FEXLTTS-SOFEN-01-03 (Ver. 1.3)

OKI middle ware for Speech Control Processor

English Text To Speech Ver 1.0 User's Manual

July 12, 2001

Modification History

1) 31-Mar-2000 : modify of speed rate range

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Contents

1 Introduction

The English Text To Speech system correctly synthesises the majority of English texts. It is sometimes necessary, however, to modify the text to make it compatible with the constraints given in the following paragraphs before submitting it to the Text To Speech process.

2 User interface description

Data transmission/receipt between MSM7630 and the host processor is called the user interface. Section of interface type is determined by the settings of the configuration register, explained below. Data means text data, dictionary data and control codes.

2.1 Reading the configuration register

When MSM7630 starts up, it reads external configuration register values and makes user interface and other environment settings

The user interface to be used is determined by the configuration register value (see table 2-1). Therefore the serial port and parallel port cannot be used in parallel.

Table 2-1

Register Value	Interface
000	2400bps serial port
001	4800bps serial port
010	9600bps serial port
011	19200bps serial port
100	Micro-controller interface

The configuration register is connected to pins D [26:24]. Pull-up 10K register gives register value "1", also Pull-down 10K register gives value "0". (when the bus capacitance is 100 pF)
Determine the value of each register so that the bus will stabilize within 18micro second.

2.2 Individual Interface description

2.2.1 Serial port interface

When a serial port interface is selected by the configuration register (when register value is set to 000,001,010 or 011), the data transmit/receive specification is as follows:

Data Format	8 bit, no parity, 1stop bit
Transfer Rate	Selectable from 2400, 4800, 9600 or 19200 bps
Busy Control	RTS Control

The diagram below shows a serial port interface example.

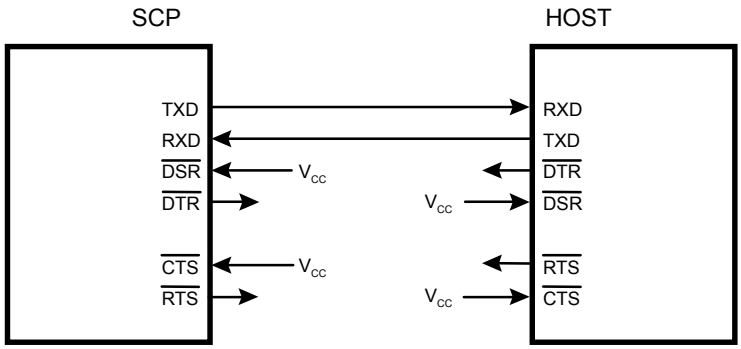


Figure 2-1

Be sure that the ports have sufficient drive capability.

The transmit/receive process from the host is as follows.

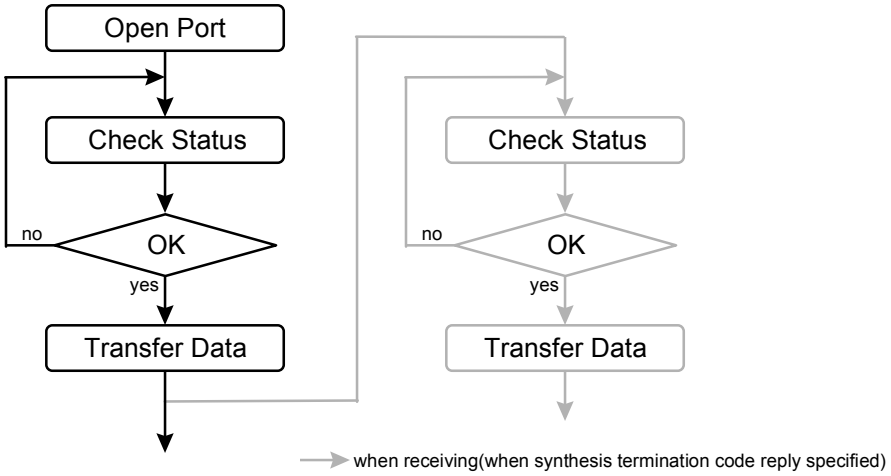


Figure 2-2

The RTS pin will output "0" during reset and immediately after its release. When the serial port cannot accept data, or in other words when the serial port buffer (1K byte) has become full, the RTS pin output will change to "1". When the serial port can accept data, the RTS pin will output "0".

