SmartVR

Quick Start Guide

Release **2.0**

www.veear.eu

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Introduction – Read this first!

Thank you for choosing a VeeaR Product!

This document contains the basic information on how to get started with your new SmartVR Development Kit. Technical details for specialized software and hardware development with this equipment are beyond the scope of this document. The full user manual is available as a separate download at www.veear.eu.

Before using your new VeeaR equipment carefully read this complete document as well as the complete user manual.

SmartVR Product Description

The SmartVR module is a development platform for speech synthesis and voice recognition applications, based on Sensory RSC-4128 mixed-signal processor.

Its small size of 42 x 72mm and two 28-pin connectors with 2.45mm pin spacing, make it breadboard friendly and suitable for prototype boards.

The SmartVR Module is factory programmed with an upgradeable Virtual Machine firmware that enables easy and low cost development for a wide range of applications with focus on speech and voice recognition.

It is available as a stand-alone OEM module or as part of two development kits.

- SmartVR-DK
- SmartVR-DK PRO

For full technical specifications of the SmartVR Module and Development Board, please refer to the SmartVR user Manual available as a separate download at www.veear.eu.

Hardware Setup

First of all check jumper settings on the Development Board, in particular:

- JP14, JP15 and JP16 are for selecting power source. Only one of these jumpers must be closed, selecting your preferred power source from USB, on-board batteries or external power source connected to EXT PWR Jack.
  In the following example we consider to use USB as power source, therefore only JP14 will be closed
- JP3 and JP2 are for selecting the audio output between PWM and amplified DAC. Both jumpers must be placed according to the PWM or DAC position. In the following example we consider to use the amplified DAC audio output
- JP18 and JP19 are for microphone enable, they both must be closed in order to use the on-board microphone
- JP6 to JP9 are for enabling push buttons A to D respectively. In the following example we consider to enable all buttons (i.e. jumpers closed)
- JP10 to JP13 are for enabling on board LEDS (Green[1], Yellow, Yellow2 and Red). In the following example we consider to enable all LEDs (i.e. jumpers closed)

Then plug the SmartVR module into the Development Board by aligning the two white arrows on both boards, as in the following picture.

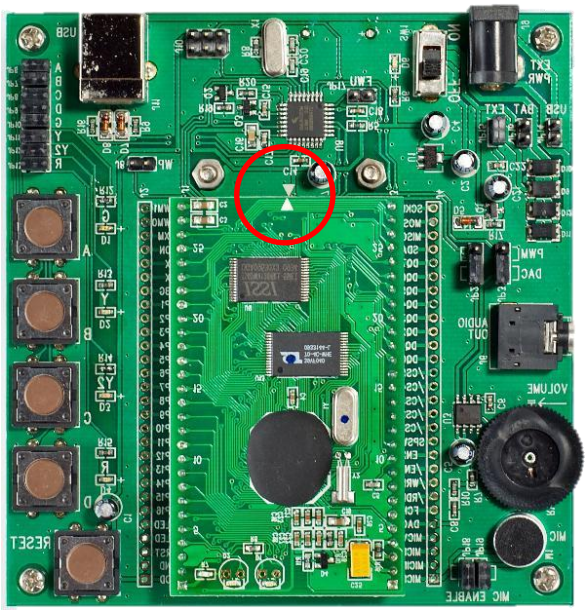


Figure 1 – Boards alignment and jumpers position

Connect your headphones or speakers to the Audio Out jack (mono output, with stereo speakers only one channel is active). You are now ready to proceed with software installation.

Note: Be careful with volume: very loud sounds can damage your hearing!

Note: Do NOT connect the USB cable to your computer until all software is successfully installed.

[1] LED marked with G could be blue on some boards

[2] During the installation process you will be requested to review some License Agreements.

Software Installation

1. Download the latest software from this page: www.veear.eu/support/downloads.aspx
2. Extract the downloaded zip file to a temporary folder.
3. Double click “Start.exe” (note in some cases “.exe” postfix may not be visible)
4. Once the Installer is started, you will see the following window:

