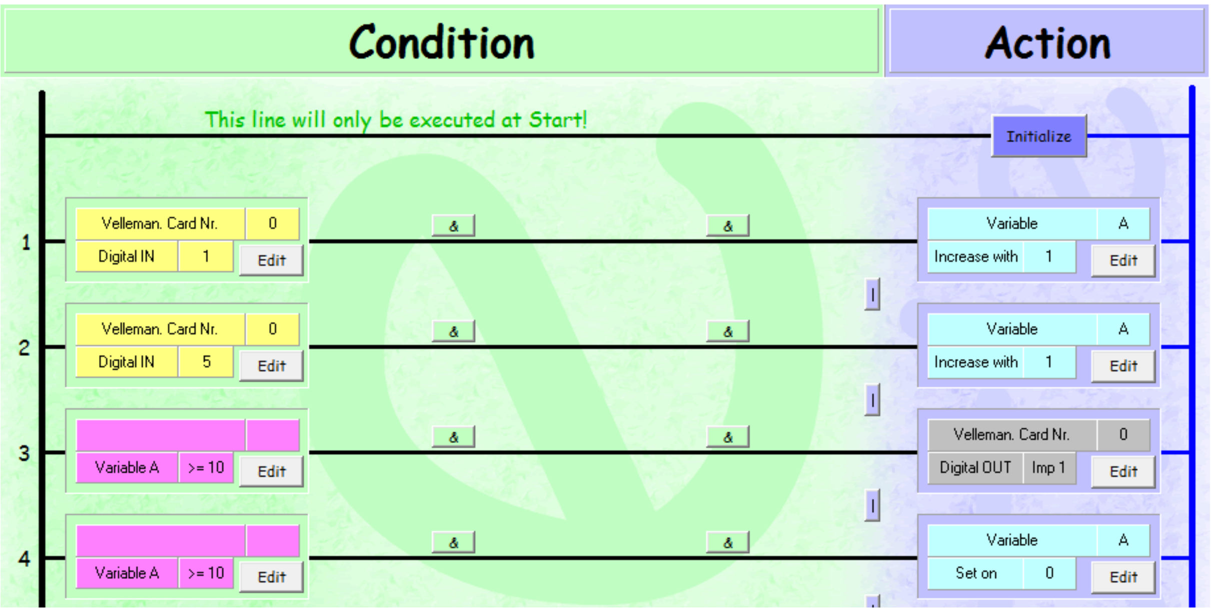
There are three variables available A, B and C. They can be set to a value from 0 to 1000. In the next program we will count how often the button of Input 1 is pushed. Every time the button is pushed and released variant A will be increased by 1.

After pushing 10 times, Output 1 is set by impulse and variant A is set to 0.

You can also see how an **OR** function is programmed.

I think you know enough of the program now to enter the program below without further explanation.

Good luck…



Condition | Action

This line will only be executed at Start! — Initialize

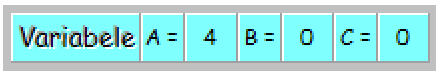
1: Velleman. Card Nr. 0 — Digital IN 1 — Edit | Variable A — Increase with 1 — Edit

2: Velleman. Card Nr. 0 — Digital IN 5 — Edit | Variable A — Increase with 1 — Edit

3: Variable A >= 10 — Edit | Velleman. Card Nr. 0 — Digital OUT Imp 1 — Edit

4: Variable A >= 10 — Edit | Variable A — Set on 0 — Edit

When you have finished programming start it.