Because RTS is controlled by software, tens of clock may pass from output of the stop bit until RTS rises. However, RTS is set to become invalid when 128 bytes remain in the receive buffer, so there will be no worry about overrun.

There is no standard time interval from the rise of RTS to the fall of the start bit.

2.2.2 Micro-controller Interface

When a micro-controller interface is selected by the configuration register (when register value is set to 100), the data transmit/receive specification is as follows.

8-Bit data port	PD
Status	PIBF, POBF
Control	PCS, PA, PWR, PRD

Table 2-2

PCS,PA,PWR,PRD	Operation
1xxx	Not operating
0x11	Not operating
0010	PIBF,POBF = output, PD = high-impedance
0110	PIBF,POBF = high-impedance, PD = output
0001	Prohibited input
0101	Write to PD
0x00	Prohibited input

x: Don't care

For example, to access from a host CPU, connect as shown in the falling diagram.

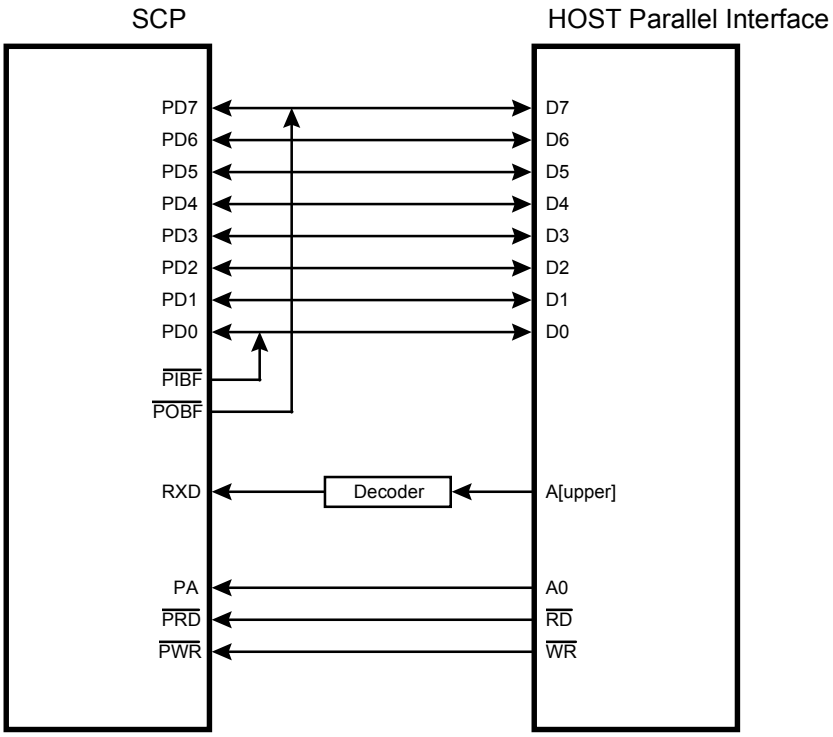


Figure 2-3

In the above case, PIBF (write buffer bit) and POBF (read buffer bit) are connected wire-OR to data port bits 7 and 0 respectively, so the relation between address, status, and data is as follows.

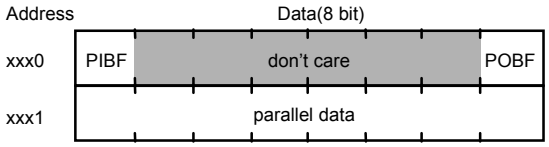


Figure 2-4

The data transfer process is as follows. The "xxx" indicates a MSM7630 parallel port address.

