



# **Quick Start Guide**

Release 2.0



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## **Table of Contents**

roduction – Read this first!	3
nartVR Product Description	3
ardware Setup	
ftware Installation	
Inning your first project1	4
sing Sensory Tools with SmartVR	
Compressed speech 1	8
Speaker Independent vocabularies1	8



#### 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 <u>www.veear.eu</u>.

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 <u>www.veear.eu</u>.



### **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<sup>1</sup>, 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.

LED marked with G could be blue on some boards

During the installation process you will be requested to review some License Agreements. SmartVR Quick Start Guide (2.0)

www.veear.eu

### **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:

SmartVR Development Kit Instal	martVR	VeraR	
SmartVR Toolkit and Sensory Tools	Installed	Optional Language Packs	
Name SmartVR DevBoard Drivers SmartVR Toolkit 2.0.7.26 Sensory FluentChip 3.1.6 Sensory QuickSynthesis 5.2.1 Sensory QuickT2SI 3.1.7	- NO NO	<ul> <li>French</li> <li>German</li> <li>Italian</li> <li>Japanese</li> <li>Korean</li> <li>Latin American Spanish</li> </ul>	
Install Selected	Update DevBoard	Install Selected All None	
For updated software and documentation go to www.VeeaR.eu         Copyright © 2009-2011, RoboTech srl. All rights reserved.       Close			

*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<sup>2</sup>.

<sup>&</sup>lt;sup>2</sup> 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:

Software	e Installation	
The software you are installing has not passed Windows Logo testing to verify its compatibility with Windows XP. ( <u>Tell me why</u> this testing is important.) Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the software vendor for software that has passed Windows Logo testing.		■ Windows Security Would you like to install this device software? Name: SmartVR DevBoard Publisher: RoboTech srl
	Continue Anyway STOP Installation	Always trust software from "RoboTech srl".       Install       Don't Install         You should only install driver software from publishers you trust.       How can I         decide which device software is safe to install?

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)<sup>3</sup> or "Install" if you are using Windows Vista or 7 (see Figure 4)<sup>4</sup>.

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

<sup>&</sup>lt;sup>3</sup> 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".

<sup>&</sup>lt;sup>4</sup> 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.



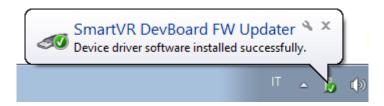


After clicking "Finish", you will be asked to update your DevBoard firmware, effectively turning it into a SmartVR DevBoard. All the software will continue to work also with the old VoiceGP DevBoard firmware, so it is fine to upgrade your DevBoard at a later time. The new firmware provides better download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

DevBoard	Firmware Update	×
	You should now update your DevBoard firmware to the SmartVR release. Although not strictly required, this update provides higher speed for downloads of user programs to SmartVR modules. To update the firmware, follow these steps: 1) Power OFF your DevBoard and select USB power (close JP14) 2) Close the jumper JP17 (near the power switch) 3) Connect the DevBoard to the PC USB port and switch power ON 4) Wait for the system to complete setup of the new USB device 5) Remove the jumper JP17 (near the power switch) To cancel the update procedure press Cancel now. You can decide to try again at a later time by pressing the Update button on the main window. To continue with the firmware update procedure please press OK.	
	OK Cance	el 📃

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:

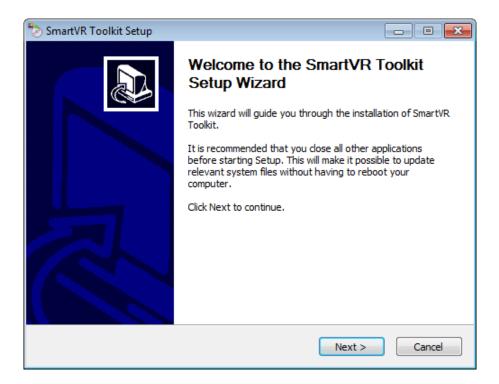




After the last step press OK to start the update process. Do not remove power or disconnect the DevBoard during the update. The update process will complete in a few seconds with a message like this:

F:\drivers\Windows_XP_Vista_7\SmartVR_DevBoard_Updater.exe Jerifying block F700-F73F	
Jerifying block F740-F77F	<u>^</u>
Jerifying block F780-F7BF Jerifying block F7C0-F7FF	
Jerifying block F800-F83F	
Jerifying block F840-F87F	
Jerifying block F880-F8BF	
Jerifying block F8C0-F8FF	
Jerifying block F900-F93F	
Jerifying block F940-F97F	
Jerifying block <u>F980-F9BF</u>	
Jerifying block <u>F9C0-F9FF</u>	
Jerifying block FA00-FA3F	
Jerifying block FA40-FA7F	
Jerifying block FA80-FABF	
Jerifying block FACO-FAFF	
Jerifying block FB00-FB3F	
Jerifying block FB40-FB7F	
Jerifying block FB80-FBBF	=
Jerifying block FBC0-FBFF	
upDateFlash: Doing Normal reboot (ignore errors)	
bdm_usb_raw_send_ep0: 0x0000001F	
upDateFlash: Successful	
Press ENTER to exit	