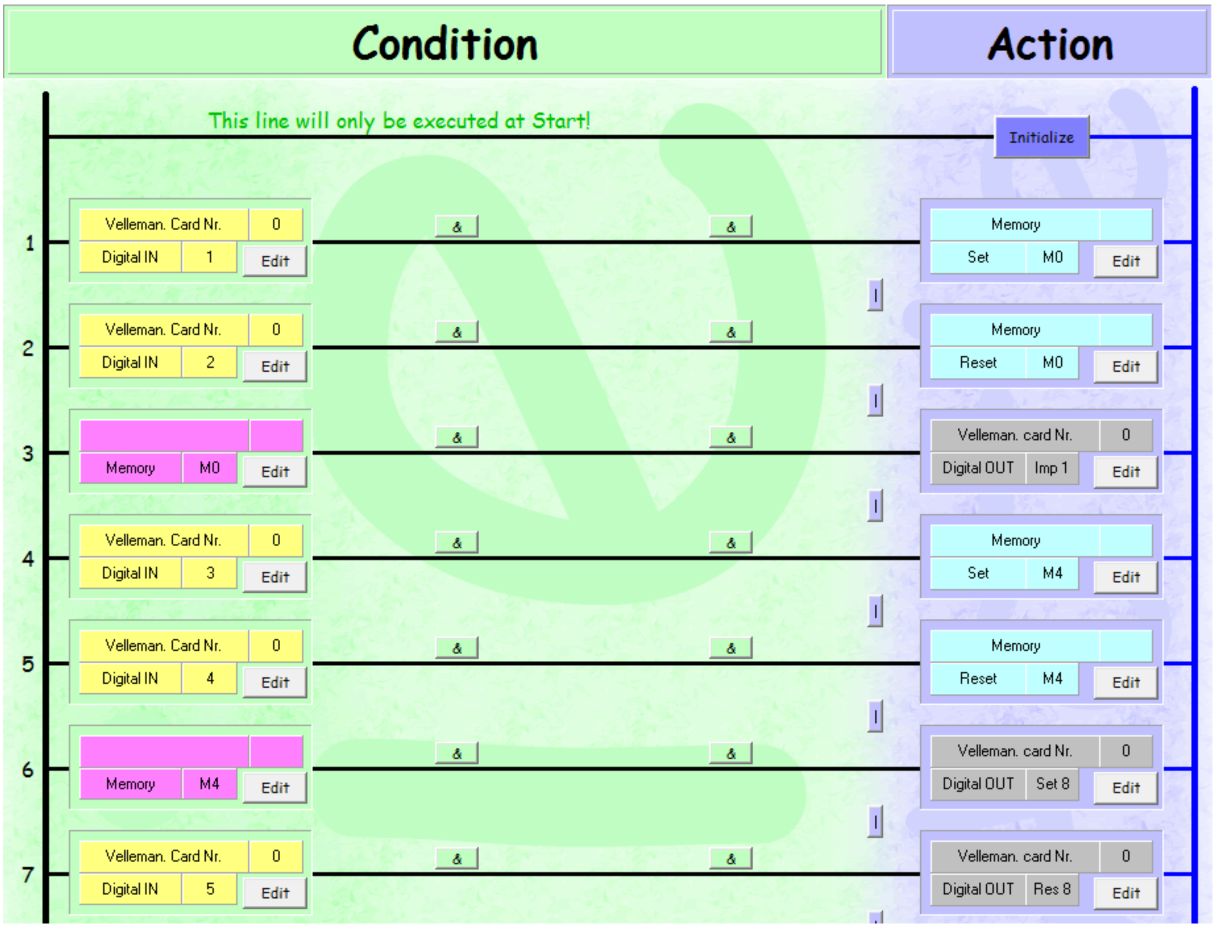
Variabele A = 4 B = 0 C = 0

- ✓ *When Input 1 **OR** input 5 turns from false to true, Variant A is increased by one.*
  On the screen you can see the value of Variant A.
  In the window on the right side of this page you can see that the value of A = 4.
- ✓ *If Variant A reaches the value of 10, Output 1 is set by impulse in Line 3 and variant A is set to 0 in line 4.*

2.12 Memory.

There are 8 memory functions available. Their value can only be 0 or 1. (False or True) In the next program it is used to hold a status.

Set the program indicated below.

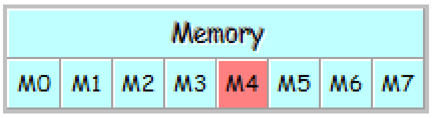


Condition | Action

This line will only be executed at Start! — Initialize

Line	Condition		Action	
1	Velleman. Card Nr. 0	Digital IN 1	Memory	Set M0
2	Velleman. Card Nr. 0	Digital IN 2	Memory	Reset M0
3		Memory M0	Velleman. card Nr. 0	Digital OUT Imp 1
4	Velleman. Card Nr. 0	Digital IN 3	Memory	Set M4
5	Velleman. Card Nr. 0	Digital IN 4	Memory	Reset M4
6		Memory M4	Velleman. card Nr. 0	Digital OUT Set 8
7	Velleman. Card Nr. 0	Digital IN 5	Velleman. card Nr. 0	Digital OUT Res 8

When you have finished programming start it.

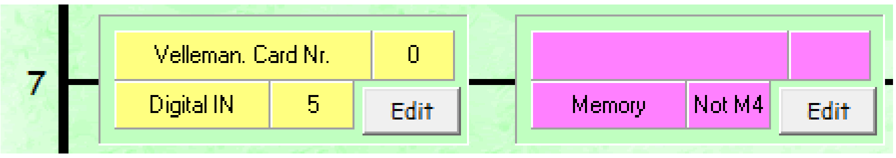


Memory

M0	M1	M2	M3	M4	M5	M6	M7

- ✓ *When Input 3 becomes true, Memory 4 (M4) will be Set.*
  The status of memory 0 to 7 is shown on the right side of the screen.
  That window is also drawn here. At this moment M4 is True. (Red).
- ✓ *When Input 4 becomes True, Memory 4 (M4) will be Reset.*

When M4 is Set, Output 8 will be Set in line 6.
As long as M4 is Set, you can't Reset output 8 by input 5. (Line 7). However Output 8 will be Reset, but during the next cycle it will be Set in Line 6 again as long as M4 is Set. Therefore you should add a condition as shown below.