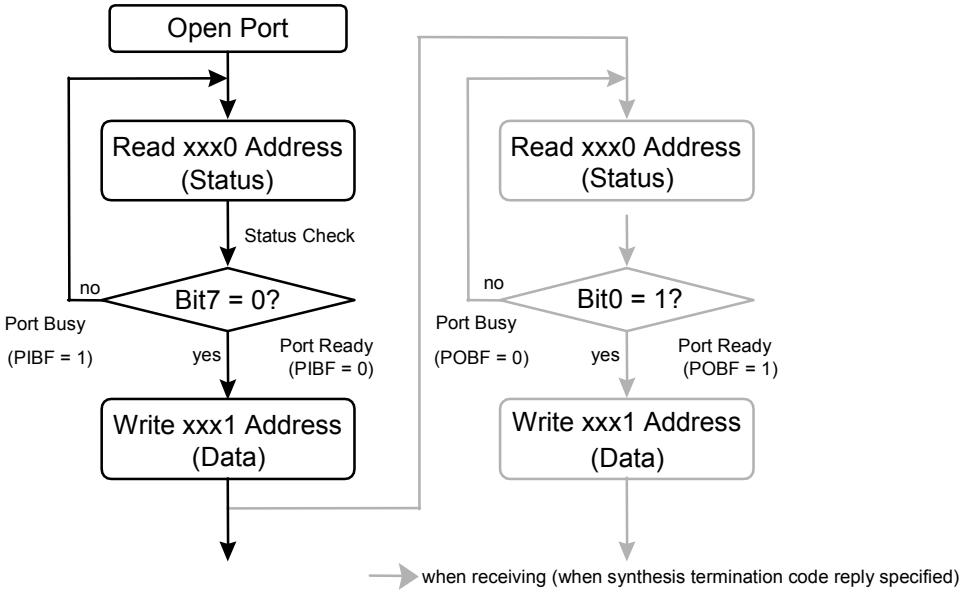


Figure 2-5

For a parallel port when a synthesis termination code replay is specified, the termination code might be missed unless the port is polled until a sentence has been transferred and the termination code accepted.

2.2.3 MSM7630 Start-up Sequence

MSM7630 operates under the following sequence when reset is applied. Make reference to the flow chart, when designing a text to speech synthesiser device that uses MSM7630.

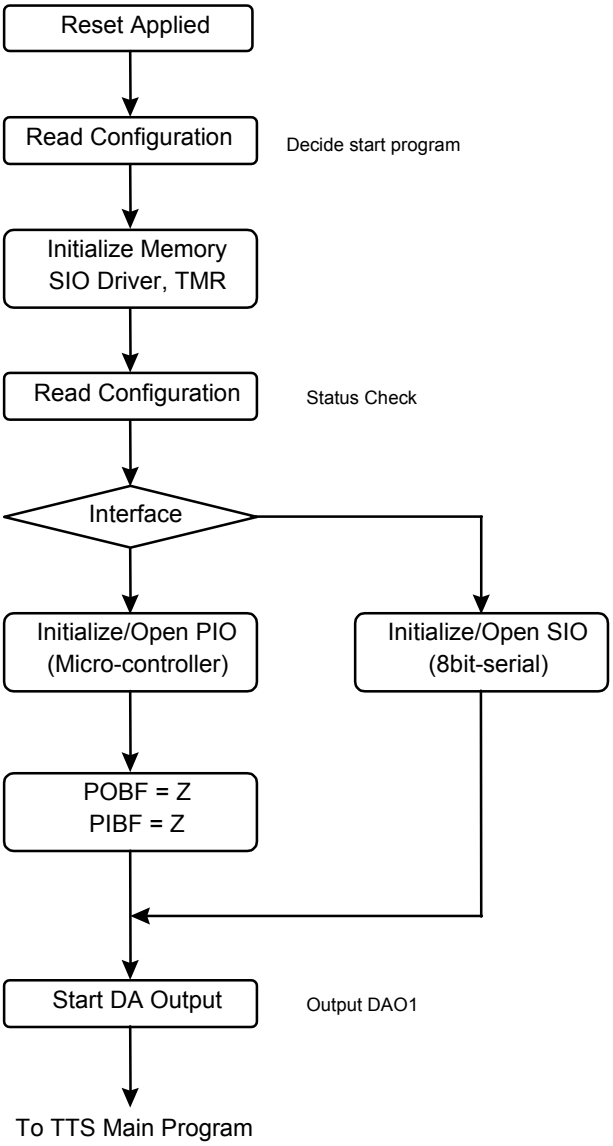


Figure 2-6

ROM accesses are granted immediately after reset. A [23:1] will fluctuate at this time Cache reads are performed, so in particular the three low-order bits will continuously change.

Active signals at this time will be as follows.

A [23:1] (especially A [3:1]), ROM, RD

Next the configuration register value will be read, and the DRAM used will be set. This starts DRAM refresh, so the following signals will become active.

