20-SIM

Installation Software & Hardware

Windows 7 / 8 / 8.1/ 10 / 11

Installation

© 2023, Controllab Products B.V.
Author: Ir. C. Kleijn

Disclaimer

This manual describes the installation procedures of the software and hardware packages of Controllab Products B.V.

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Reference

Kleijn, C.
20-sim Installation
Enschede, Controllab Products B.V., 2023

Information

Controllab Products B.V.
Address: Hengelosestraat 500
7521 AN Enschede
the Netherlands
Phone: +31-85-7731872
Internet: https://www.20sim.com
https://www.20sim4C.com
https://www.controllab.nl
E-mail: info@20sim.com

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1 20-sim 5.0

1.1 Versions

20-sim is available in two versions: Viewer and Professional.

- **Viewer/Demonstration version**: This is a freeware version that allows you to load and run models and evaluate the package. Saving of models is not possible in this version.
- **Personal**: This version is for use at home, for students and personal education. Not for commercial, government, academic or other organizational use. This is the full version of 20-sim with standard toolboxes.
- **Professional**: This is the full version of 20-sim with standard toolboxes.

Next to the standard toolboxes that come built-in with 20-sim, additional toolboxes can be purchased. The table below shows in detail the options that are available:

20-sim with standard toolboxes	**Viewer**	**Personal**	**Professional**
Library Models	**v***	**v**	**v**
Number of Variables	unlimited	< 200	unlimited
Number of Equations	unlimited	< 200	unlimited
3D Mechanics Toolbox	**v***	**v**	**v**
Animation Toolbox	**v***	**v**	**v**
Control Toolbox	**v***	**v**	**v**
Frequency Domain Toolbox	**v***	**v**	**v**
Scenario Manager	**x**	**v**	**v**
Mechatronics Toolbox	**v***	**v**	**v**
Real Time Toolbox	**v***	**v**	**v**
Time Domain Toolbox	**v***	**v**	**v**
Scripting Toolbox	**x**	**v**	**v**
Additional toolboxes			
20-sim Unity Toolbox	**x**	**x**	**p**

v = included
p = has to be purchased separately
v* = included but no saving possible
x = not available

20-sim is installed, using an Installation Manager that will lock 20-sim to your computer. There are three types of licenses available:

- **Free :** The demonstration version comes with a license that is not locked to your computer. No actions have to be taken after installation of the program.
- **Single License:** A single license locks 20-sim to a specific computer. After installation you have to register to get a valid license.
- **Floating License:** A floating license allows multiple users to work with 20-sim at the same time. After installation you have to register to get a valid license.

1.2 Requirements

20-sim is guaranteed to work on computers that will meet the following requirements:

- Operating System: Windows 7, 8, 8.1, 10, 11.
- Processor requirements: 20-sim requires a CPU with SSE2 support. Supported: Intel Pentium 4 and above, AMD Athlon x64 and above.
- Available Disk Space: 1 GB.

1.3 Installing 20-sim (Single)

20-sim can be downloaded from the website www.20sim.com. This is an installation file that will install 20-sim on your computer. The first 4 steps are equal for all users. Depending on the type of license (single, floating) you have to continue differently.

1. **Install 20-sim** and **start** the program.

If a valid license for 20-sim was activated before, the program will start automatically and you can skip the rest of this section. If you have not installed 20-sim before, the *License Information* dialog will open. You can also manually open the *License Information* dialog:

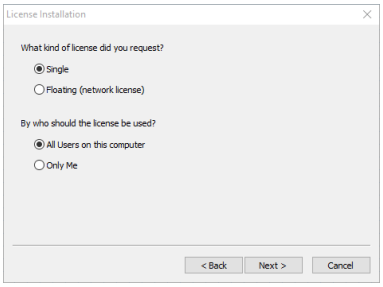
2. From the **Help** menu select **License Activation**.

Use the Registration/Update window to request for a license.

3. If you have a valid license key or license file, press the **Activation** button to enter your license key or browse for the license file.

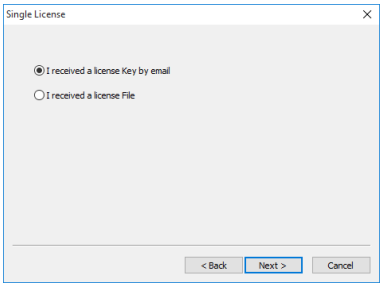
If you do not yet have a valid license, press the **Trial License** button request an trial license or press the **Buy** button to purchase a license. If you want to continue in *Viewer* mode (no save functionality), just close the dialog without activating 20-sim.

4. Select **which kind of license** you have and **who** should use the license.



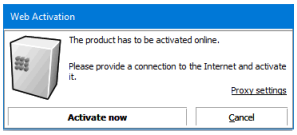
License installation dialog.

5. On the next dialog, select ***I received a license key by e-mail*** and enter the **key** in the next dialog. When you received a **license file**, you have to enter the **location** of the license file.