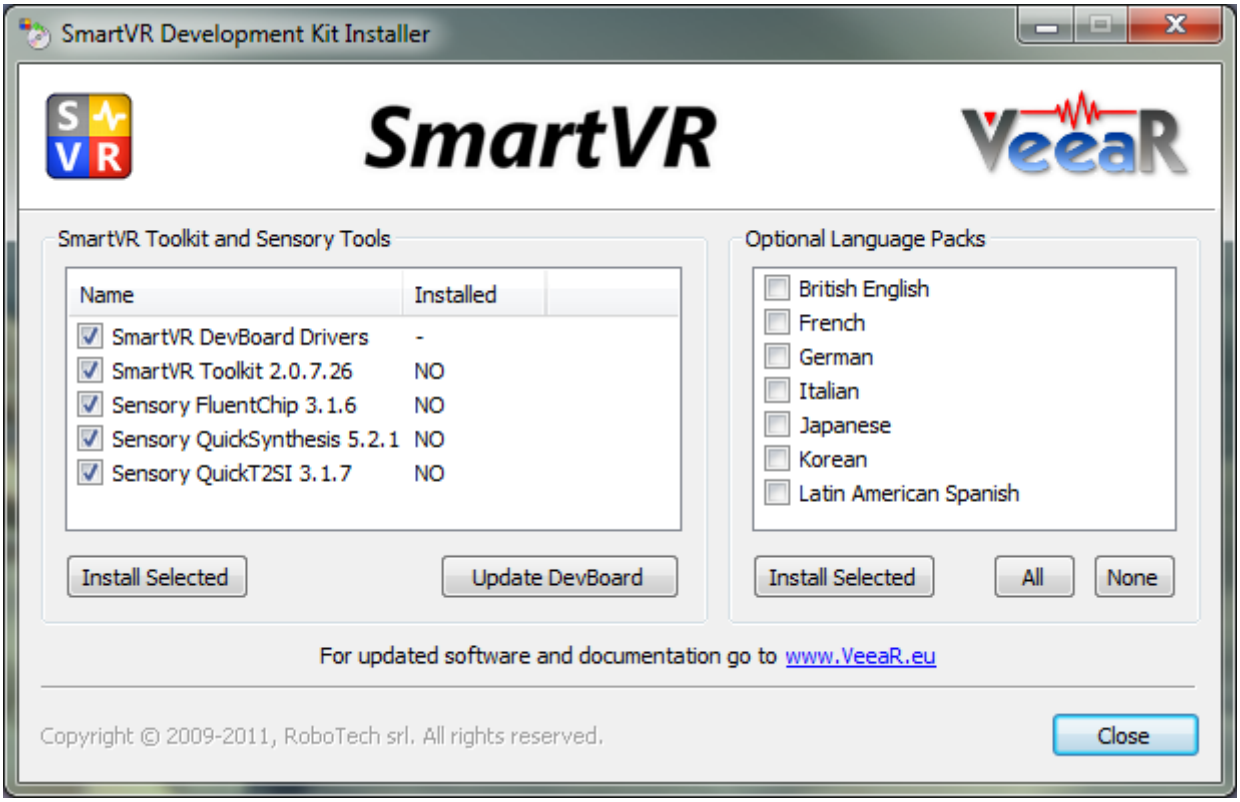


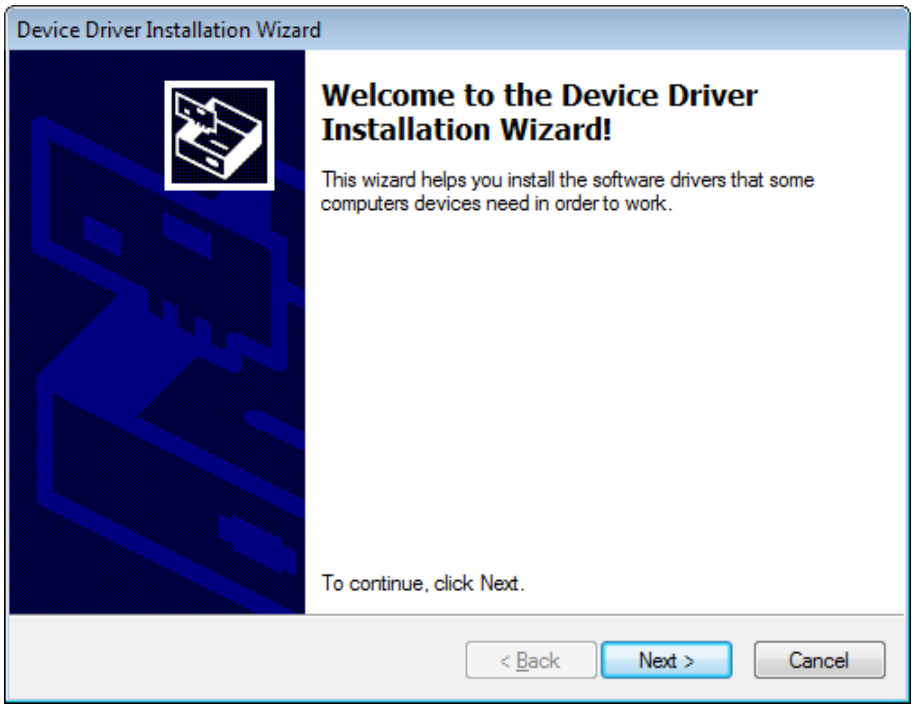
Figure 2 – Installer window

The Installer will automatically check if any software is already installed in your computer and, if not or outdated, it will propose you to install it.

In order to correctly use the SmartVR Toolkit you need to install all items in the list "SmartVR Toolkit and Sensory Tools", as in Figure 2.

Click "Install Selected" in order to start the installation of the selected items.
On the first "SmartVR Toolkit Setup" window click "Next" and then leave default options and proceed with installation[2].

[2] During the installation process you will be requested to review some License Agreements.



Click on next and, depending on your operating system, you will see a window asking if you want to proceed with this installation:

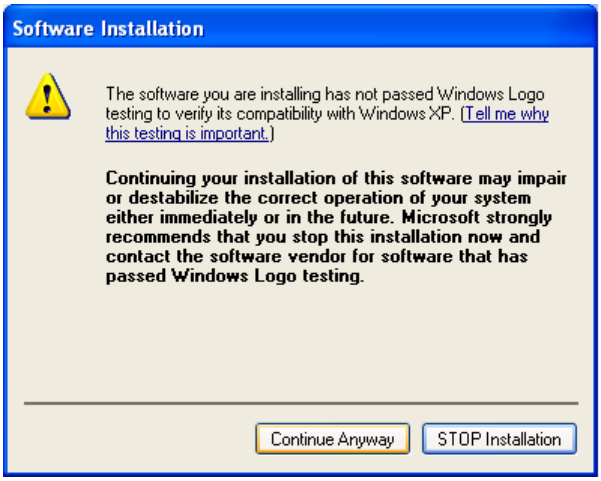


Figure 3 – Driver Installation in Windows XP

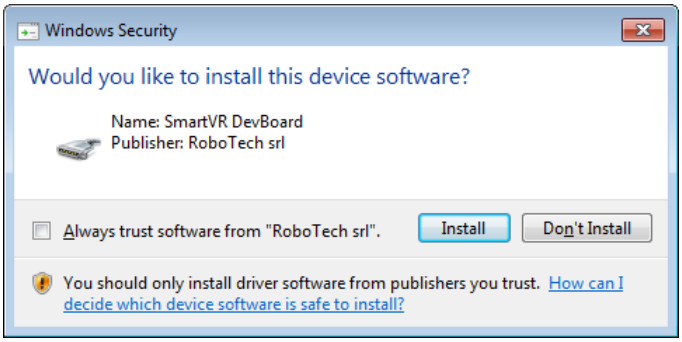


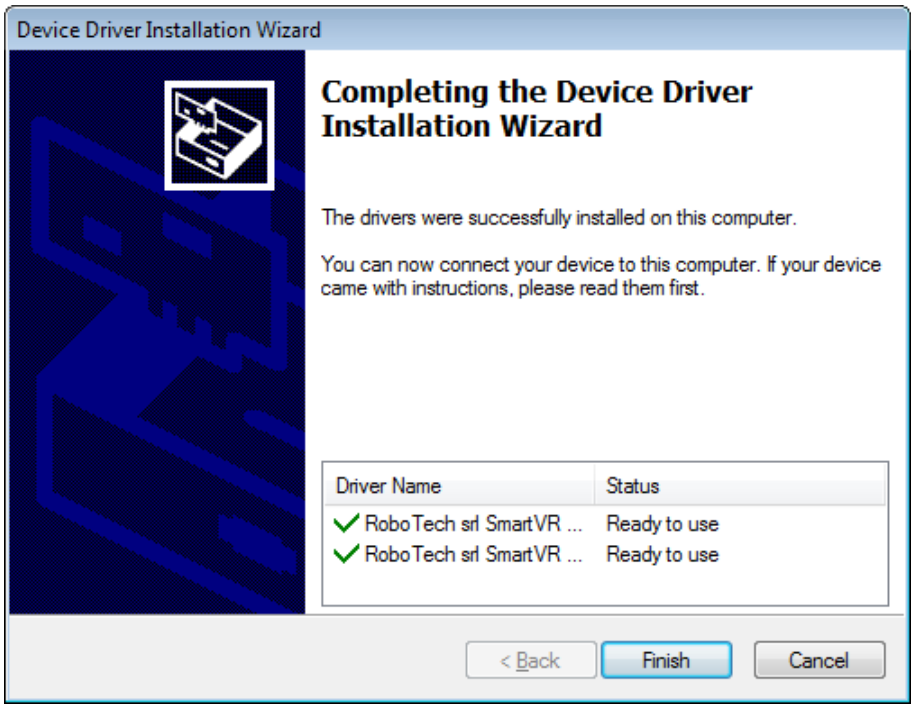
Figure 4 – Driver Installation in Windows Vista or 7

Click on "Continue Anyway" if you are using Windows XP (see Figure 3)[3] or "Install" if you are using Windows Vista or 7 (see Figure 4)[4].

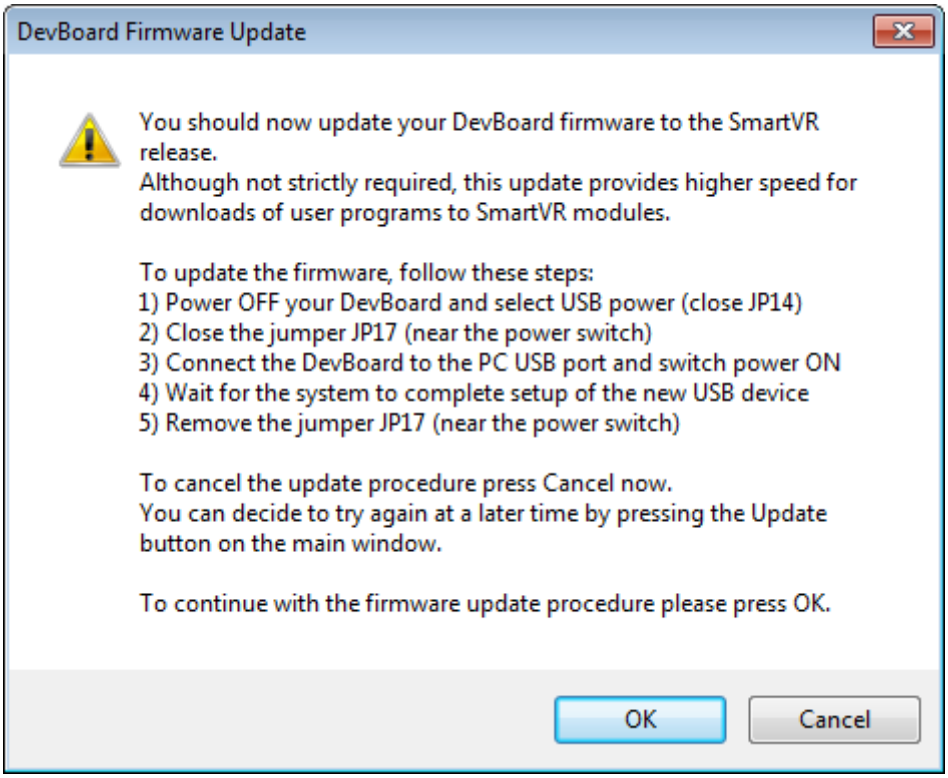
At the end of the driver installation you will see a window with two green check marks, indicating a successful installation.