7 — Velleman. Card Nr. 0, Digital IN 5 — Memory Not M4

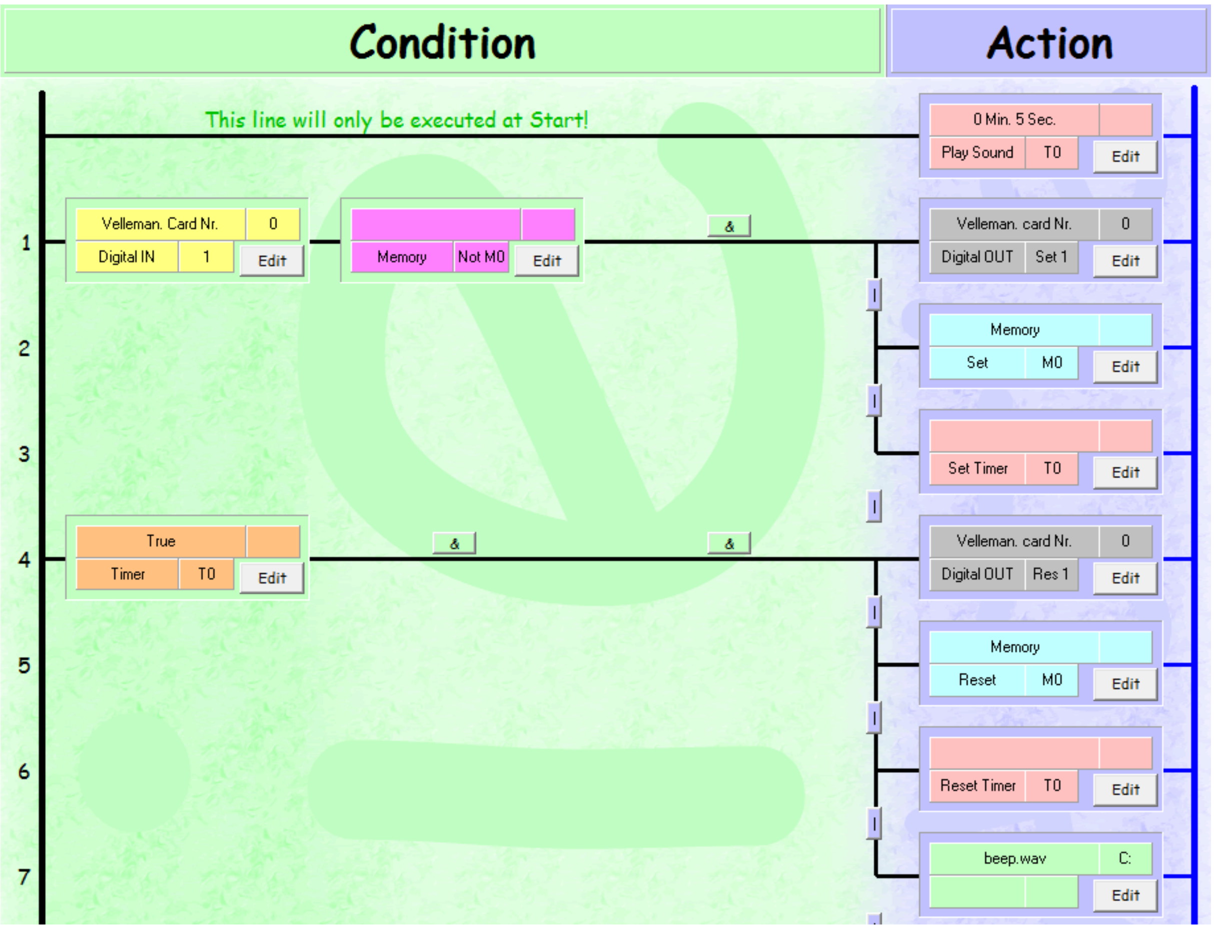
- ✓ *With the Inputs 1 and 2 you can Set and Reset M0.*

2.13 Simultaneously activate actions at once.

If you have to activate more than one action, you can of course repeat that condition and the necessary actions on every line. There is however a simpler way to do that.

When you click | in the action field, you make a vertical connection between the two action lines. At the same time the lines and the associated conditions of the underlying line will be deleted.

In the program below this function is used. 'Write' the program and see how it works.



This line will only be executed at Start!
0 Min. 5 Sec. – Play Sound T0

1 Velleman. Card Nr. 0 – Digital IN 1 – Memory Not M0 – Velleman. card Nr. 0 – Digital OUT Set 1

2 Memory – Set M0

3 Set Timer T0

4 True – Timer T0 – Velleman. card Nr. 0 – Digital OUT Res 1

5 Memory – Reset M0

6 Reset Timer T0

7 beep.wav C:

- ✓ In the topmost line Timer 0 is set to 5 seconds.
- ✓ When the condition on line 1 becomes true Output 1, Memory M0 and Timer T0 will be activated.
- ✓ After 5 seconds line 4 will become true and Output 1, Memory M0 and Timer T0 will be deactivated and the sound beep.wav will be played.

2.14 Control the interface via a network.

When the interface is connected to a computer with a network connection, the interface can be controlled from a distance. This can even be done via the internet. Remember though that the speed can decrease quite a bit.

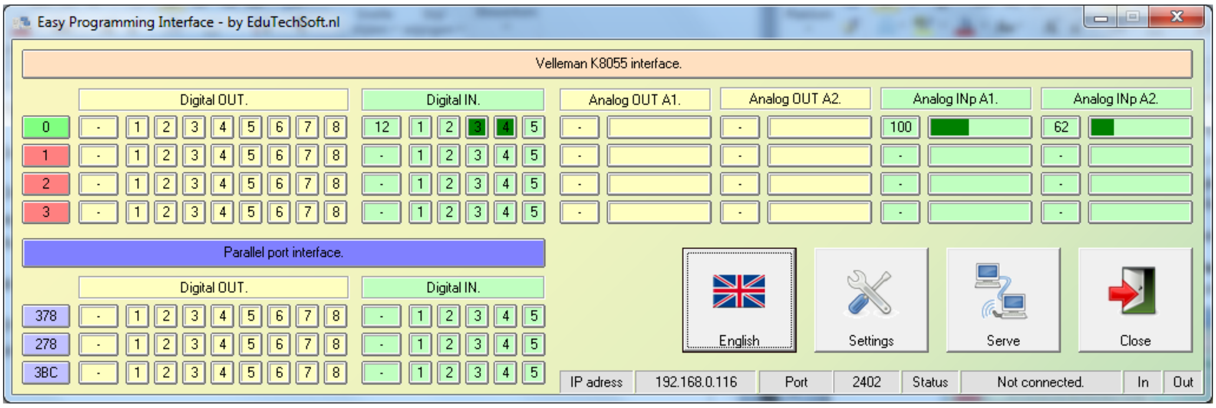
Every computer in a network has its own unique number called an address. This is called the IP-address. Such an address consists of four numbers in a range from 0 to 255 divided by points.