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:

🌚 SmartV	R Toolkit Setup
?	This SmartVR Toolkit release requires you to upgrade your SmartVR modules firmware. You can also upgrade at a later time by opening the Welcome dialog from the Help menu, choosing the VEEEM_01A project and downloading to your modules. Do you want to upgrade now?
	OK Cancel

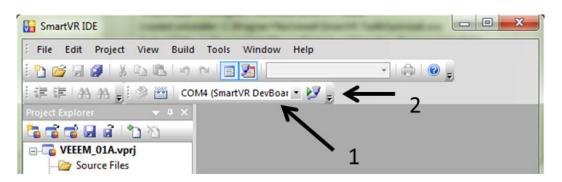
You will be prompted with the following instructions. Follow the instructions carefully and click OK:

🍤 SmartV	/R Toolkit Setup
i	Now the SmartVR IDE will be opened with the firmware upgrade project: - insert a SmartVR module on your DevBoard - connect the DevBoard to your PC with USB cable and switch power ON - make sure the correct COM port is selected in the SmartVR IDE - press the Download button on the toolbar or choose Download from the Build menu 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. Please press OK to continue.
	ОК

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:

🔄 SmartVR Toolkit Setup				
Installation Complete				
Setup was completed successfully.				
Consisted				
Completed				
Estada el estado				
Extract: si_patgen.mco Output folder: C:\Users\Public\Documents\SmartVR Examples				
Output folder: C:\ProgramData\Microsoft\Windows\Start Menu\Programs\VeeaR\Sm				
Create shortcut: C:\ProgramData\Microsoft\Windows\Start Menu\Programs\VeeaR\S				
Output folder: C:\Program Files\VeeaR\SmartVR Toolkit				
Created uninstaller: C:\Program Files\VeeaR\SmartVR Toolkit\uninstall.exe				
Output folder: C:\ProgramData\Microsoft\Windows\Start Menu\Programs\VeeaR\Sm				
Create shortcut: C:\ProgramData\Microsoft\Windows\Start Menu\Programs\VeeaR\S ExecShell: open C:\Users\Public\Documents\SmartVR Examples\VEEEM 01A\VEEEM				
Completed				
VeeaR				
< <u>B</u> ack Cancel				

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



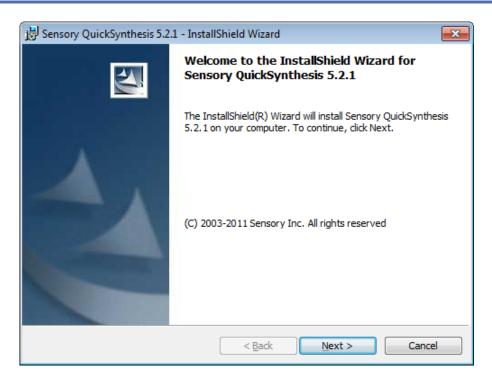
Then the installation process continues with the FluentChip Library wizard:



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

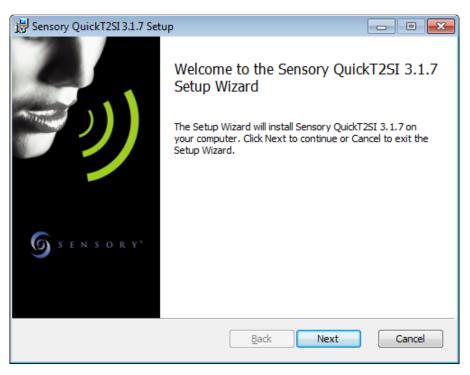
Click "Finish" on the last window of the FluentChip Library wizard and the installation process then continues with the QuickSynthesis wizard:





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:

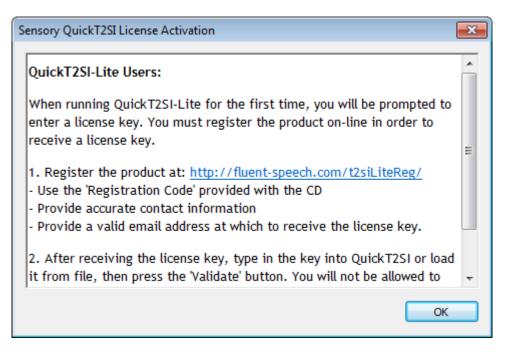


As before, click "Next" and then leave default options and proceed with installation.

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<sup>5</sup>.