Single License dialog.

You will be asked for confirmation (click **Activate Now**) and activation will be carried out. After a successful activation process the License Information dialog will show the new license (Standard License or Professional License).



Web Activation dialog.

1.4 Installing 20-sim (Floating)

A floating license (also known as concurrent license or server license) is a license that is shared by more users. A floating license has to be installed by the administrator first and then for the users. You can only install a floating license if you have received a license key.

Prerequisites

- A valid **20-sim floating license key**
- A **Windows, Linux or MacOSX server** that is accessible by all users that will use the floating license.
- A dedicated **Windows share** on this server.

  For example:
  `\\fileserver\20simlicense`

This share on the server should be **accessible by all 20-sim users** and the share should have **read and write permissions for all 20-sim users**.

Note: Windows DFS (distributed file system) shares are not supported.

Administrator

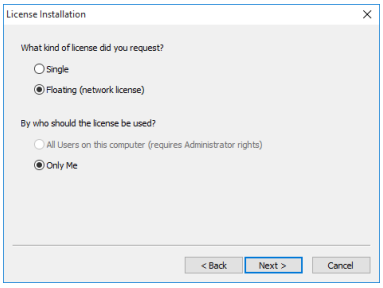
The 20-sim installation can be downloaded from the website www.20sim.com if you do not have it already.

1. **Install 20-sim** and **start** the program.
2. From the **Help** menu select **Registration/Update License**.

The *License Information* dialog will open:

Use the Registration/Update window to request for a license.

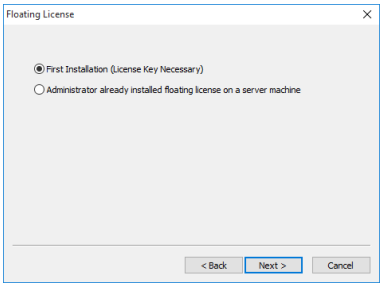
3. Press the **Activation** button.
4. Select **Floating** and **who** will use the license.



License installation dialog.

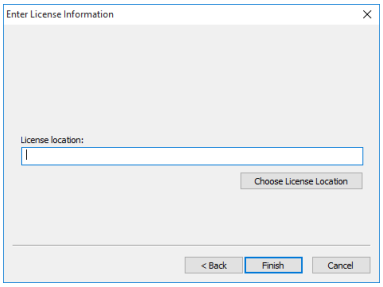
You have to enter the license key and a location on the server first. This location on the server should be accessible to all users and should have read/write permission.

5. On the next dialog, select **First Installation** and click **Next**.



Choose First Installation

6. Enter the 20-sim floating **license key** and the **location on the server** where the floating license should be stored.

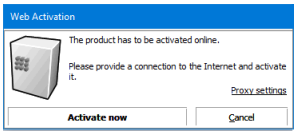


Choose License Location

A 20-sim license file named *20sim.lic* will be installed on the provided license location.

7. Write down the **location of this file** because every new user of this 20-sim floating license will need to enter it.

You will be asked for confirmation (click **Activate Now**) and activation will be carried out.



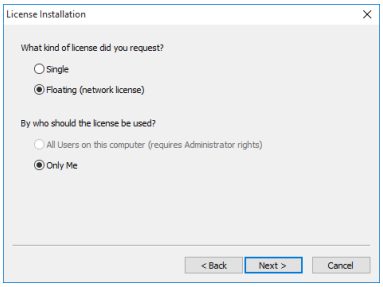
Web Activation dialog.

Users

Every 20-sim user has to install 20-sim on his local computer and enter the location of the 20-sim floating license.

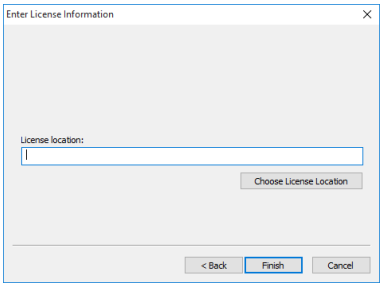
1. **Install 20-sim** and **start** the program.
2. From the **Help** menu select **Registration/Update License**.
3. Press the **Activation** button.

4. Select **Floating** and **who** should use the license.
5. On the next dialog, select **Administrator already installed server license** and choose **Next**.



Choose the second option

6. Enter the **license file location** (ask your system administrator for the location of the 20-sim floating license) and click finish.



Enter the license location

If everything went right, 20-sim is now activated using the floating license stored on the server.

In case of problems, contact Controllab Products

E-mail: info@20sim.com

1.5 ClassroomKit

For educational purposes, 20-sim is available as a Classroom Kit. A Classroom Kit lets students and teachers use the software at the educational institute and at home. The use is limited to a maximum of 200 individual users and 200 users on the network of the educational institute.

A Classroom Kit comes with two types of license keys:

- A *student license key* which may be distributed among students and teachers (max. 200 users).