The IP-address of the computer I'm working on now is: 192.168.0.116

On the same network that address can only appear once. A school or office network is usually separated from the internet due to a server or router. Therefore a computer at school can have the same IP-address as a computer at home.

We'll start controlling via a local network.

Start the program **EasyProgIntFace server** on the computer whose interface you want to control through the network. Below you can see a screenshot of the program.



IP adress 192.168.0.116 Port 2402 Status Not connected. In Out

You can see that 1 Velleman interface is found. Of this interface the status of the inputs and outputs are shown. (Input 3 and 4 operational, Analog IN A1 = 100 and A2 = 62)

There are 2 data you'll need to memorise or have to write down.
These are the IP-address and port. Here the IP-address is 192.168.0.116 and the port is 2402.

On your computer the IP address will probably be different.

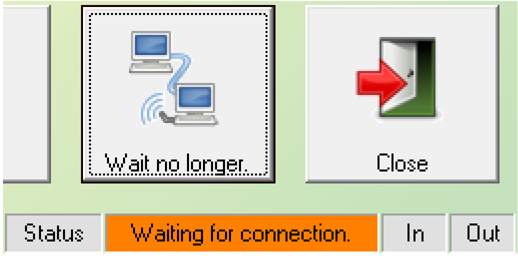
Click and the server is standing by.

On the screen the text on the button will turn to '**Wait no longer.**'

In the status bar the text

'**Waiting for connection.**' is shown.

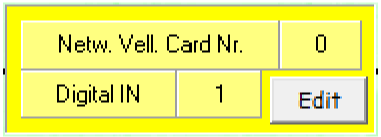
These are the settings of the server.



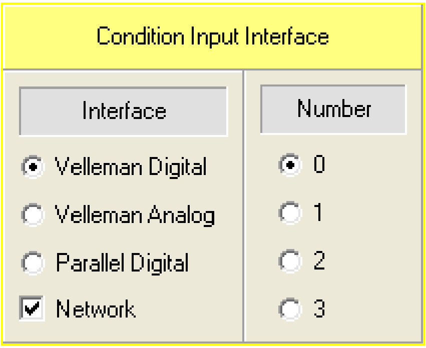
Status Waiting for connection. In Out

Now go to the computer from where you want to control the interface that is connected to the server.
Start the program EasyProgIntFace. It is a good idea when this computer is in the neighbourhood of the server.

Set the following condition on line 1.



Netw. Vell. Card Nr.	0	
Digital IN	1	Edit

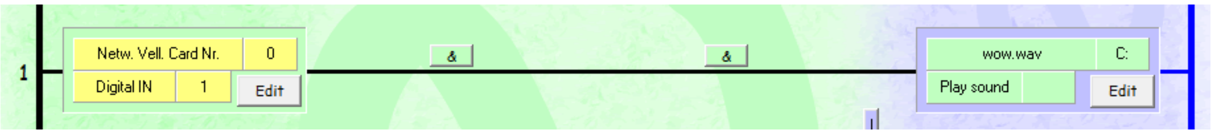


Condition Input Interface

Interface	Number
● Velleman Digital	● 0
○ Velleman Analog	○ 1
○ Parallel Digital	○ 2
☑ Network	○ 3

For the creation of this condition you must enable the checkbox network as shown.

As an action on line 1 choose playing a sound. Below you see the program as it's meant to be.



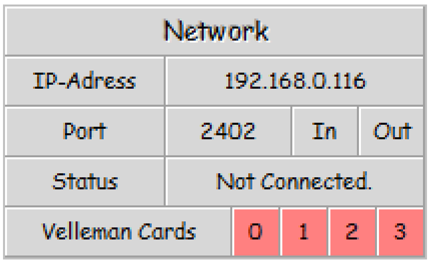
1

Netw. Vell. Card Nr.	0	
Digital IN	1	Edit

wow.wav	C:	
Play sound		Edit

Now the program has to know to which computer is has to be connected.
To do this use the IP address and port that you remember or have written down.

You can see the settings in the Network window.



Network

IP-Adress	192.168.0.116		
Port	2402	In	Out
Status	Not Connected.		

Velleman Cards	0	1	2	3

If they are not the same as you have memorised of have written down you need to adjust them.

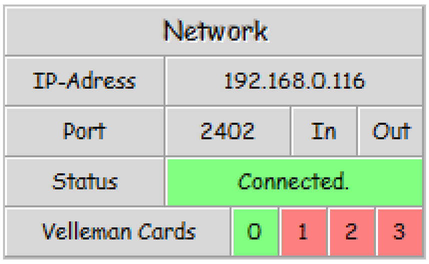
Click the address and/or the port and enter the numbers carefully.

Carefully check the numbers of the IP address and port one more time.

Now click start.

If all is set up correctly a connection will be made.

On the computer the network window will change as you can see here.



Network

IP-Adress	192.168.0.116		
Port	2402	In	Out
Status	Connected.		

Velleman Cards	0	1	2	3

Let someone enable input 1 of the Velleman card on the server. On this computer the chosen sound will then be played.

When data are sent or received the boxes 'In' and 'Out' will light up.

When you create a connection with the interface over the Internet it works in the same way. However, the system administrator usually has to make some adjustments. On the server or the router it has to be indicated that requests for the port number used, have to be forwarded to the IP-address of the computer to which the interface is connected.