[3] In Windows XP you will see the same window of Figure 3 also the first time you connect the Development Board to a USB port on your computer: just click again on "Continue Anyway".

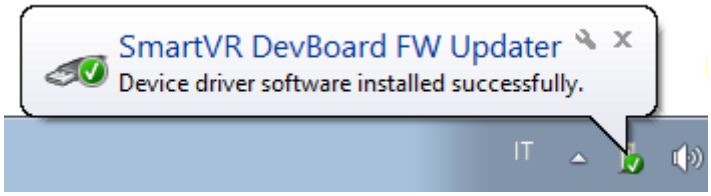
[4] If you check 'Always trust software from "RoboTech srl"' you will need to click on "Install" just once in Windows Vista/7, otherwise you will need to click on "Install" in two different windows because two different drivers will be installed.



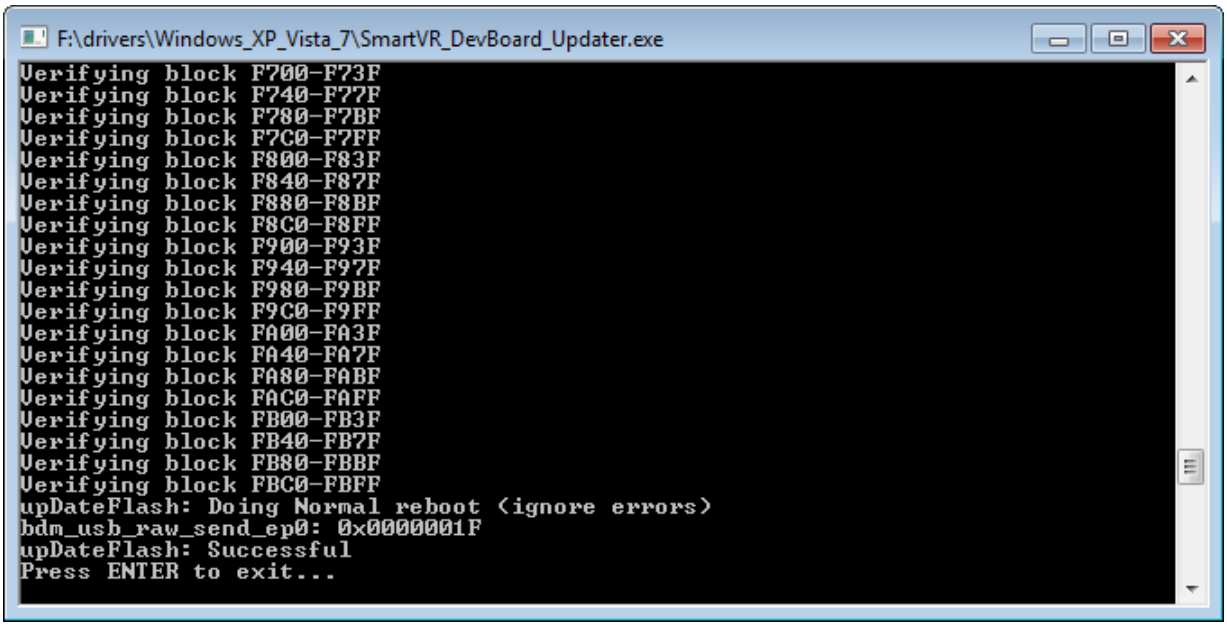
After clicking "Finish", you will be asked to update your DevBoard firmware, effectively turning it into a SmartVR DevBoard. All the software will continue to work also with the old VoiceGP DevBoard firmware, so it is fine to upgrade your DevBoard at a later time. The new firmware provides better download speed when programming SmartVR modules.



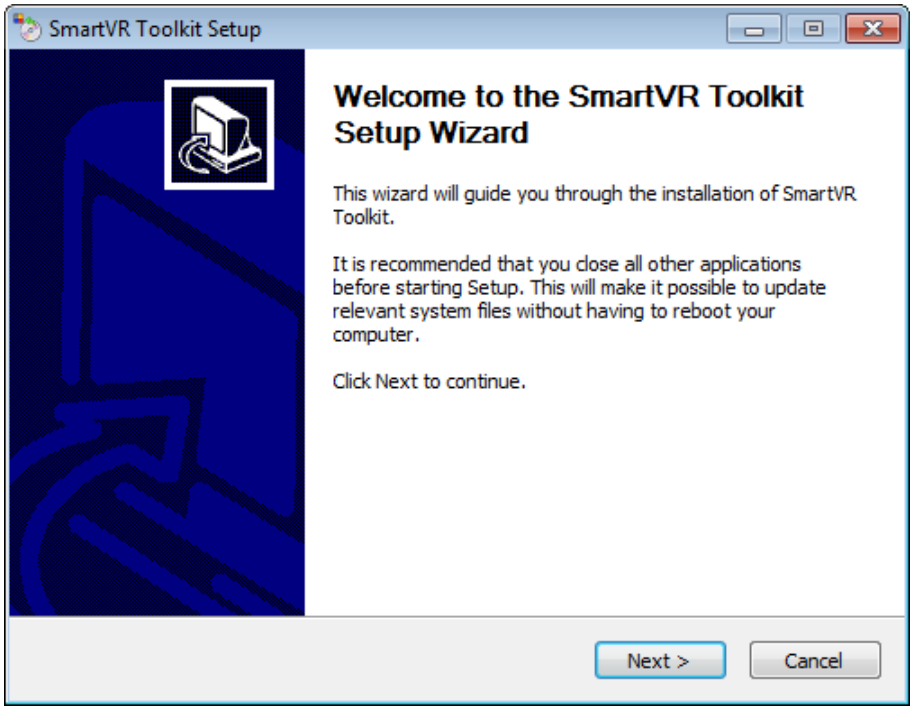
If you want to proceed with the upgrade, please follow the steps outlined on the dialog box. A new USB device will be found and installed:



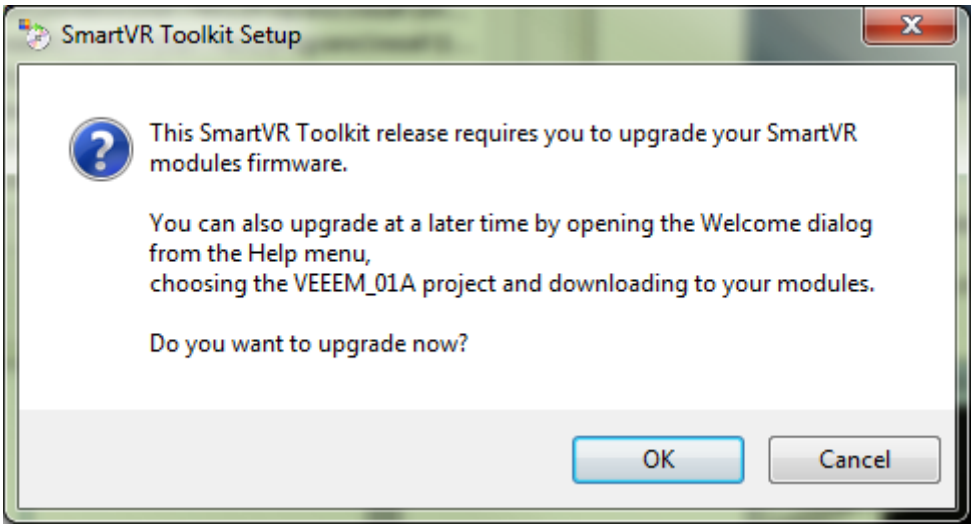
After the last step press OK to start the update process. Do not remove power or disconnect the DevBoard during the update. The update process will complete in a few seconds with a message like this:



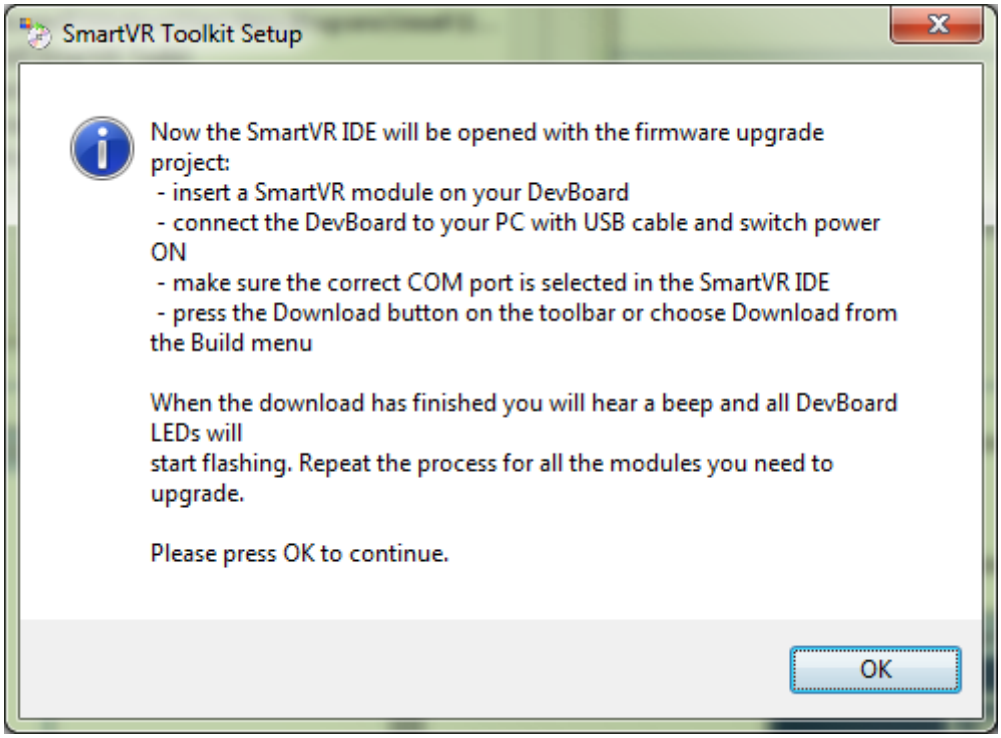
If you choose to postpone the upgrade, you will be prompted about the steps to follow:



At this stage you may be requested to update the SmartVR Module firmware. Click OK:

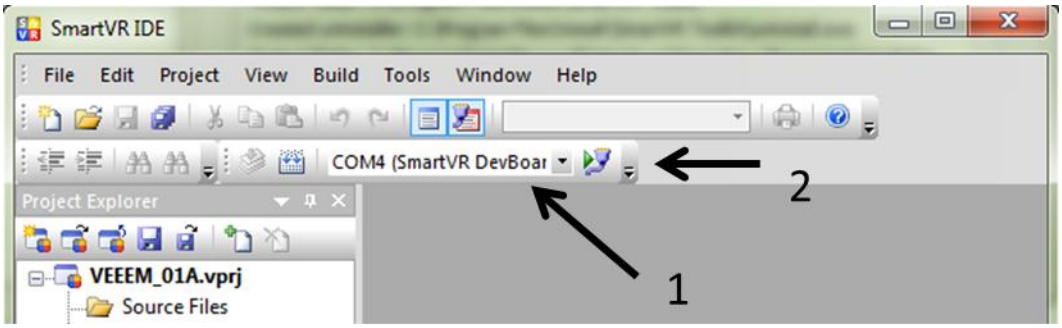


You will be prompted with the following instructions. Follow the instructions carefully and click OK:



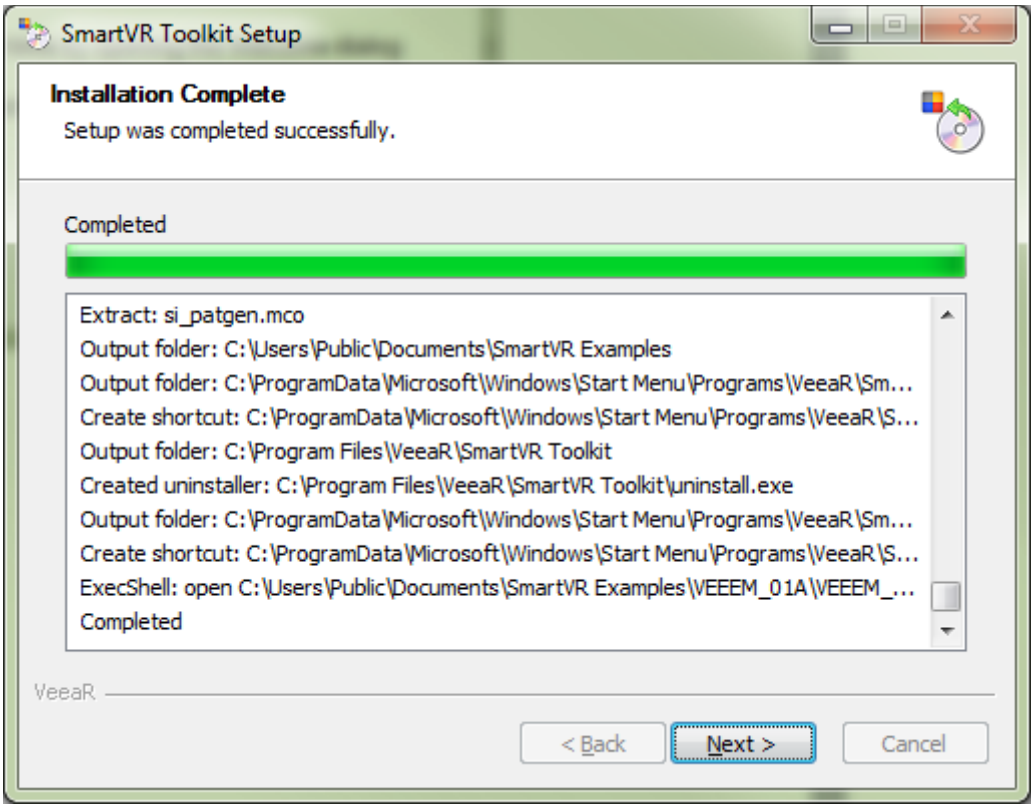
Please note that the SmartVR IDE will be opened only after clicking “OK” as instructed above.

1. Make sure the correct COM port is selected in the SmartVR IDE
2. Press the Download button on the toolbar or choose Download from the Build menu

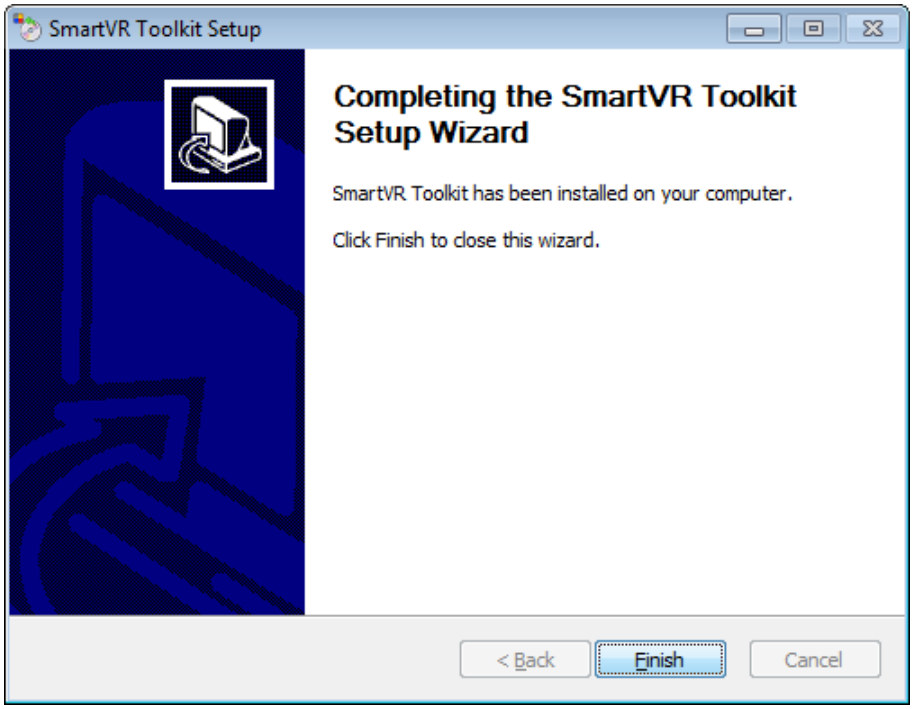


3. When the download has finished you will hear a beep and all DevBoard LEDs will start flashing. Repeat the process for all the modules you need to upgrade.