- A *floating license key* which can be installed at the educational institute (max. 200 users).

Student License Key

A student license key has a time limitation of one year. Controllab Products B.V. will take care that every year a new student license key is sent to the owner of a Classroom Kit.

1. The student license key has to be stored on a location that is only available for students and teachers (place it on your intranet) to prevent illegal copying.
2. Install 20-sim with the student license key. For installation guidelines see the section on installing a single license.

Floating License Key

The floating license key will have no time limitation. It allows you to use 20-sim on multiple machines on the network.

1. To install a floating license key follow the instructions of the previous section.

1.6 Deactivation

If you want to move 20-sim to another computer, you have to deactivate your license before uninstalling the program. On the new computer you can then install the program and activate the license. To deactivate your license:

1. From the Windows **Start menu** open **20-sim**.
2. From the **Help** menu choose **License Activation**.
3. Press the **Activation** button.
4. Choose **Deactivate the License** and click **Finish**

You will be asked for confirmation and deactivation will start. After a successful deactivation, you version of 20-sim has turned into the demonstration version. You can now uninstall the software and reinstall it.

1.7 Uninstalling

You can uninstall 20-sim by clicking the Uninstall command from the 20-sim start menu. Uninstalling of 20-sim **will not deactivate your license**. If you want to move 20-sim to another computer, you have to deactivate your license first before uninstalling.

1.8 Unattended Installation

An unattended installation is an installation that is performed without user interaction during its progress or with no user present at all.
To perform an unattended installation the default 'program files' installation directory run the following command :

```
20sim.exe /S
```

It is possible to set an alternative installation directory by specifying the /D argument. It must be the last parameter used in the command line and must not contain any quotes, even if the path contains spaces. Only absolute paths are supported.

```
20sim.exe /S /D=D:\My Installation Files\20-sim 4.9
```

1.9 Unattended Uninstall

An unattended uninstall is an uninstall that is performed without user interaction during its progress or with no user present at all.
To perform an unattended uninstall from the default 'program files' installation directory run the following command on the 20-sim uninstaller:

```
C:\Program Files (x86)\20-sim 4.9\Uninstall.exe /S
```

2 20-sim 4C 2.1

2.1 Requirements

20-sim 4C is guaranteed to work on computers that will meet the following requirements:

- Operating System: Windows 7, 8, 8.1, 10.
- Available Disk Space: 350 MB.
- Ethernet: an ethernet connection is required for external targets.

Further requirements for using 20-sim 4C:

- 20-sim 4.1.2.4 Professional (or higher) installed on the same computer.
- A valid 20-sim 4C license. Contact your local distributor to obtain a valid license. Note that 20-sim 4.1 (or higher) Professional and the 20-sim 4C 2.1 have separate licenses!

2.2 Installing 20-sim 4C

20-sim4C can be downloaded from the website www.20sim4C.com. This is an installation file that will install 20-sim on your computer. In this topic we describe how to obtain a valid license for 20-sim.

1. **Install 20-sim 4C** on the same computer as 20-sim 4.1 Professional or higher.

2. From the Windows **Start menu** open **20-sim 4C**.

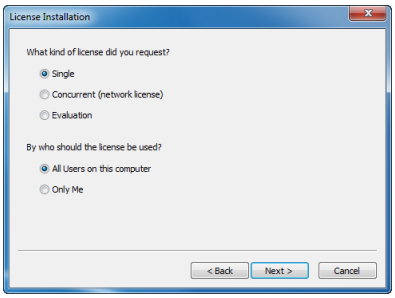
If a valid license of 20-sim 4C was activated before, the program will start automatically. If you have not installed 20-sim 4C before, the *License Activation* dialog will open:

20-sim 4C 2.1 License Activation Dialog.

3. If you have a valid license key or license file, press the **Activation** button to enter your license key or browse for the license file.

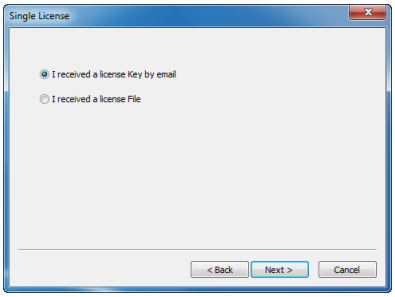
If you do not yet have a valid license, use the e-mail button to request an evaluation license or to purchase a license.

4. Select **which kind of license** you have and **who** should use the license.



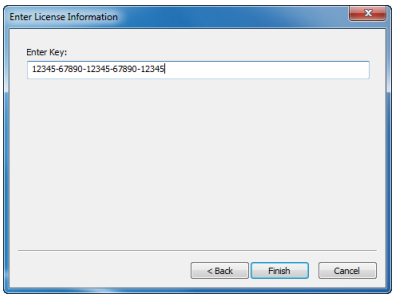
License installation dialog.

5. On the next dialog, select ***I received a license key by e-mail*** when you have a license key. When you got a **license file**, select the other option.