3. Notes about the program.

Some properties of the program.

Program.

- The difference between Pause and Stop is that the variables etc. will be reset.

Timers.

- Timers can be set at 0,01 sec. This is done because it appears to be that some animations will run faster. Especially if you only use the interfaces provided by the parallel port, this is clearly visible. Don't assume however that they work that securely. The operation of the Velleman cards alone takes about 0.16 sec
- When you use 'older'.vpp programs it might be that the timer is a hundred times smaller. If that is the case, adjust the timers and overwrite the old program.
- The number of timers that are used at the same time, has an impact on the accuracy as well.

Network.

- On its own wired network speeds are pretty good, even when you are using a wireless connection. Connections over the Internet are a bit slower however. Test in advance at what minimum time the timers can be set.
- Control over a network is also something else than controlling locally. For example, when locally an output is Set in line 3, it will do so directly. For example, would the same output be reset in line 6 this will also be done directly!
  So during 1 cycle the outputs will be Set and Reset.
  By control over the network the outputs will be controlled after each cycle. So for the same program the output via the network is not Set for a (very) short period.
- The last entered IP address and Port are stored as standard.
- When you save a program the IP address and Port are stored as well and when reading the program it will be used as default.

Error messages.

- When the connection is lost, the program will usually stop responding (hang). Maybe one day error handling will be added.

Dashboard.

- The version number of the program is shown by clicking on the logo.

General.

- The number of function keys that can be pressed simultaneously can vary depending on the computer. It varies from 2 to 5 on the computers I've tested.
- The Dell computers at our school used to have restricted graphic views. In case of a resize to a maximum, the background image can no longer be displayed.
  With the program about the calliper I also had an exceptional problem. This is what I have only encountered with Dell computers. When a PCI or AGP graphics card is used, it does not occur.

4. Learning while having fun.

In this chapter some examples are presented. Its purpose is to learn how things are programmed while making an animation or something like that.

4.1 Running light.

	Condition			Action
Init	-	-	-	PreSet T0 = 0,1 sec
1	Digital IN 1 Velleman card nr. 0	-	-	Set T0
2	Digital IN 2 Velleman card nr. 0	-	-	Reset T0
3	If Timer T0 is True	-	-	Increase variant A by 1
4	If Variant A => 9	-	-	Set variant A to 1
5	If Variant A = 1	-	-	Impulse Digital OUT 1 Velleman card nr. 0
6	If Variant A = 2	-	-	Impulse Digital OUT 2 Velleman card nr. 0
7	If Variant A = 3	-	-	Impulse Digital OUT 3 Velleman card nr. 0
8	If Variant A = 4	-	-	Impulse Digital OUT 4 Velleman card nr. 0
9	If Variant A = 5	-	-	Impulse Digital OUT 5 Velleman card nr. 0
10	If Variant A = 6	-	-	Impulse Digital OUT 6 Velleman card nr. 0
11	If Variant A = 7	-	-	Impulse Digital OUT 7 Velleman card nr. 0
12	If Variant A = 8	-	-	Impulse Digital OUT 8 Velleman card nr. 0

4.2 Simultaneous use of several Inputs.

The interface has only 5 digital inputs. That doesn't seem much. However there are 2^5 different ways of using them. (2^5 = 2 x 2 x 2 x 2 x 2 = 32)

Every input can be true or false in its own way. But there is also the possibility of a combination of several inputs.
You can of course serve Input 1 And Input 2.
That's also true for the combination 1 And 3 And 4 and so on.

In this way there are 32 different ways of Input.

The next program only uses Inputs 1, 2 and 3.
So there are 2^3 = 8 different ways of input.

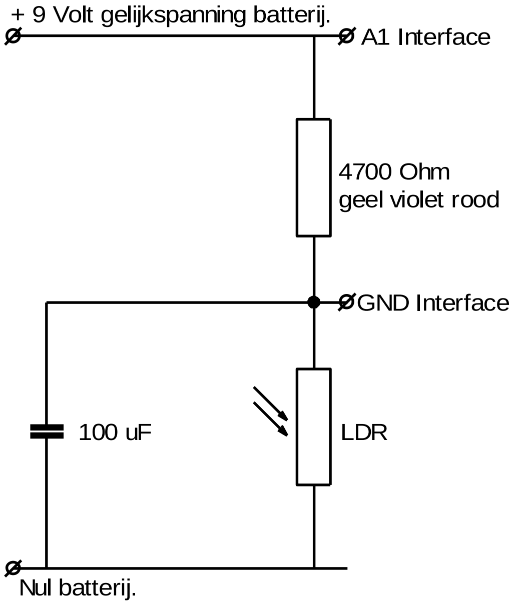
	Condition			Action
Init	-	-	-	-
1	Digital IN 1 Velleman card nr. 0	Digital NOT IN 2 Velleman card nr. 0	Digital NOT IN 3 Velleman card nr. 0	Impulse Digital OUT 1 Velleman card nr. 0
2	Digital IN 2 Velleman card nr. 0	Digital NOT IN 1 Velleman card nr. 0	Digital NOT IN 3 Velleman card nr. 0	Impulse Digital OUT 2 Velleman card nr. 0
3	Digital IN 1 Velleman card nr. 0	Digital NOT IN 1 Velleman card nr. 0	Digital NOT IN 2 Velleman card nr. 0	Impulse Digital OUT 3 Velleman card nr. 0
4	Digital IN 3 Velleman card nr. 0	Digital IN 2 Velleman card nr. 0	Digital NOT IN 3 Velleman card nr. 0	Impulse Digital OUT 4 Velleman card nr. 0
5	Digital IN 1 Velleman card nr. 0	Digital IN 3 Velleman card nr. 0	Digital NOT IN 2 Velleman card nr. 0	Impulse Digital OUT 5 Velleman card nr. 0
6	Digital IN 1 Velleman card nr. 0	Digital IN 3 Velleman card nr. 0	Digital NOT IN 3 Velleman card nr. 0	Impulse Digital OUT 6 Velleman card nr. 0
7	Digital IN 2 Velleman card nr. 0	Digital IN 2 Velleman card nr. 0	Digital IN 3 Velleman card nr. 0	Impulse Digital OUT 7 Velleman card nr. 0
8	Digital NOT IN 1 Velleman card nr. 0	Digital NOT IN 2 Velleman card nr. 0	Digital NOT IN 3 Velleman card nr. 0	Impulse Digital OUT 8 Velleman card nr. 0