RAS, CAS0, CAS1

Next the SIO drive will be initialized. For male phoneme simplex data, the mode will be set, the configuration register value will be read again, and the interface used will be set.

Based on these settings, the following signals will become active.

8-Bit serial interface	RTS,{TXD}
Micro-controller interface	{POBF, PIBF, PD}

However, these signals might not be seen as active for data.

Finally initialization of DA register (internal) values will begin, and DAO1 pin output voltage will become active 1.5Volt. Control will then jump to the main routine. After this the individual interface will wait for input.

The above start-up sequence needs about 700mSec. MSM7630 does not perform self-diagnostic as part of its start-up process.

3 Text To Speech program specification

3.1 Operating Mode

MSM7630 has the operating modes shown in the table below. The operating mode is selected by an operating mode specification (refer to the control code/command listing in Appendix Table). The default mode is text to speech synthesis mode. When in this mode, input sentences can be output as synthesized speech.

Table 3-1

Mode	*Function*
0	Text To Speech synthesis mode
1	Unused
2	Unused
3	Exception dictionary read mode

Control codes and commands are provided to control MSM7630 operation. The validity of control codes and commands differs depending on the operating mode. The table below gives a summary of control codes and commands.

Table 3-2

Category		*Function*
Level1 control codes	Escape codes	Valid except in exception dictionary read mode. These codes primarily set the initial operating state of MSM7630.
Level2 control codes	Text-related	Valid in text-to-speech synthesis mode. These code primarily control how sentences are read.
Level3 control codes	Text-related	Valid except in exception dictionary read mode. These codes primarily control speech quality.
Commands	Control codes	Valid in text-to-speech synthesis mode. Commands control the speech synthesis sequence.

3.1.1 Text To Speech synthesis mode

In this mode, sentences are input and then speech synthesised. MSM7630 detects a termination in the input text (by a termination character) and starts the speech synthesizing operation.

Returning synthesis termination code

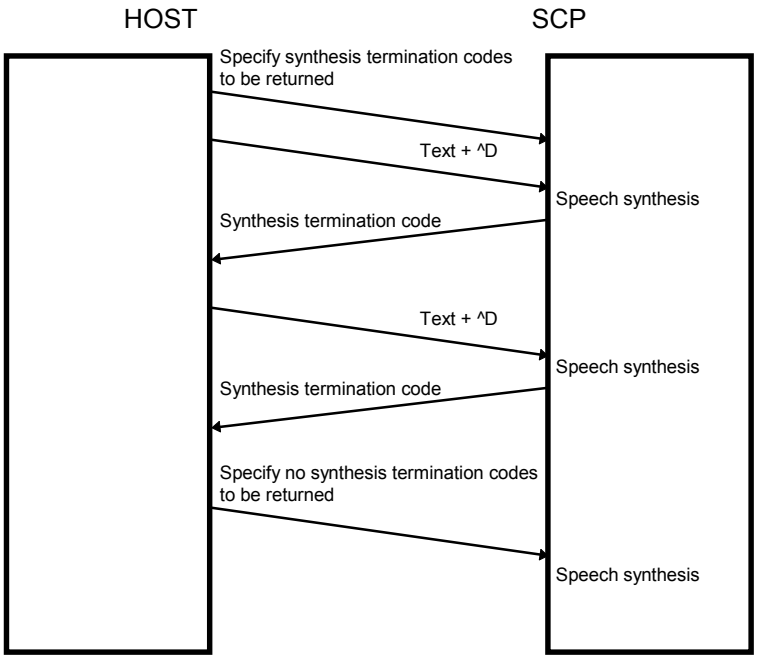
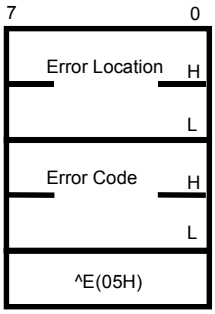


Figure 3-1

In the text to speech synthesis process, MSM7630 normally just synthesizes speech from accepted test, and does not return anything, so a host cannot inspect MSM7630 software status.
For these case MSM7630 can be made to return a synthesis termination code each time synthesis processing of s sentence completes (each time the synthesized sound is output) by specifying that a synthesis termination code is to be returned (refer to "Control Codes/Commands (1) Level 1").