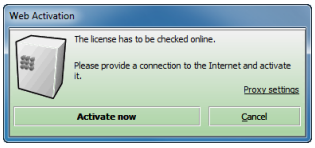
License key or license file?

6. Enter your **20-sim 4C license key** (or browse for the license file):



Enter your license key.

7. In case of a license key, 20-sim 4C will now validate your license on-line. Please make sure that you have a **working Internet connection**. Click **Activate now** to continue.

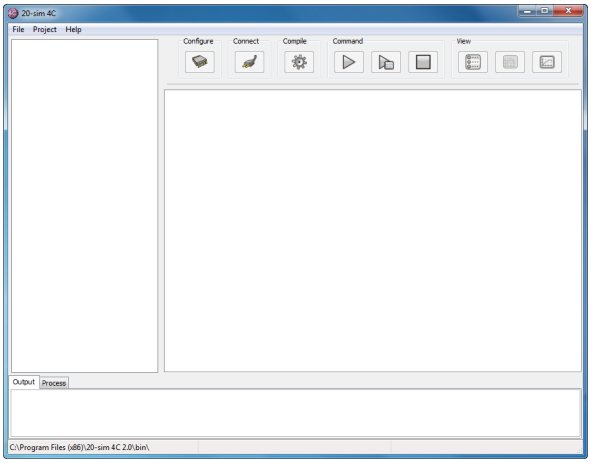


On-line license activation.

As a result of a successful license installation, 20-sim 4C shows your license information in a dialog:

License activation was successful.

After closing the license information dialog, 20-sim 4C is ready for use and should look like the figure below:



20-sim 4C.

If you cannot open 20-sim 4C or have problems with the installation or the license activation, please check the troubleshooting section. If this does not help, please contact Controllab Products B.V.

2.3 Uninstalling 20-sim 4C

You can uninstall 20-sim 4C by clicking the **Uninstall** command from the 20-sim 4C start menu. Uninstallation of 20-sim 4C will not deactivate your license. If you want to move 20-sim 4C to another computer, you have to **deactivate your license** first before uninstalling.

2.4 Deactivation

If you want to move 20-sim 4C to another computer, you have to deactivate your license, before uninstalling the program. On the new computer you can then install the program and activate the license.

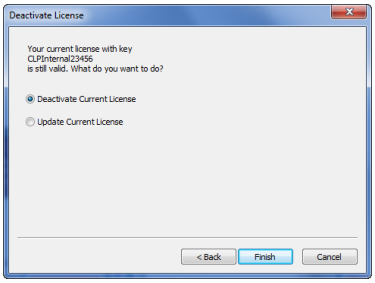
To deactivate your license:

1. From the Windows **Start menu** open **20-sim 4C**.
2. From the **Help** menu choose **License Activation**.

The *License Activation* dialog will open.

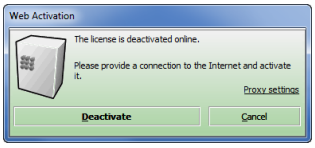
The License Activation dialog.

3. Click on the **Activation** button and then select **Deactivate Current License**.



Click Deactivate Current License if you want to use the program on another computer.

4. Click **Finish** to deactivate your license. You will be asked to confirm the deactivation and have to click **Deactivate**.



2.5 Upgrading

If you want to upgrade to a newer version of 20-sim 4C, go to the 20-sim 4C website and download the new version. After downloading you can install it.

- If the new version is a minor update (e.g. version 2.0.x.x), it will automatically replace the old version. After installation you can run the new version immediately. No new license is required.
- If the new version is a major upgrade (e.g. version 2.1.x.x or higher), it will be installed next to the old version. Both versions can be used at the same time. The new version will require a new license.

2.6 Unattended Installation

An unattended installation is an installation that is performed without user interaction during its progress or with no user present at all.
To perform an unattended installation on the default 'program files' installation directory, run the following command :

```
20-sim-4C-2.1.x.x-win32.exe /S
```

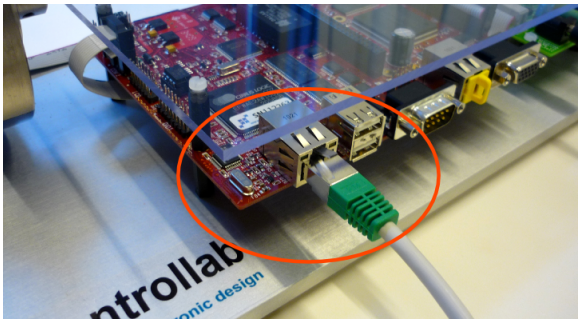
It is possible to set an alternative installation directory by specifying the /D argument. It must be the last parameter used in the command line and must not contain any quotes, even if the path contains spaces. Only absolute paths are supported.

```
20-sim-4C-2.1.x.x-win32.exe /S /D=D:\My Installation Files\20-sim 4C 2.1
```

2.7 Connecting the Target

20-sim 4C uses an ethernet connection to communicate with a target. This connection can be established using a cross cable that is connected between your PC (the host PC) and the target directly or by connecting your PC and the target to your local network.