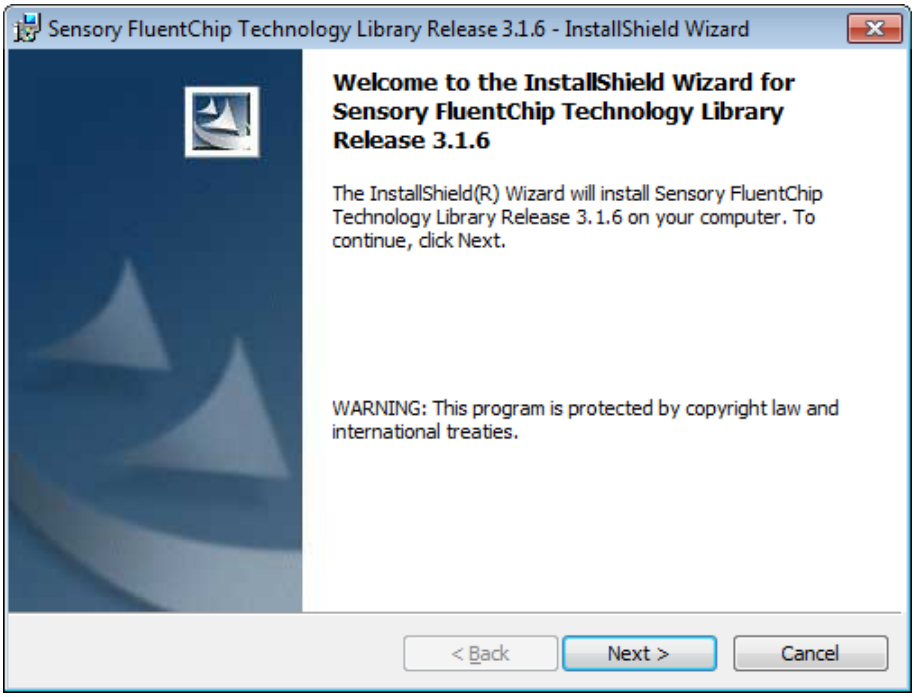
4. Now click Next in the SmartVR Toolkit Setup window and afterwards Finish:



The first wizard ends by clicking on "Finish" on the last window:

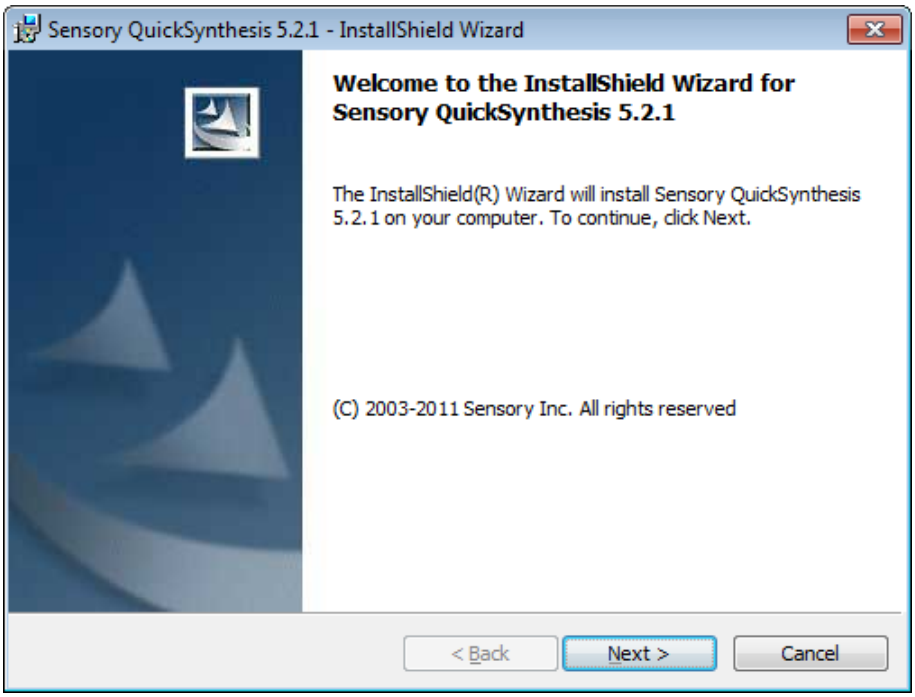


Then the installation process continues with the FluentChip Library wizard:



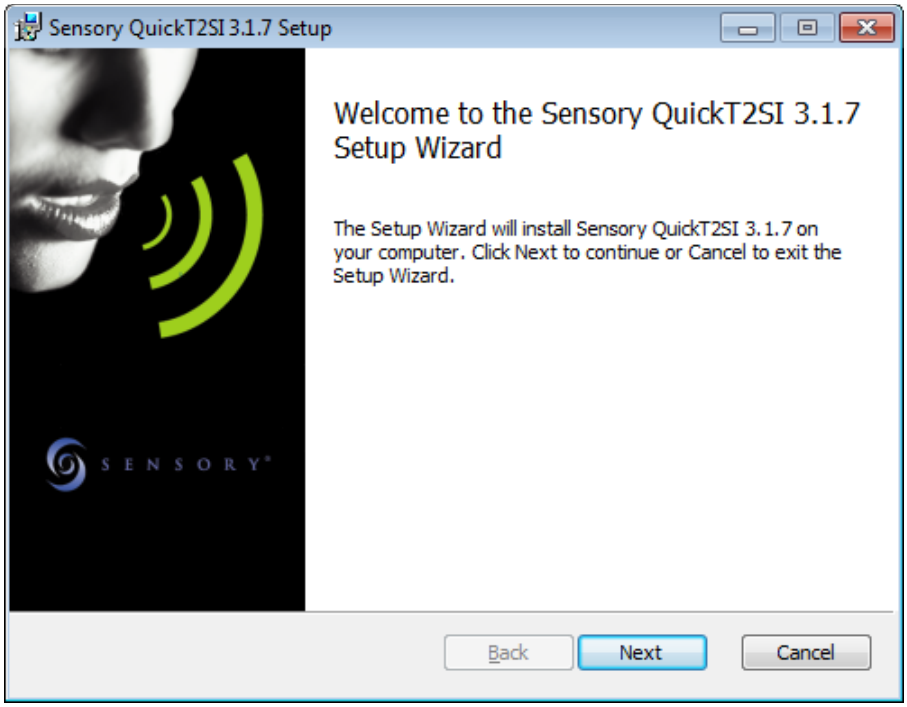
As before, click "Next" and then leave default options and proceed with installation.

Click "Finish" on the last window of the FluentChip Library wizard and the installation process then continues with the QuickSynthesis wizard:



As before, click "Next" and then leave default options and proceed with installation.