When a synthesis termination code has been specified to be returned, only the response request code ^D (04H), not the termination characters, will be recognized as a terminator. The host appends the response request code ^D (04H) to each sentence of text and sends the sentence to MSM7630. The host then must not send further text or Level 1 control codes until MSM7630 returns the synthesis termination code. MSM7630 will return the synthesis termination code when output of synthesized sound ends. After the synthesis termination code has been returned, the host can immediately send the next text. Fig. 3-1 shows the sequence when return of synthesis termination codes has been specified, and Fig. 3-2 shows the format of the synthesis termination code.



Error location is 2-Byte binary data
=FFFFH:normal termination
not equal FFFFH:
indicates location where text analysis failed as number of bytes from start of text or from previous ^D.

Error code is data that indicates the cause of the error. It will be FFFFH for normal termination.

Figure 3-2

3.1.2 Exception Dictionary Read Mode

In this mode, an exception dictionary created by a utility that runs on the host is downloaded into the devices. An exception dictionary is not appended to the previously sent user dictionary, but entirely overwrites it. An exception dictionary that has been sent cannot then be read.

3.1.2.1 Dictionary transfer procedure for serial and microcontroller interfaces

After the host has specified exception dictionary read mode (refer to "Control Codes/Commands (1) Level 1"), it will receive an ACK (06H) code from MSM7630, and then will send the exception dictionary. After MSM7630 receives the exception dictionary, it performs a BCC check and, based on the result, sends a termination response of ACK (06H) for normal termination or NACK (15H) for abnormal termination. After it sends the termination response, MSM7630 will automatically transfer to its default operating mode ("text-to-speech synthesis mode).

3.1.2.2 Time-out

In exception dictionary read mode, MSM7630 will monitor the time interval between character transmissions. When the interval timer times out (about one second), MSM7630 will transfer to text-to-speech synthesis mode. It will not inform the host.

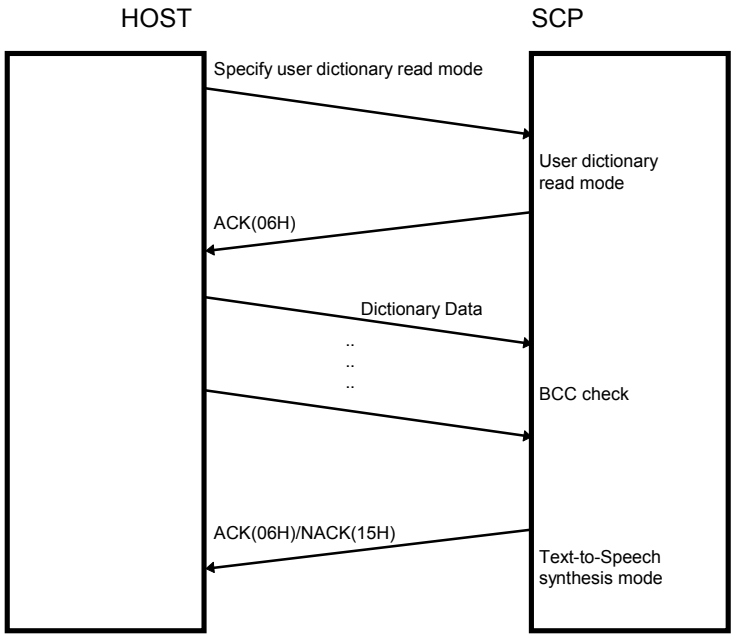
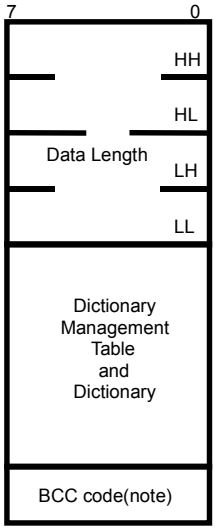


Figure 3-3



Note:The BCC code (1 byte) is for the exclusive OR of all data in the dictionary managemant table and the dictionary.

Figure 3-4

3.1.3 Hardware sound output (busy signal)

Busy signal should be given while sound output. Busy signal is active low level.