Using a cross-cable to connect the host PC directly to the target is recommended if you encounter problems with the connection.



Plug in the cross cable or network cable.

Cross Cable

1. Plug the **cross cable** in the **connector** of your target.
2. The other end of the **cross cable** must be plugged into your **host PC**.

It may take several minutes before Windows has configured the network interface. Please be patient when 20-sim 4C cannot make a connection immediately.

Network Cable

1. Plug the **network cable** in the connector of your target.
2. The other end of the **network cable** must be plugged into a **switch or hub of the network**.

Use a 'normal' network cable to connect the target via a switch or hub to your network. If your network provides a DHCP server the configuration is automatic. If your network does not provide a DHCP server make sure your network is configured in the 192.168.1.x range and that your PC computer has a proper connection to the network.

See Networking in the Troubleshooting chapter in case you experience problems.

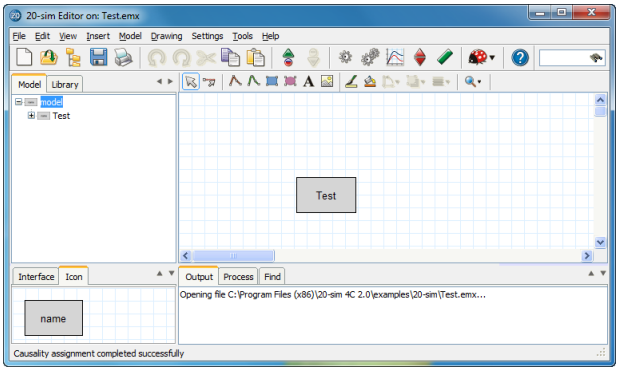
2.8 Running a Test model

To test if the installation was successful, we will run an example model in 20-sim and generate C-code that will be transferred to 20-sim 4C to run on your target. The model is called *Test.emx* and has no external inputs or outputs.

Exporting the 20-sim Model to 20-sim 4C

1. From the Windows Start menu open **20-sim**.
2. In **20-sim** load the model ***C:\Program Files\20-sim 4C 2.1\examples\20-sim\Test.emx***.

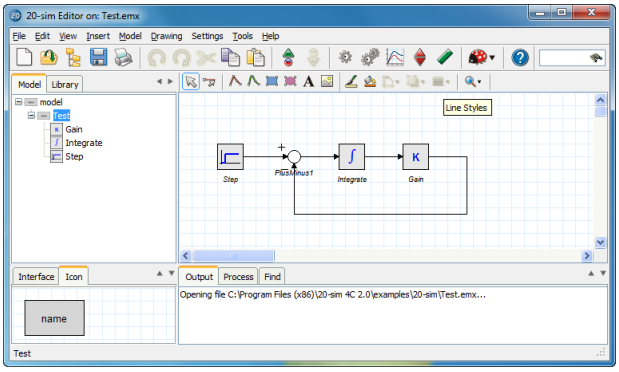
Note: For 64-bit Windows versions the location is: *C:\Program Files (x86)\20-sim 4C 2.1 \examples\20-sim\Test.emx*. If your version of 20-sim 4C is installed on a different location, please use the correct path.



The model Test.emx loaded in 20-sim.

The 20-sim model Test.emx contains one submodel (named Test).

3. Select the submodel **Test** and from the Model menu select **Go Down**.



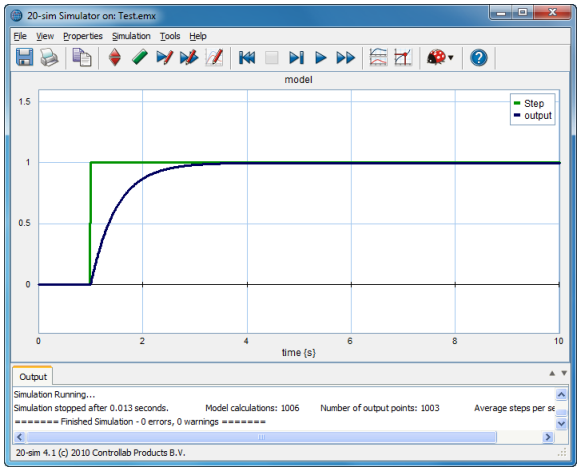
The submodel Test contains a block diagram model with no external inputs or outputs.

As you can see the submodel Test is a block diagram model of a first order system which contains no external inputs or outputs.

4. From the **Model** menu select **Start Simulator**.
Now the 20-sim Simulator opens showing an empty plot.

5. In the **Simulator** from the **Simulation** menu select **Run** to run a simulation.

You should see a stepwise change in the setpoint signal and a first order response of the system.