While testing this program you can get an impression of its speed. Try to push button 1 and 2 (Input 1 and 2) simultaneously and release them simultaneously.

Big chance that there is a small time difference in releasing them, and by that you set another Output.

Every time an Input is being served line 8 applies.

4.3 LDR, NTC and PTC Input.



A LDR is a Light Dependent Resistor.

When more or less light falls on it, its resistance will change. We will connect this resistor to the analog input of the interface.

My students use this circuit diagram to measure how long it takes for a Mercury-vapor lamp before it reaches full intensity.

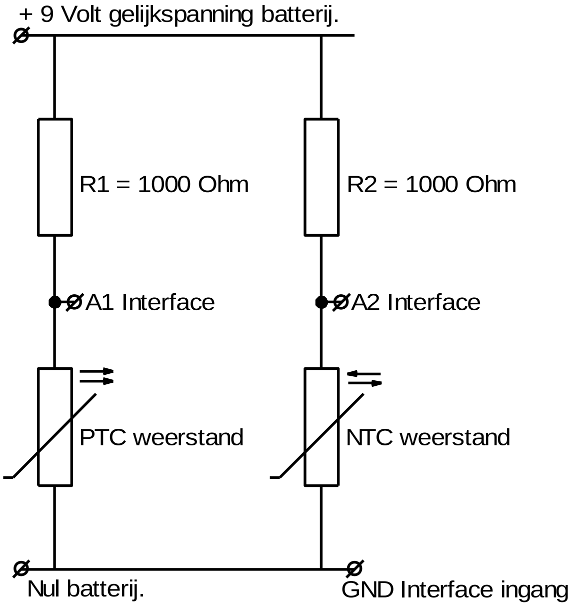
The value of the resistor can be changed, depending of the LDR you use.

The capacitor eliminates little changes, but it can do without.

NTC and PTC resistors are Temperature Dependent Resistors.

Most resistors do vary a little when the temperature changes, but with a NTC and PTC its resistance will change lot.

Connected to your interface you can use them for 'measuring' the temperature.



NTC = Negative Temperature Coefficient. The value of the resistor decreases when it becomes hotter.

PTC = Positive Temperature Coefficient. The value of the resistor increases when it becomes hotter.

When you use this circuit diagram you will see the inputs will change when heating them with a hairdryer.

Page 15 of this manual describes how to use the analog input.

Remember to remove the jumpers SK2 and SK3 and turn the potentiometers RV1 and RV2 to their maximum position clockwise.

5. Introduction.

Interface cards that can be used to control external equipment are usually not easy to program. Often there is support for programming in C, Delphi of Visual Basic, but for most of the people this is not a solution.

With this program you can manipulate the interface in a very easy way. You don't need to have any programming skills or any knowledge of a programming language whatsoever.

You will see that it's quick and simple to write a 'program'.

I think that without any experience you can write your first program in 5 minutes.

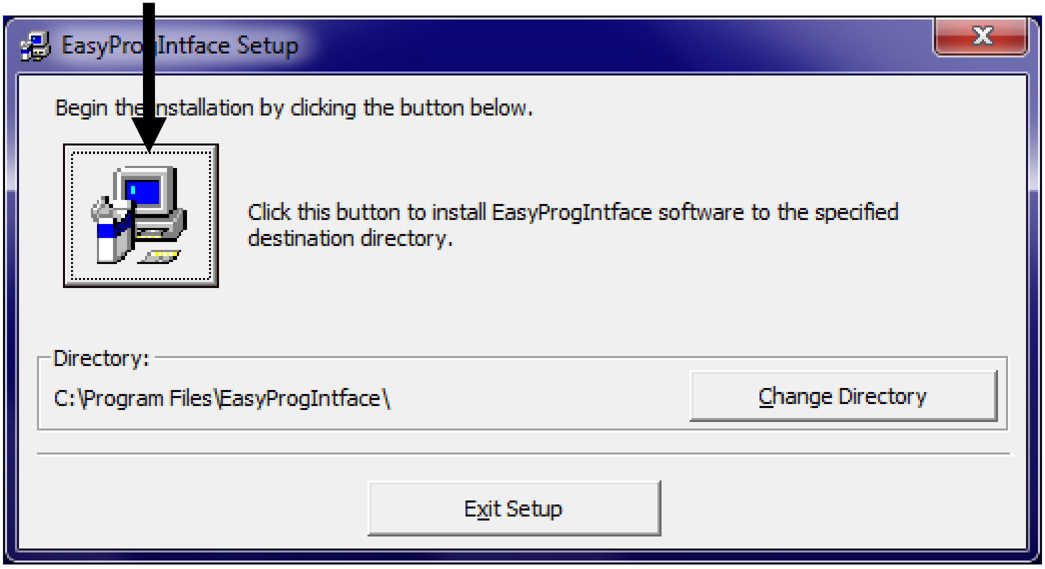
The reason for putting this introduction at the end of this document is that my students don't have to read this, and can start programming as soon as possible.