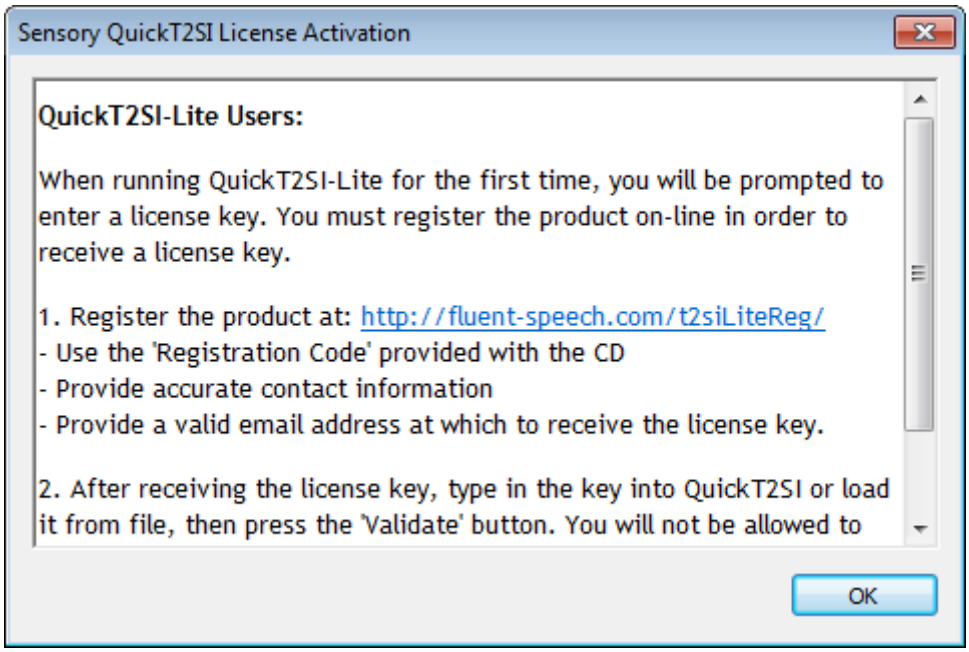
Click "Finish" on the last window of the QuickSynthesis wizard and then proceed with the QuickT2SI (Text to Speaker Independent) setup:



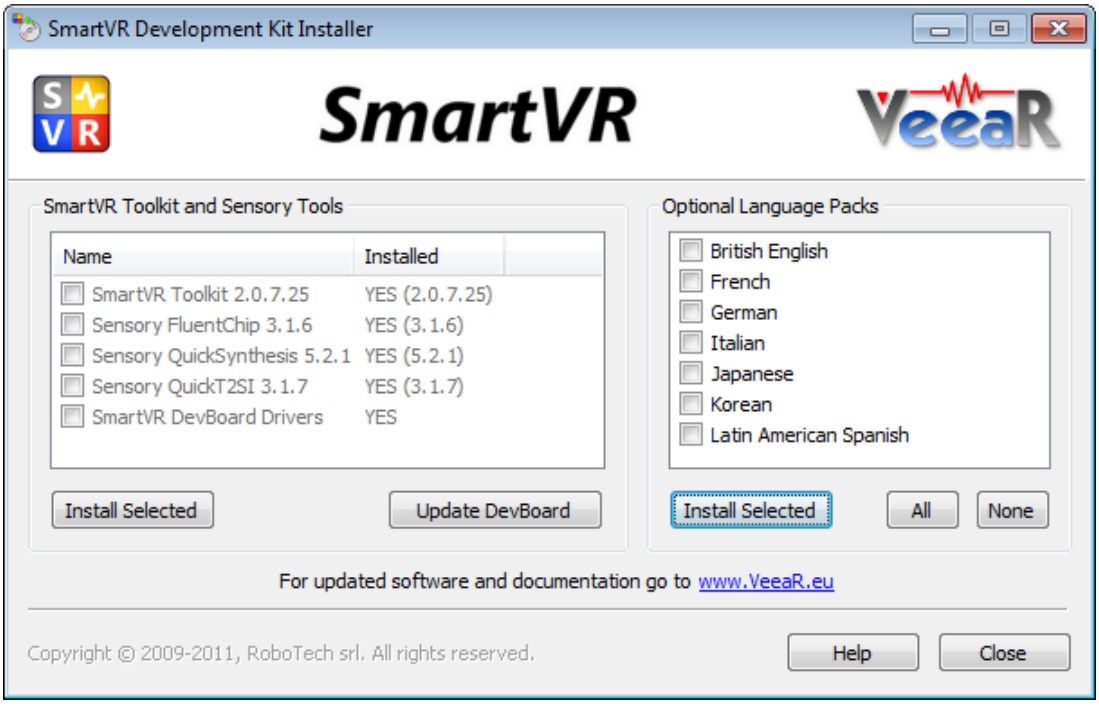
As before, click "Next" and then leave default options and proceed with installation.

After clicking on "Finish" on the last window of this wizard, a new window will remind you how to obtain a valid license key in order to activate your copy of QuickT2SI-Lite[5].

[5] NOTE: QuickT2SI-Lite License Registration code is provided only with the SmartVR-DK PRO Kit.



If everything has been installed properly (with or without the firmware update), you will see a SmartVR Development Kit Installer window like this:

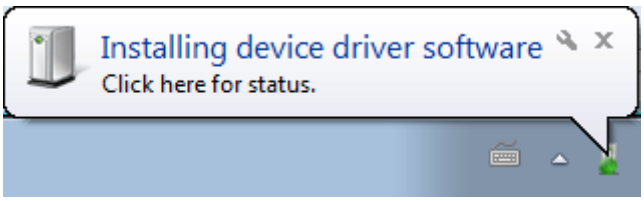


Now you can install Optional Language Packs, if needed, by checking the desired languages and then clicking on "Install Selected".

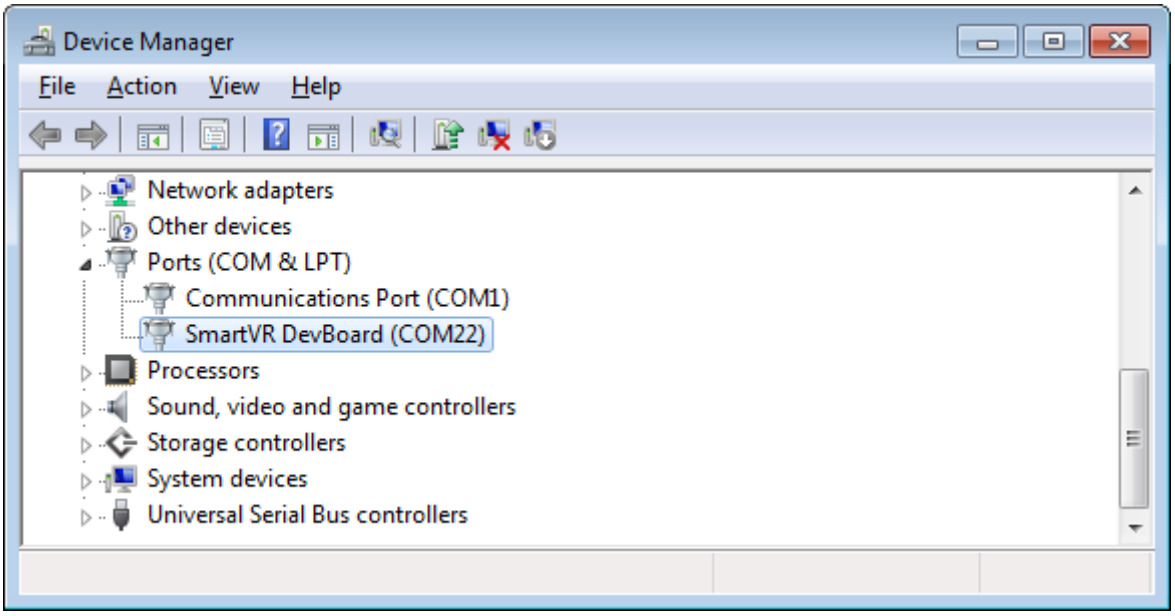
Then you can close the installer by clicking "Close" and you are ready to go!

