

HemiSSon

HemTextToSpeech

K TEAM

Version 1.2
December 2003

Documentation drawn up by:

Alexandre Colot, K-Team S.A.
Ch. de Vuasset, CP 111
1028 Préverenges
Switzerland

E-mail: <mailto:info@hemisson.com>
Website: <http://www.hemisson.com/>

Registered Trade Mark:

Hemisson: K-TEAM SA.
SysQuake LE: Calerga SA

Please note:

- The contents of this manual may be changed without prior notification.
- Every effort has been made to ensure the accuracy of this manual.
However, if you do find an error, we would be grateful if you would inform K-Team S.A.
- Notwithstanding the above, K-Team S.A. cannot be held liable for any consequences arising from an error in this manual.

Table of Contents

1	Introduction	3
1.1	How to Use this Manual.....	3
1.2	Precautionary Measures.....	3
1.3	Recycling.....	3
2	Connecting Up	4
2.1	Fitting.....	4
2.2	Removal.....	5
3	The HemTextToSpeech Module	6
3.1	Overall View.....	6
3.2	Testing and Sequence Programming.....	7
3.3	I2C Address.....	8
3.4	Register Addresses.....	8
3.4.1	Command Register.....	8
3.4.2	Firmware Version Register.....	8
3.5	Command Register.....	9
3.5.1	Reading a Pre-Defined Phrase.....	9
3.5.2	Loading a Dynamic Phrase.....	9
3.5.3	Dynamic Phrase Speech Production.....	9
4	Utilisation	10
4.1	C Programming.....	10
4.1.1	Void HemTextToSpeech Init(void).....	10
4.1.2	Void HemTextToSpeech Speed(char value).....	10
4.1.3	Void HemTextToSpeech Pitch(char value).....	10
4.1.4	Char HemTextToSpeech Version(void).....	11
4.1.5	Void HemTextToSpeech Speak(char sentence[], int nbr).....	11
4.1.6	Void HemTextToSpeech Speak PreDef(char nbr).....	11
4.2	Serial Port Control.....	11
A	Technical Specifications	12

1 Introduction

The TextToSpeech module enable you to access the world of speech, and in actual fact, using this module you can make Hemisson speak so that it can interact with you.

1.1 How to Use this Manual

This manual is an introduction to the HemTextToSpeech module designed for the Hemisson robot. If you cannot find any information in this manual relating to a given problem that you encounter, please go to the Hemisson website (<http://www.hemisson.com/>), and in particular the Forum or the FAQs¹ section.

1.2 Precautionary Measures

Here are a few recommendations for proper use of the HemTextToSpeech module:

- **Keep it away from damp areas.**
Any contact with water might cause it to short circuit.
- **Always make sure it is placed in a stable position.**
This will avoid any risk of it falling that might lead to its breaking or causing injury to another.
- **Do not plug in the module whilst the robot is switched on.**
So as to avoid all possibility of damage, all connections should be made should be done when the robot is switched off.
- **Never leave Hemisson switched on when not in use.**
Once you have finished working with Hemisson, switch it off.
- **Check that you have set the unit up properly before switching on**
If you have assembled it wrongly, leading perhaps to a short circuit, you risk damage to your components, as well as Hemisson and its battery.

1.3 Recycling

You need to consider what to do with the equipment once it reaches the end of its useful life. Some parts can be recycled, such as the battery, which should not be thrown in the bin but put in the proper container. If you recycle it you will be contributing to making the environment cleaner and safer for future generations. For all these reasons, please ensure you deal appropriately with the equipment once it reaches the end of its useful life, for example either by returning it to the manufacturer or your local reseller.

¹Question Forum

2 Connecting Up

Fitting and removal of the extension module is a delicate operation. Please read the instructions below to prevent damage to it. K-TEAM cannot be held liable for any damage caused by improper handling.

2.1 Fitting

To begin with, make sure the robot is switched off (position O.); then insert the HemLinCam module (with its lens facing forward of the robot) without forcing it, but keeping it as vertical as possible, in the front connector on Hemisson, as follows (the module is in grey) :

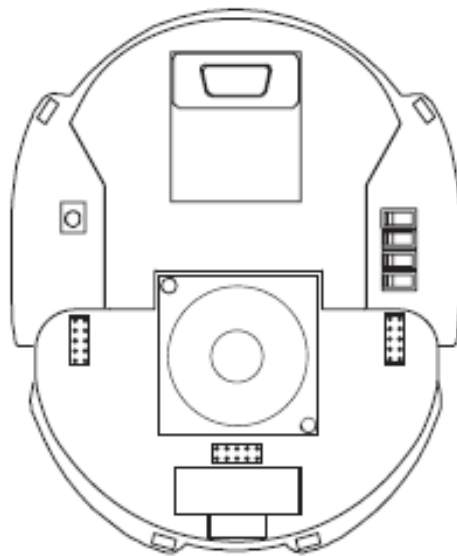


Fig. 2.1 – Positioning the HemTextToSpeech module on Hemisson

Under no circumstances try to insert HemTextToSpeech in any other way, as this might cause serious damage to your Hemisson robot as well as the extension module.