<sup>&</sup>lt;sup>5</sup> 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:

SmartVR Development Kit Insta	ller	_ = ×
S A- V R	SmartVR	VeeaR
SmartVR Toolkit and Sensory Tools		Optional Language Packs
Name         SmartVR Toolkit 2.0.7.25         Sensory FluentChip 3.1.6         Sensory QuickSynthesis 5.2.1         Sensory QuickT2SI 3.1.7         SmartVR DevBoard Drivers	Installed           YES (2.0.7.25)           YES (3.1.6)           YES (5.2.1)           YES (3.1.7)           YES	<ul> <li>British English</li> <li>French</li> <li>German</li> <li>Italian</li> <li>Japanese</li> <li>Korean</li> <li>Latin American Spanish</li> </ul>
Install Selected	Update DevBoard	Install Selected All None
For upd	ated software and documentation	on go to <u>www.VeeaR.eu</u>
opyright © 2009-2011, RoboTech :	rl. All rights reserved.	Help Close

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

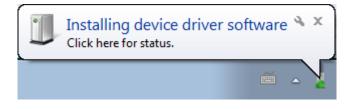
Then you can close the installer by clicking "Close" and you are ready to go!



### **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:

🚔 Device Manager	- • •
<u>File Action View H</u> elp	
Network adapters	*
D Other devices	
Ports (COM & LPT)	
SmartVR DevBoard (COM22)	
Processors	
Sound, video and game controllers	
Storage controllers	=
⊳ In System devices	
🖕 🖕 Universal Serial Bus controllers	-

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

↓ VeeaR ↓ SmartVR Toolkit	Control Panel			
SmartVR Examples SmartVR Help	Devices and Printers			
SmartVR IDE	Default Programs			
<b>●</b> Back	Help and Support			
Search programs and files				
📀 🧭 🚞 💽				



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

Welcome!				
Welcome to the new SmartVR IDE release 2.0.7 (25)				
Please have a lool projects from the		ires in the on-line H	Help or open one of the demonstration	
VEEEM_01A tt t2sisd t2simath t2si t2si sxmmc sx	svws sv serial sdwsm sdmsg sdf	rpmsg pwrdov gpio fatfs	Description Math Game using T2SI Recognition	
•		4		
			Open Cancel	

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

You will see the following window:

🗄 SmartVR IDE
File Edit Project View Build Tools Window Help
🗄 🎦 🚅 💭 🐉 🛍 🗠 🗠 🔳 🔁 🗌 🚽 🚽 🚽 🚽 🖓 🖕
: 律 律 🖪 备 🖕 i 🧇 🛗 🛛 COM22 (SmartVR DevBoz 🔹 🛂 🖕
Project Explorer 🔍 🔻 🗶
🛅 📬 🖼 🗟 👘 🖄 🖄
⊡ 🕞 t2simath.vprj
Source Files
t2simath.c
Header Files
h t2si\comm_rscApp_di h t2si\comm_rscApp_nc
h speech\si_patgen.h
Resource Files
speech\si_patgen.mcc
t2si\comm_rscGram_c
t2si\rscNet_combo.m
Output 👻 🕈 X Terminal 💌 🖡 X
Updated dependencies 💠 😒 57600 💌 🔊
Updated tags
Ready Line: %Id, Col: %Id OVR CAP NUM SCRL ,;;

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: 11 // 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. 11 // The program goes into a low-power sleep if there is no activity // for approximately 3 minutes and needs a reset to wake up. 11 //-\_\_\_\_\_

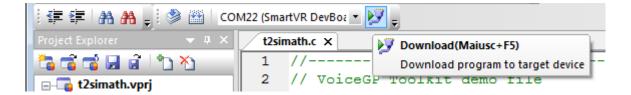
Now you are ready to build and download your first project. Click on the "Build All" icon:

🕴 ோ 👬 👫 🚚 🔅 🎬 🔛 COM22 (SmartVR DevBoz 💌 😏 🖕					
Project Explorer 🔷 🔻	Build All(F7) ×				
🔁 📬 🖬 🖬 👘 🏷	Builds the project				
🛛 🖃 🖓 t2simath.vprj	/, /oiceGP Toolkit				

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

0			
	Build	started	
	Build	successful	
•			- P-

...now click on the "Download" icon:





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

Output	
Download started	
Open port 'COM22'	
Enter bootloader	
Retry attempt 2	
Identification	
Found VeeaR bootloader	
Found SmartVR/VoiceGP module	=
Found code flash BFD7	
User program matches firmware version (1.01)	
Switch to high speed	
Found 14 sectors to be erased	
Erase sector 3B000 : 100%	
Found 187 blocks to be programmed	
Program block 3B300 : 100%	
Verify block 3BF00 : 100%	
Download successful	
	-
• III	F.

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<sup>™</sup> 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<sup>™</sup> 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<sup>™</sup> tool is designed to support the T2SI<sup>™</sup> (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<sup>™</sup> 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<sup>™</sup> 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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