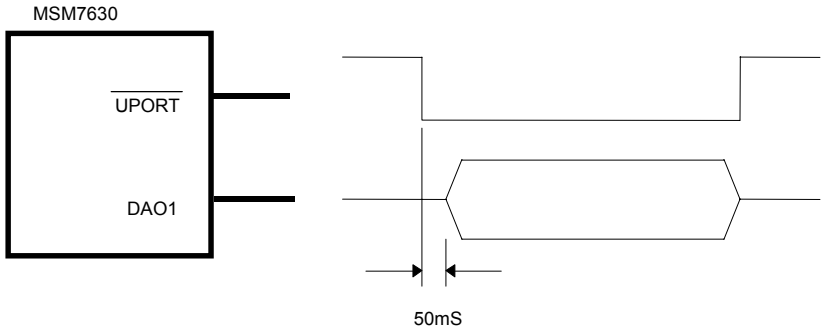


Figure 3-5

3.2 Control Codes Specifications

Control codes are sent by the host to control MSM7630's speech synthesis operations before starting. Some are sent alone, and some are sent inserted anywhere between sentences or words in the text.

3.2.1 Level1 Control Code

Level 1 control codes are output before the text file to set the operating state of MSM7630. Text characters are specified in half size capitals to follow the escape code (1BH). Lists the Level 1 control code

Table 3-3

Level 1 Control Code	*Description*
1	Code format
2	Operating mode
3	Synthesis termination code

a) Code format

Specifies the code format of input text.. The word *dos* refers to IBM extended characters.

Table 3-4

	Code format	*Description*
1	[ESC]C0	IBM dos (default)
2	[ESC]C1	ISO 8859-1
3	[ESC]CD	Return to default

3.2.1.1 Operating mode specification

Specifies the MSM7630's operating mode.

Table 3-5

	Code format	*Description*
1	[ESC]M0	Text-to-Speech synthesis mode (default)
2	[ESC]M1	reserved
3	[ESC]M2	reserved
4	[ESC]M3	Exception dictionary read mode

3.2.1.2 Synthesis termination codes returned/not returned

This feature specifies whether or not a synthesis termination code is to be returned after synthesis ends for each sentence. Since MSM7630 normally speech synthesizes the text it receives without returning anything, the host cannot inspect its status. Therefore, while the host shows text one character at a time on its display and sends the text to the MSM7630 for speech synthesis processing, the display and synthesized sounds may not be synchronized (since there is a process delay from text input to synthesis start). Synthesis termination codes are used to synchronize the host and MSM7630 processes.

Table 3-6

	Code format	*Description*
1	[ESC]E0	Do not return synthesis termination codes (default). (note 1) The terminating character will be recognized as the end of text. If text analysis is not possible, then the portion of text that cannot be analyzed will be skipped, but the speech synthesis process will be performed.
2	[ESC]E1	Return synthesis termination code. Instead of a terminating character, only the response request code ^D (04H) will be recognized as the end of text (note 2).
3	[ESC]ED	Return to default setting

Note 1: Fig. 3-2 shows the format of synthesis termination codes.
Note 2: The response request code is appended after the text's terminating character.

3.2.2 Level 2 Control Code

Level 2 control codes not only set the operating state prior to sending a text, but can also used between sentences in a text. They are specified with characters, and affect text following the control code.

Table 3-7

Level 2 Control Code	*Description*
1	numeric form pronunciation

These controls allow the numeric forms to be pronounced in several ways depending on the context. The default mode is "usual". There are 6 control codes: "usual", "scientific", "commercial", "date", "telephone", "roman".

Table 3-8

Control Code	*Description*	*INFORMATION VALUE*
[u]	To restore the default mode	No information value
[s]	To pronounce scientific expressions	No information value
[c]	To pronounce Commercial expressions	No information value
[t]	To pronounce telephone numbers	No information value
[R+]	To pronounce roman numbers	**+** to enable and **-** to disable

3.2.2.1 Usual pronunciation [u]

This control restores the default mode.

The Control Name value is **u**, there is no Control Information value.

Example :

"......[u] 521-12 ....."

3.2.2.2 Scientific pronunciation [s]

This control permits to pronounce the scientific expressions with the characters "+, -, *, \, =".

The Control Name value is **s**, there is no Control Information value. To disable this control it is necessary to use another control as "usual".

Example :

"...[s] 12+13+14=39 [u]..." will be pronounced "*...twelve plus thirteen plus fourteen equals thirty-nine...*"

3.2.2.3 Commercial pronunciation [c]

This control is not supported by this version.