2.2 Removal

To remove, first of all make sure that your robot is switched off (position O), then withdraw the HemTextToSpeech module vertically with one hand, whilst holding the robot with the other.

3 The HemTextToSpeech Module

3.1 Overall View

The HemTextToSpeech module is built up as follows:

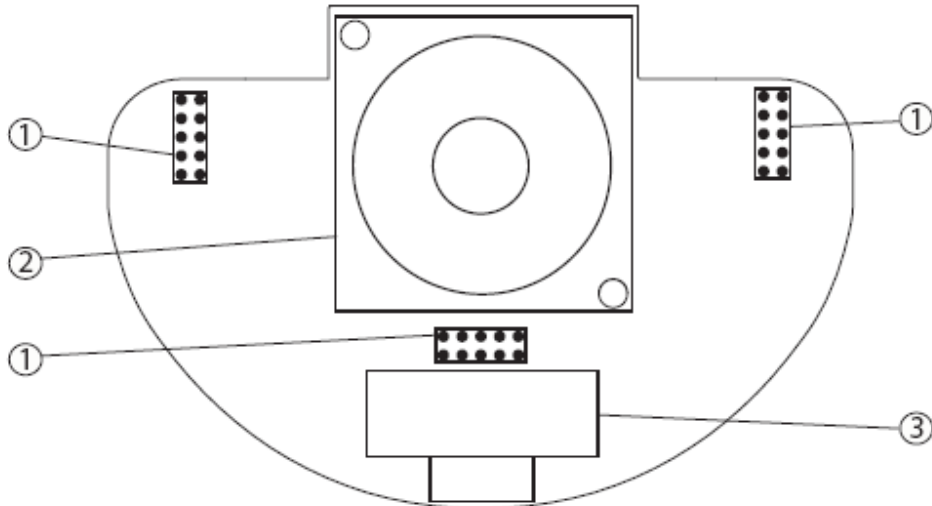


Fig. 3.1 – Detail of the HemTextToSpeech Module: View from above

1. Hemisson extension connectors
2. Loud speaker
3. DB9 serial socket

3.2 Testing and Sequence Programming

The DB9 serial socket on the module enables direct access to the extension without the need for routing via the Hemisson I2C. This allows you to test the module. In addition, using this mode it is possible to pre-record phrases what you will later be able to call directly via I2C.

- To do this, install the extension on Hemisson.
- Connect your serial cable between the extension and your PC.
- Switch on Hemisson.
- Execute the program sp03.exe that you will find on the Hemisson website.

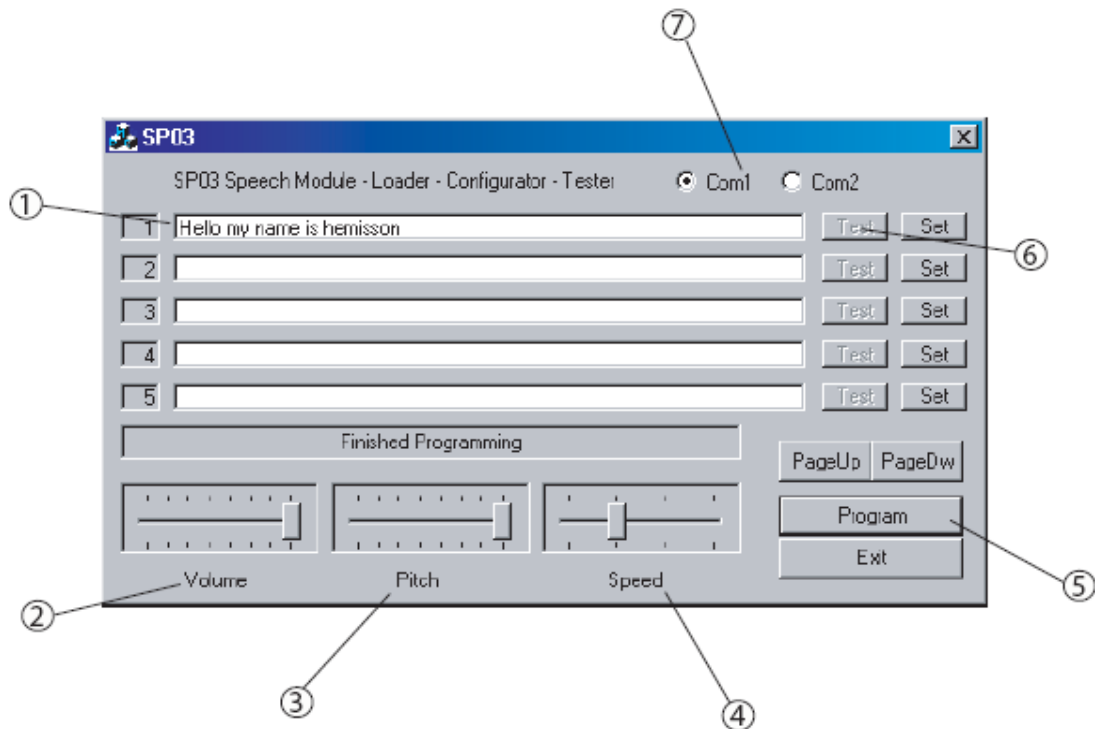


Fig. 3.2 – Details of the SP03.exe Program

1. Text input area, where you can enter the text for speech production. Phrase no.1 will be the phrase produced by Hemisson on start-up
2. Volume control
3. Pitch control
4. Speed control
5. Programming of phrases entered into the HemTextToSpeech memory
6. Speech production of entered phrase
7. COM port selection

3.3 I2C Address

The Hemisson robot accesses the HemTextToSpeech module via I2C communication. The module has a 7-bit address, plus 1 bit for selecting “read” or “write” mode.