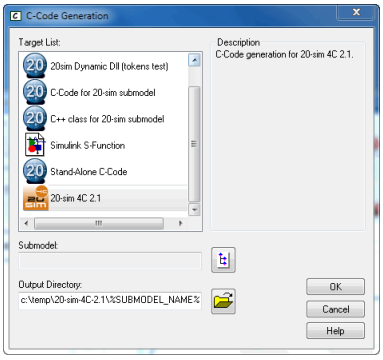


The simulation results for the model Test.emx.

We will generate C-code from this model and run it on a target.

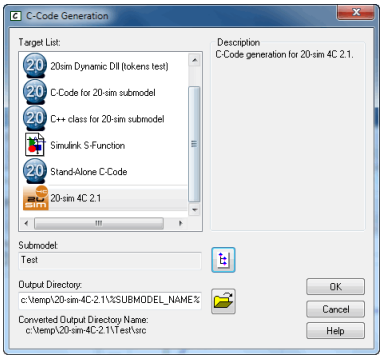
6. In the Simulator, from the **Tools** menu select **Real Time Toolbox** and **C-code Generation**. The C-code Generation dialog will pop-up.

7. Select the **20-sim 4C target**. Make sure it looks like the figure below (in 20-sim 4.1 multiple targets may be shown). If the 20-sim 4C target is not shown, please check the troubleshooting section.



The C-code generation menu in 20-sim.

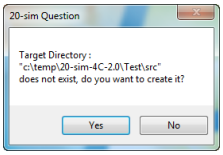
8. Click on the **Submodel button** and select the submodel ***Test***. The C-code Generation dialog should look like:



The C-code generation menu in 20-sim.

Note that a default location for the C-code files is given in the Output Directory field: *C:\temp\20sim-4C\%SUBMODEL_NAME%*, where *%SUBMODEL_NAME%* will be replaced by the submodel name. If you want to use a different location, please enter it here.

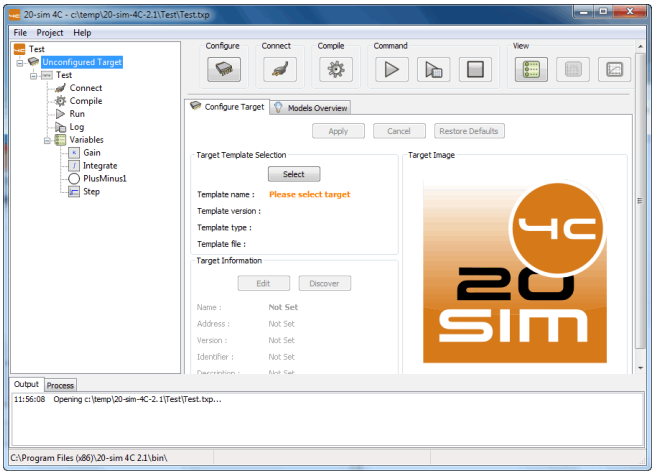
9. Click the **OK** button to close the dialog.
Now the model will be exported to 20-sim 4C as C-code. All code files are stored in a temporary folder. A dialog may appear asking you to create this folder.



The folder for temporary code files.

10. Click **Yes** to create the folder (or go to step 7 to enter another directory).

If everything works fine, 20-sim 4C will be opened, with the Test model loaded:



20-sim 4C with the Test model loaded.

If an error occurs and 20-sim 4C does not open, please check the troubleshooting section.

20-sim 4C Settings and Monitoring

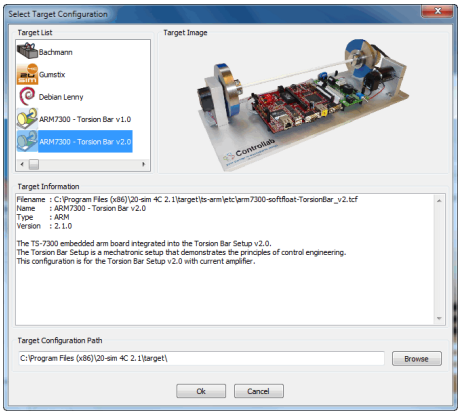
We will enter the settings to get the model running on your target and choose the variables that we would like to monitor.

Configure

1. Click on the **Configure** button .

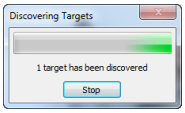
2. Click on the **Select** button, select the proper target and click OK.

The next picture shows as an example the ARM7300 - Torsion Bar v2.0 target.



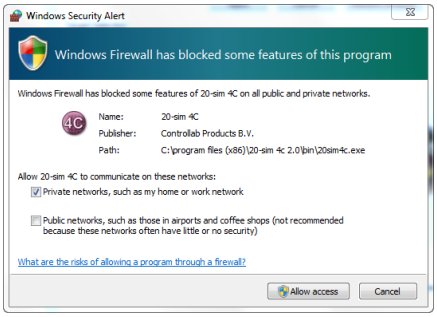
Select the proper target.