6. The program.

6.1 Installation

To install, first you have to unpack the downloaded file. (ZIP).
Then use setup to install the program.

Push this button to continue installing.



EasyProgIntface Setup

Begin the installation by clicking the button below.

Click this button to install EasyProgIntface software to the specified destination directory.

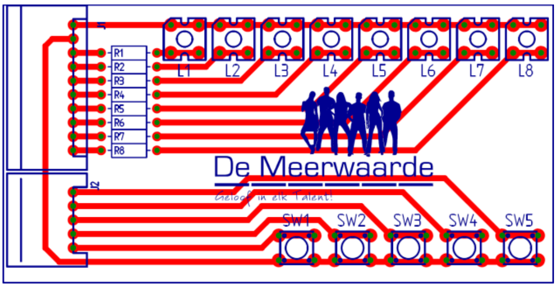
Directory:
C:\Program Files\EasyProgIntface\

While unzipping, an extra folder Geluiden (Sounds) is created. In this folder there are some sound effects that can be used in this program.

It's convenient to copy this folder to the folder where EasyProgIntFace is installed.

The programs described in this manual can be downloaded separately. You can place the unzipped folder in 'My Documents' or 'library documents', depending on the used windows version.

6.2 Description of the program.



The main purpose of this program is to show my students the basics of ladder programming in an easy way. Besides that they can use it to program their own interface they make during my lessons.⟶

The program is not ready yet. I want to add the 'OR' function (Those are vertical lines). OR can be made already but it can be done more efficiently. My students start working with the software now; this gives me the opportunity to see how things can be done better, changed, added and so on.

All interfaces can be addressed simultaneously. It is no problem whatsoever to use S1 of the parallel port interface for Setting Output 8 of the Velleman card number 1, or vice versa. When doing so you can address 35 inputs and 56 outputs.

6.3 Parallel port addresses.

There is an address needed for the use of the printer ports. In this case an address is a number.

Normally the address for an on board printer port (LPT1) is &H0378. (Hexadecimal)

When adding extra printer ports you can use a PCI card[3]
However these cards don't use standard addresses. To make it possible to use them you can change the address. Open the file (use notepad) ***Poortsettings.dat*** that is located in the folder where EasyProgIntFace is installed. Here you can edit the addresses needed for your computer.

Use the Hexadecimal values. This file consists of four lines. In lines 2 to 4 are the values that are used for parallel ports 1 to 3

Here you see the settings that I have used on my computer with 3 LPT ports.

Poortsettings.dat

```
De IO adressen voor de parallelle poorten.
0378
E800
EC00
```

The addresses you have to use can be found in Windows under hardware.

If the file ***Poortsettings.dat*** doesn't exist the standard addresses will be used.

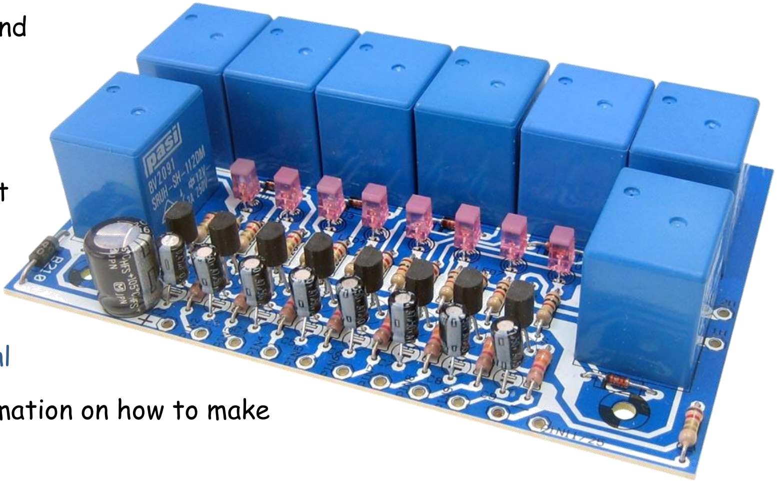
[3] Tested with this card that adds 2 parallel ports. Conrad number 971510 (In the Netherlands)

7. Finally.

Not all functions of the program are described in this manual. Saving and reading from disk is for obvious reasons not described.

A this moment my students work with this program so the bugs in it will come to light.

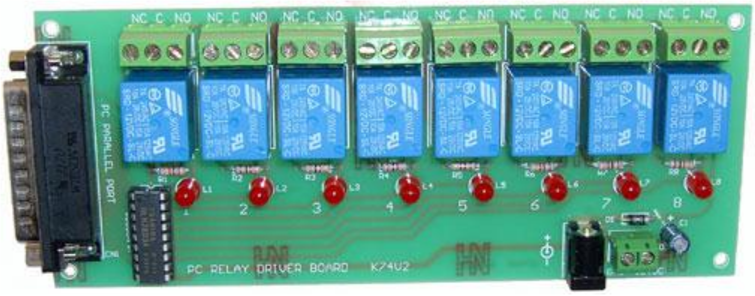
If you have found bugs or have any suggestions you can e-mail me at h.o.boorsma@edutechsoft.nl



On my website you can find information on how to make your own interface. (Dutch only)

There are also complete parallel interfaces with relays available, as you can see above. These interfaces can also be addressed by this program.