Running your first project

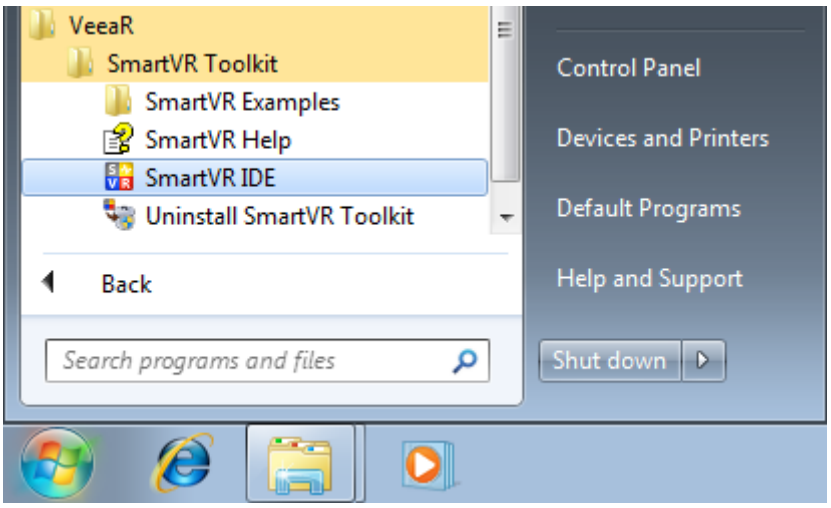
Connect one end of the USB cable to an available port on your computer and the other end to the SmartVR Development Board then switch the board ON.
The first time you turn on the board connected to your computer, Windows will install the drivers:



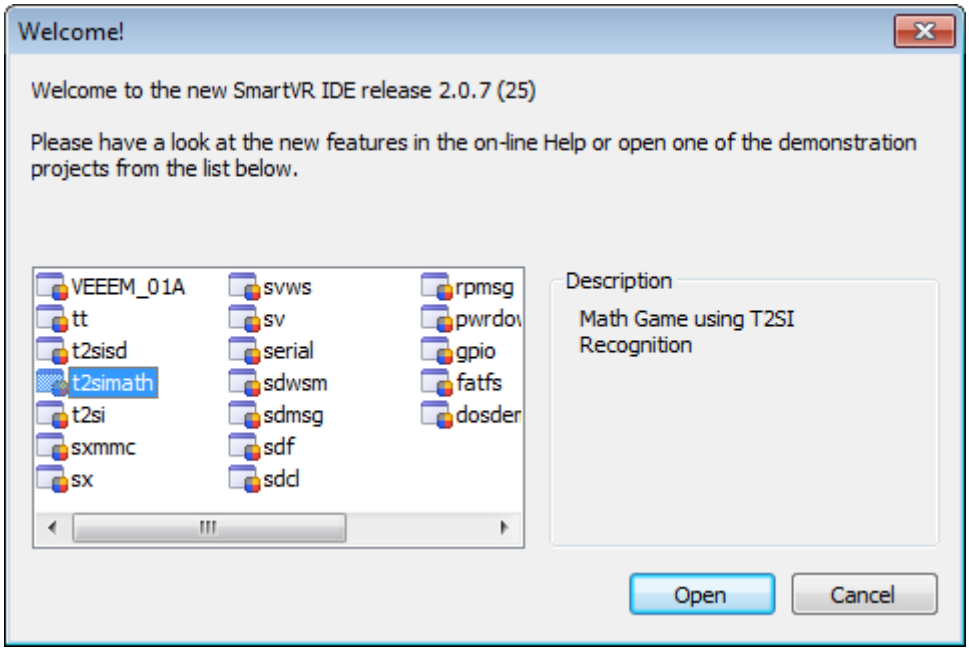
The DevBoard appears as a new serial port that allows programming SmartVR modules. You may check what COM port has been assigned to the DevBoard by looking at the system Device Manager:



Now you can run the SmartVR IDE, either from the desktop icon or from the Start menu:

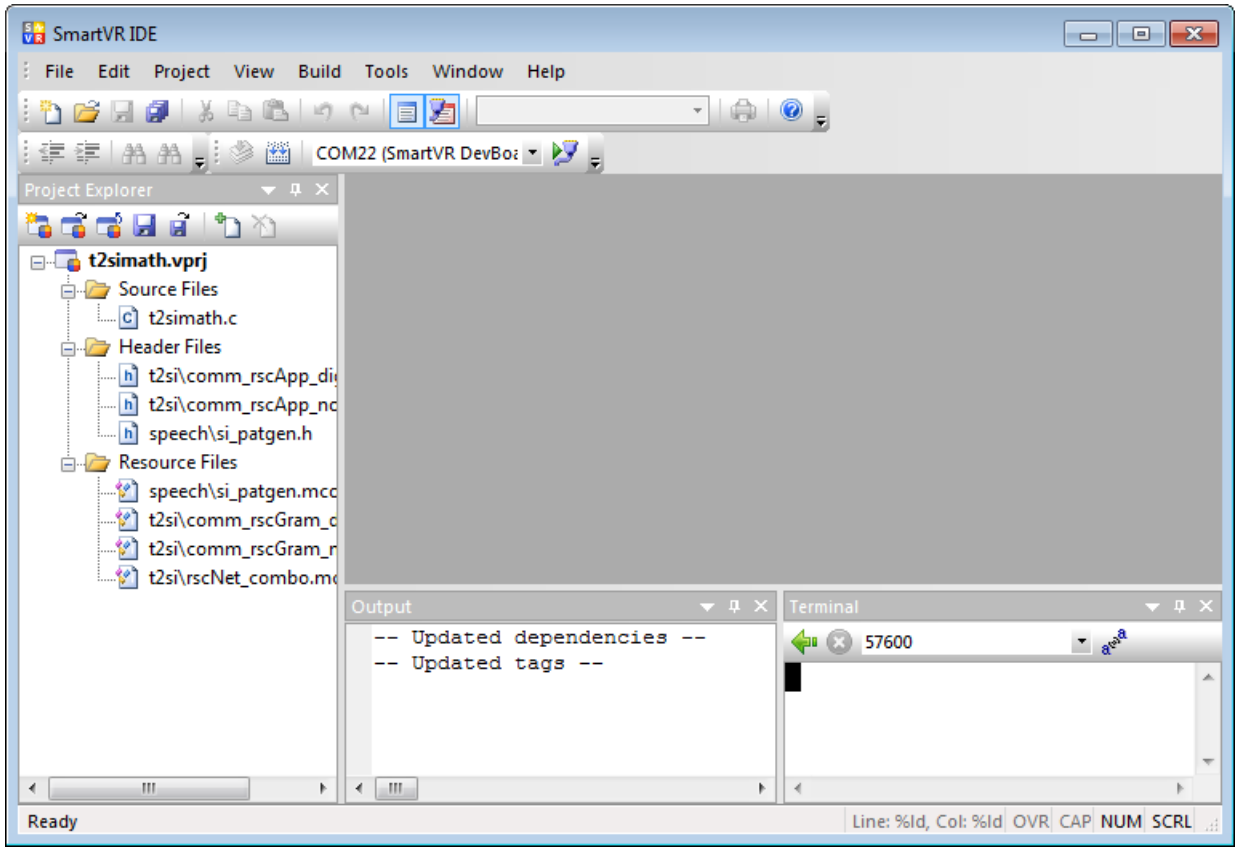


The first time you run the IDE you will see a welcome message:



Let's select the "*t2simath*" demo project and click "Open".

You will see the following window:

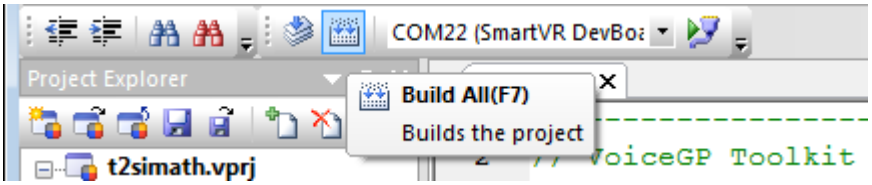


You can double click on "*t2simath.c*" on the Project Explorer window on the left in order to have a look at the main code of this project.