20-sim 4C will now start a search to find the IP-addresses of connected targets:



Finding the IP-address.

If a firewall is installed, a warning message may pop-up:

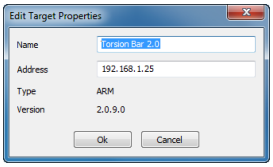


The Windows firewall message when the Refresh button is clicked.

3. Click the **Allow Access** button (Windows 7) or the **Unblock** (Windows XP, Windows Vista) button (or a similar button if another firewall message is shown) if the name of the program is 20-sim 4C and the publisher is Controllab Products B.V.

4. *Optional:* Press the **Discover** button on the **Configure Target** tab to manually repeat step number 3.

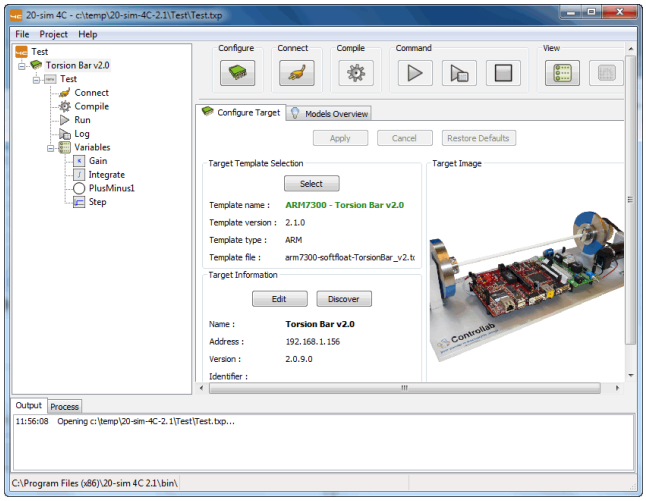
5. *Optional:* You can change the target name and IP-address manually for your target using the **Edit** button.



Changing the target name and IP-address manually.

6. Click on the **Apply** button.

If everything was installed and connected successfully, the Configure button should turn into green .



The configuration was entered successfully.

If the Configure button has turned to red please check the Troubleshooting section.

Connect

7. Click on the **Connect** button .

8. Our model does not have external inputs or outputs that we have to connect so click the **Apply** button.

Compile

9. Click on the Compile button to compile the generated code into an executable.

The Compile button should turn into green when the compilation process is successfully finished. If it has turned into red please check the Troubleshooting section for help.

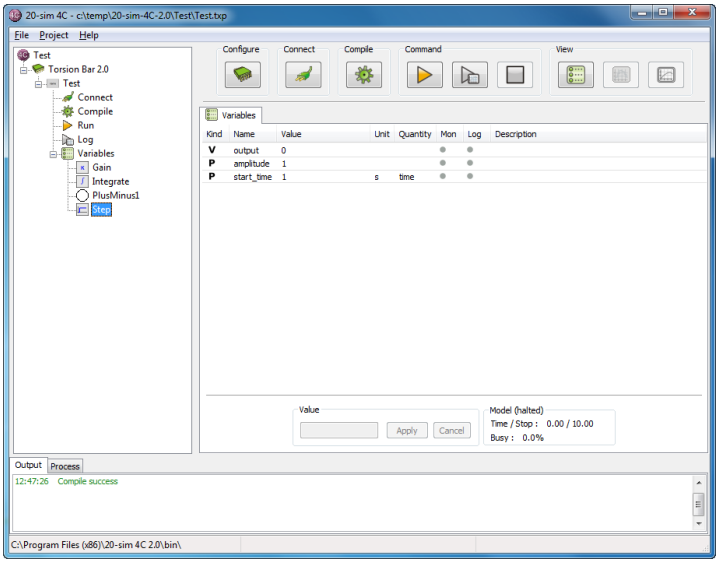
Command

Our model has no external inputs or outputs. To make sure its runs properly we have to monitor its internal variables during running. That is why we will first choose the variables that we will monitor and then run the model.

10. In the tree-view at the left side of the 20-sim 4C windows click **Variables**. It will expand showing the available submodels

11. Click on the ***Step*** submodel.

Now a list of two parameters (amplitude and start_time) and one variable (output) should be visible.

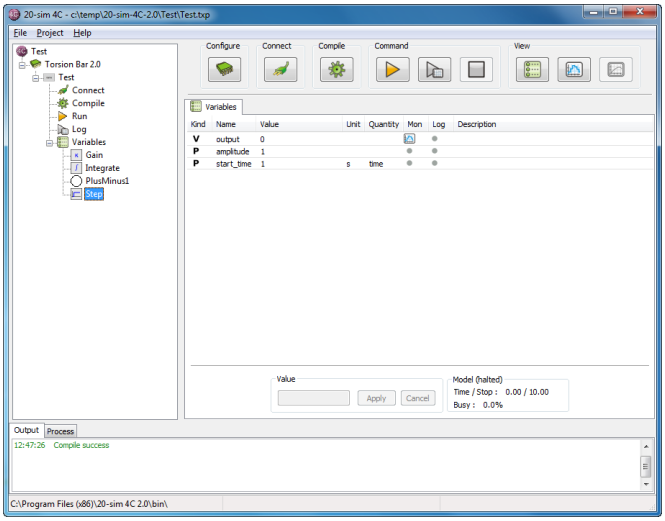


The list of parameters and variables of the submodel Step.