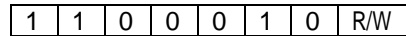


Fig. 3.3 – Module I2C Address

This therefore gives a “read” mode address of **0xC5**, and a “write” mode address of **0xC4**.

3.4 Register Addresses

To call the pre-defined phrases or to send dynamic phrases, you need to get “read” and “write” access to the registers listed below

Throughout the following section we shall use notation as follows:

- *R*: For a register that can only be accessed in “Read” mode.
- *W*: For a register that can only be accessed in “Write” mode.
- *R&W*: For a register that can be accessed in both “Read” and “Write” mode.

3.4.1 Command Register

Description: Enables speech production of both pre-defined phrases and dynamic phrases. Please see the command register details in the following section.

Address: 0 (0x00)

Access: W

3.4.2 Firmware Version Register

Description: Enables reading of the firmware version of the module

Address: 1 (0x01)

Access: R

3.5 Command Register

3.5.1 Reading a Pre-Defined Phrase

To read a phrase that has been previously defined using the SP03.exe program, all you need to do is write the number in the command register of the phrase for speech production (from 1 to 30 (0x01 – 0x1E)). So writing 0x0A in the 0x00 register will enable speech production of phrase no.10.

3.5.2 Loading a Dynamic Phrase

For speech production of phrase that is not in the memory, you need to begin by loading it in the module buffer. To do this use the following sequence (this is an example for saying “Hello”):

VALUE	DESCRIPTION
0xC4	SP03 address
0x00	SP03 command register
0x00	SP03 NOP command
0x00	Volume
0x05	Speed
0x03	Pitch
0x48	'H'
0x65	'e'
0x6C	'l'
0x6C	'l'
0x6F	'o'
0x00	ZERO

3.5.2 Dynamic Phrase Speech Production

Once the phrase for speech production has been transferred to the buffer, the command 64(0x40) has to be written in the command register.

4 Utilisation

There are two ways of using HemTextToSpeech with Hemisson:

- C Programming
- Serial port control

4.1 C Programming

To program Hemisson in C, you first need to acquire the CCS compiler (available from the software section of the Hemisson website). We first recommend you read the latest version of the HemiOs manual (<http://www.hemisson.com/French/assistance.html>); in this document you will find all the information you need on the HemiOs as well as how to install CCS.

- Then download (<http://www.hemisson.com/French/assistance.html>) the latest available version of HemiOs.
- Open the project in CCS

The HemTextToSpeech.h library includes the following functions:

4.1.1 Void HemTextToSpeech Init(void)

Purpose: Initialisation of the module; this is the first function to call at the start of the code.

Example:

```
HemTextToSpeech_Init( );
```

4.1.2 Void HemTextToSpeech Speed(char value)

Purpose: Specify speech speed.

Example:

```
HemTextToSpeech_Speed(1);
```

4.1.3 Void HemTextToSpeech Pitch(char value)

Purpose: Specify the pitch.

Example:

```
HemTextToSpeech_Pitch(2);
```

4.1.4 Char HemTextToSpeech Version(void)

Purpose: Read the firmware version.

Example:

```
char Version;  
version = HemTextToSpeech_Version( );
```

4.1.5 Void HemTextToSpeech Speak(char sentence[], int nbr)

Purpose: Speech production of a phrase that has been loaded dynamically.

Example:

```
char Sentence[]="Hello my name is hemisson";  
HemTextToSpeech_Speak(Sentence,sizeof(Sentence));
```

4.1.6 Void HemTextToSpeech Speak PreDef(char nbr)

Purpose: Read a pre-defined phrase.

Example:

```
HemTextToSpeech_Speak_PreDef(1);
```

NB: To use these functions, you must first prefix an include command for the library at the beginning of your code: #include "HemTextToSpeech.h"

4.2 Serial Port Control

Using the 1.30 version of the Hemisson firmware available from the website (<http://www.hemisson.com/French/assistance.html>) you can access I2C modules via RS-232 commands. To do this you should consult the latest version of the Hemisson user manual.

Examples:

- R,C4,01,01: Sends the firmware version.

A Technical Specifications

- Weight [g]: Not available
- Voltage [V]: 5
- Current [mA]: 35 (on standby), 60 (during speech)
- Maximum I2C frequency [KHz]: 400

K-Team SA
Ch de Vuasset, CP 111
1028 Préverenges
Switzerland