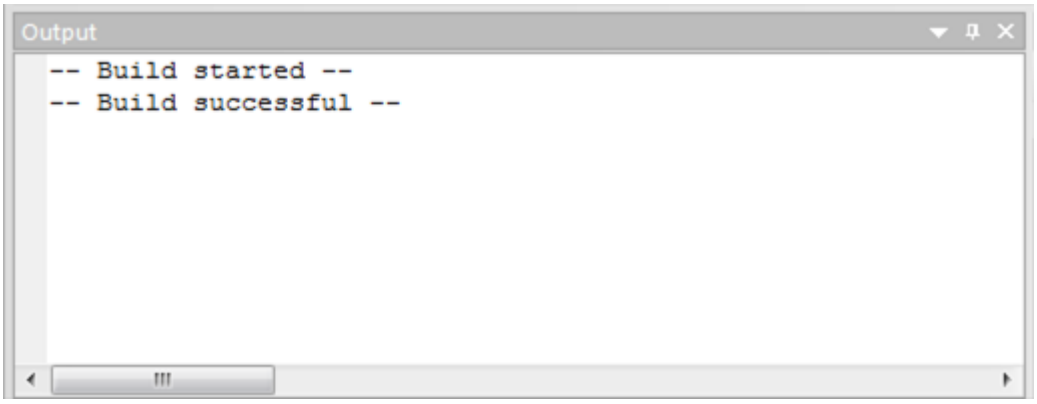
Every demo has comments at the beginning of the main code describing what the demo actually does, for instance the "*t2simath*" demo has the following description:

```
// OPERATION:
//
// T2SIMATH illustrates Text to Speaker Independent technology,
// using more than one command grammar with a common acoustic model. The data
// files for this sample were built using the QT2SI Acoustic Model Combiner tool.
//
// Button A causes the program to generate a random math problem,
// ask it and wait for an answer. If the answer has a low confidence level,
// the program re-prompts for confirmation,
// then announces the final Correct/Incorrect result.
// Button A can be used to interrupt speech or recognition.
//
// The program goes into a low-power sleep if there is no activity
// for approximately 3 minutes and needs a reset to wake up.
//
//-------------------------------------------------------------------------
```

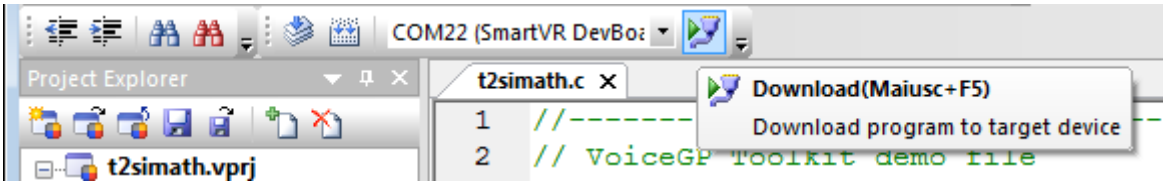
Now you are ready to build and download your first project.
Click on the "Build All" icon:



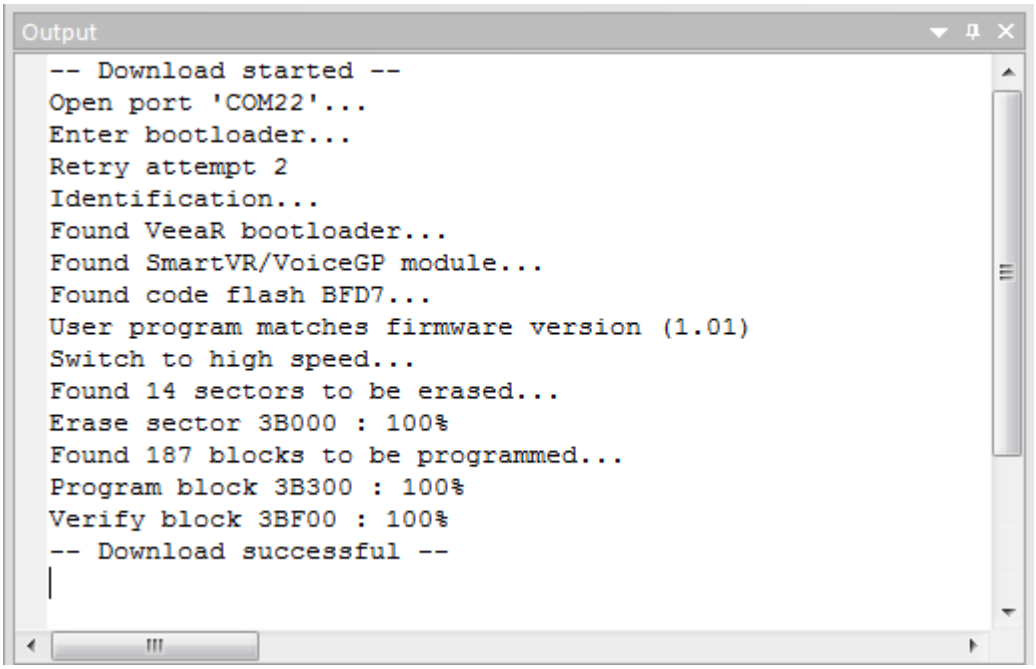
…the Output window will tell you if the Build was successful:



…now click on the "Download" icon:



…the Output window will tell you if the Download has been done:



Now you will hear a "beep" and a voice telling you "*Press the A button for a new problem!*"… Just press the A button on the DevBoard and start "playing"!

Using Sensory Tools with SmartVR

Compressed speech

The Sensory QuickSynthesis4™ tool is designed to help create and manage speech and sound synthesis for Sensory RSC4x micro-controller applications, using a variety of compression technologies with a wide range of data rates. It provides a graphical user interface to create lists of sounds and phrases and to compile them into object modules that can then be linked into the final application.

The SmartVR platform with Virtual Machine firmware supports these compression technologies:

- SXH (SX-2 to SX-6, 8KHz or 9.3KHz)
- ADPCM (4-bit, 8KHz)
- PCM (8-bit, 8KHz or 9.3KHz)

Music and LipSync technologies are not currently supported (they might be available with future VM firmware revisions).

When you build a QS4 project for use with the SmartVR VM platform, select the default options:

- "Build Linkable Module (most cases)"
- "Load in CONST space (share ROM with program)"
- "Load above or at: 0"

The tool generates four kinds of files, with the same name as the project file and a different extension. To use the generated data you need to add the ".H" and ".MCO" files to your SmartVR IDE project and include the ".H" file in your source files where necessary.

Please see the "sx" demo project in the SmartVR IDE for examples of use in C language and the FluentChip Reference manual for syntax and documentation (also available from SmartVR IDE Help menu).

You can experiment with QS4 by using the "sample.qxp" project file, located in the folder "QuickSynthesis4\projects\sample" under your "Program Files" folder or wherever you chose during setup.

Please refer to the QuickSynthesis4™ on-line Help for details and usage information.

> **Note:** Direct download to the SmartVR module from the QS4 tool, for testing compression results, is not currently supported!

Speaker Independent vocabularies

The Sensory QuickT2SI™ tool is designed to support the T2SI™ (Text-to-Speaker-Independent) engine, which is a small-footprint, speaker-independent, phonemic speech recognizer that runs on the RSC-4x family of mixed-signal speech processors. It provides a graphical user interface to enter speech command lists and compile them into object modules that can then be linked into the final application.

The QuickT2SI™ Lite license enables creation of recognition sets with up to 12 commands each.

When you build a QT2SI project for use with the SmartVR VM platform, make sure you select the default options in the Hardware tab:

- "Target Device: RSC-4128"
- "Acoustic Model Memory Space: const"
- "Trigger Grammar Memory Space: const"
- "Command Grammar Memory Space: const"

The SmartVR platform with Virtual Machine firmware has room for up to 320KB of T2SI data. You may check the amount of memory needed by your set at the end of the build (see “Total ROM size”).

The tool generates three kinds of files, with the same name as the project file and a different extension. To use the generated data you need to add the “.H” and “.MCO” files to your SmartVR IDE project and include the “.H” file in your source files where necessary.

Please see the “t2si” demo project in the SmartVR IDE for examples of use in C language and the FluentChip Reference manual for syntax and documentation (also available from SmartVR IDE Help menu).

You can experiment with QT2SI by using the “sample.rsc” project file, located in the folder “*SmartVR Examples\t2si\t2si*” under your “Shared Documents” folder (Windows XP) or “Public Documents” folder (Windows Vista/7).

Please refer to the QuickT2SI™ on-line Help for details and usage information.

Note: Direct download to the SmartVR module from the QT2SI tool, for testing recognition results, is not currently supported!

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