The variable *output* has two gray dots (Mon and Log) at the left. You can click these dots to select the variable for monitoring or logging.

12. With your mouse pointer go to the variable ***output*** and click on the grey dot to select it for **monitoring**.

20-sim 4C should now look like:

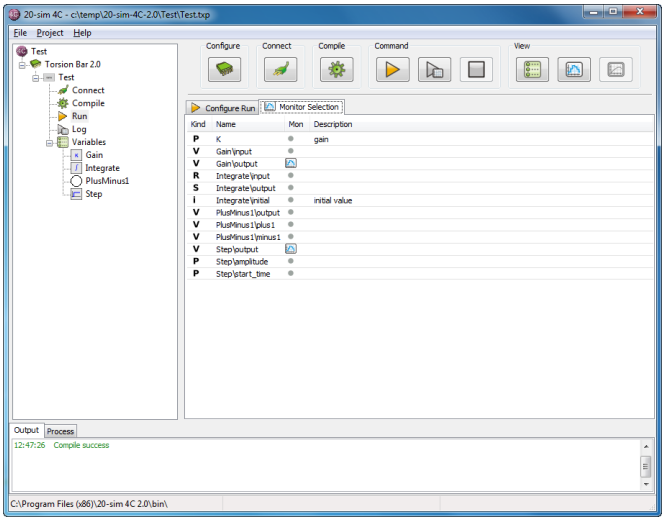


The list of parameters and variables of the submodel Step.

Now we will choose a second variable for monitoring.

13. Click on the ***Gain*** submodel and select the variable ***output*** for **monitoring**.
To see all variables that have been chosen for monitoring, you can view a Monitor Selection.

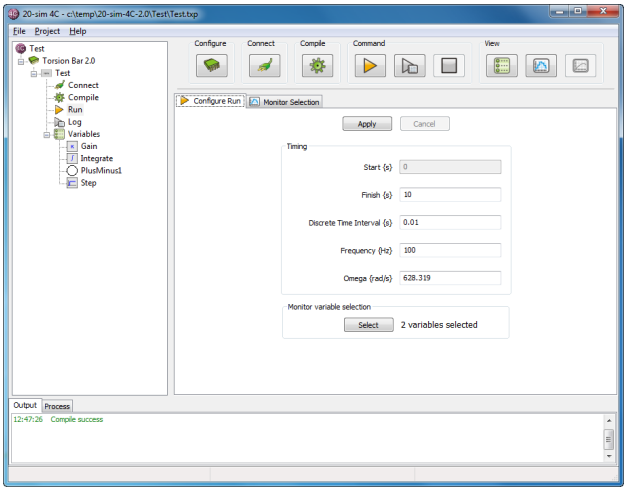
14. In the tree-view click **Run** and then the tab **Monitor Selection**.
Now 20-sim 4C should look like:



The list of monitored variables.

Now we will configure the run settings, open a monitor plot and start to run the model on the target:

15. Select the **Configure Run** tab and click on the **Apply** button to accept the default settings for this run experiment. The **Run** button should become green .



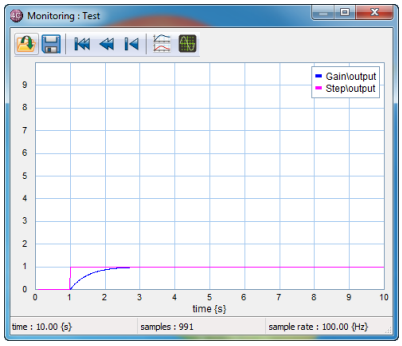
Configure runtime settings.

By default, 20-sim 4C will use the same settings as used in the 20-sim simulator. On the Configure Run tab, you can change for example the Finish time for your model.

16. Click on the **Monitor** button to open a plot window.

17. Click on the **Run** button to start running the model on the target.

Now you should see the following plot after 10 seconds of running. The plot shows a stepwise change in the setpoint signal and a first order response of the system.



The monitored variables, shown in a plot.

If your results are similar, 20-sim 4C is properly installed and your target is properly working. If the plot results are not similar but some other variable is shown in the plot, check if the correct variables were chosen for monitoring (hint: check the Monitor Selection tab of step 14).

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This manual describes the installation procedures
for all products of Controllab Products.

Controllab Products B.V. Hengelosestraat 500, 7521 AN Enschede, The Netherlands
T +31(0)85 773 18 72, E info@controllab.nl, **www.20sim.com**