Conrad ordering number 130217. (Netherlands)
You can easily add the 5 Inputs. Note that when you use relays you need an external power adapter.

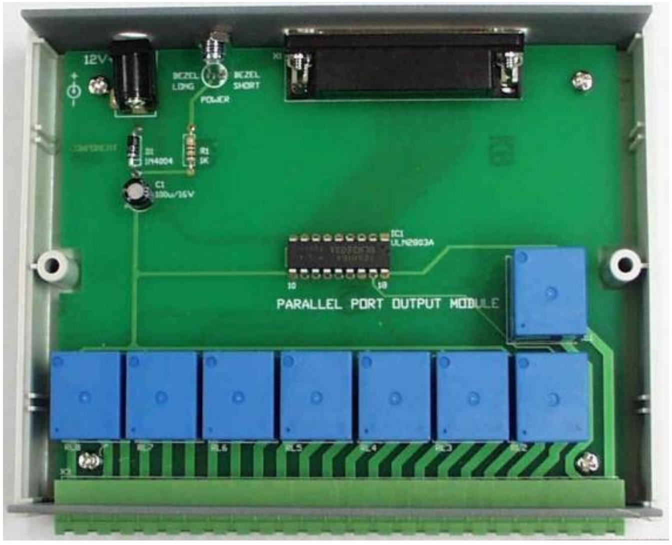


I've found another one on the internet. It seems that its delivery to the Netherlands is not easy.

CK1601- Parallel Port Relay Board (Kit) - $34.95.

The address is:

http://electronickits.com/kit/complete/elec/ck1601.htm



A complete instruction for building a parallel interface can be found on http://www.quasarelectronics.com

The name of this kit is 3074V2.
(5 Amps @ 45Vac/70Vdc max.)

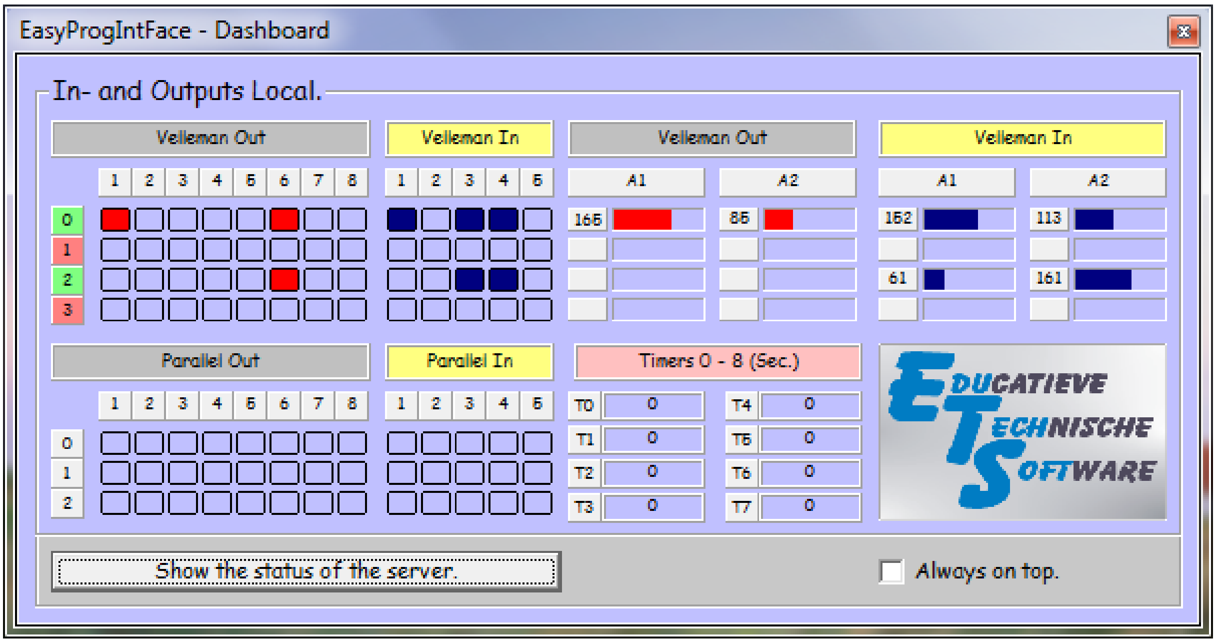
However at http://www.electronics123.com it's rated at 250VAC at 5A.

If you want to switch to more current (7A) they suggest you solder some heavy duty wire links, on the bottom of the PCB, from the relay contacts to the screw terminal block. (Effective in parallel with the PCB track).

8. My experiences in the classroom.

The program is not intended for professional applications. The reliability cannot be 100 % guaranteed.

- The most 'successful' program that my pupils write is Chapter 2.6 sound (play sounds). When you connect large sound boxes, you can be sure that you have to remind the students to continue with the next chapter.
  Very successful is the sound of monkeys on line 1 and the M16 on line 2.
  (Other 'less responsible' combinations, have I also encountered.)
- The management of pneumatic components is also fun to do.


EasyProgIntFace - Dashboard
In- and Outputs Local.
Velleman Out
Velleman In
Velleman Out
Velleman In
1 2 3 4 5 6 7 8
1 2 3 4 5
A1
A2
A1
A2
0
1
2
3
165
85
152
113
61
161
Parallel Out
Parallel In
Timers 0 - 8 (Sec.)
1 2 3 4 5 6 7 8
1 2 3 4 5
0
1
2
T0 0
T1 0
T2 0
T3 0
T4 0
T5 0
T6 0
T7 0
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