3.2.2.4 Pronunciation of dates [d]

This control is not supported by this version.

3.2.2.5 Pronunciation of telephone numbers [t]

This control permits to pronounce some British English telephone numbers like "(0) 6789 345677".

The Control Name value is **t**, there is no Control Information value.

Example :

"...[t] (0) 6789 345677 [u]..." will be pronounced "*...oh six seven eight nine three four five six seven seven...*"

3.2.2.6 Pronunciation of roman numbers [R+]

This control permits to pronounce the roman numbers. The roman numbers are composed with the capital letters "I, V, X, L, C, D, M".

The Control Name value is **R**, the Control Information value is **+** to enable and **-** to disable. The control "usual" also permits to disable it.

Example :

"... [R+] XI [R-]..." will be pronounced "*eleven*"

3.2.3 Level 3 Control Code

Level 3 control codes can be inserted anywhere between words in the text, not just between sentence. They primarily voice quality, enabling fine control of voice quality for each word.

Table 3-9

Level 3 Control Code	*Description*
1	Pitch modification
2	Speed rate modification
3	Voice volume
4	Pause control
5	Modulated sound output

3.2.3.1 Pitch modification

This control permits to change the pitch in the text.

Table 3-10

	Code format	*Description*
1	{H+n}	n: From –100 (low) to +100 (high) . The default value is 0.
2	{HD}	Return to default setting

This control permits to modify the pitch of the synthetic voice.

The Control Name value is **pitch**, the Control Information value is surrounded with brackets and ranging from -100 (low) to +100 (high).

Example :

"Good morning {H+10} mister Lester {H-10} ....."

3.2.3.2 Speed rate modification

This control permits to modify the speech rate of the text.

Table 3-11

	Code format	*Description*
1	{T+n}	n: From +100 (slow) to – 0 (fast: male voice) – 10 (fast: female voice). The default value is 0.
2	{TD}	Return to default setting

This control permits to modify the speech rate of the text.

The Control Name value is **duree**, the Control Information value is surrounded with brackets and ranging from -0 (fast: male voice), -10 (fast: female voice) to +100 (slow).

Example :

"Good morning {T+30} mister Lester {T-10} Dupont..."

3.2.3.3 Voice volume

Specifies the loudness of voice.

Table 3-12

	Code format	*Description*
1	{P-n}	n: From –100 (min) to 0 (max) . The default value is 0.
2	{PD}	Return to default setting

3.2.3.4 Pause Control

This control allows a pause in the text.

Table 3-13

	Code format	*Description*
1	{p1000ms}	1000 millisecond pause in the text
2	{p1s}	1 second pause in the text
3	{p2mn}	2 minute pause in the text

This control allows a pause in the text.

The Control Name is **pause**, the Control Information is a duration either in millisecond or in second or in minute surrounded with brackets.

Example :

"Good morning {p1000 ms} Sir....."

"Good morning {p1 s} Sir....."

"Good morning {p2 mn} Sir....."

3.2.3.5 Modulated sound output

Output modulated sounds.

Table 3-14

	Code format	*Description*
1	{B0}	500 Hz, 160 ms sine wave
2	{B1}	1 kHz, 160 ms sine wave
3	{B2}	2 kHz, 160 ms sine wave
4	{B3}	Chime 1 (short-long)
5	{B4}	Chime 2 (rising tone: short-short-short-long)
6	{B5}	Chime 3 (falling tone: short-short-short-long)

3.2.4 Command Specification

Commands are interrupting processes that are completely asynchronous with MSM7630's internal processes. Synthesis Stop, pause and restart are provided by commands. Commands are invalid in text-to speech synthesis, used primarily to control the sequence of speech synthesis. Commands are allocated to control codes below 0x20.

a) Stop

Stops the current text-to-speech synthesis process.

Table 3-15

	Code format	*Description*
1	^C(03H)	Stop the current Text-to-Speech synthesis process

The stop command causes MSM7630 to discard all text captured so far during synthesis, including speech synthesis parameters. MSM7630 will then return to an input wait state.

3.2.4.1 Initialize

Stops processing of the current operating mode. Returns all Level 1 to 3 Code settings (including mode specification) to their defaults.

Table 3-16

	Code format	*Description*
1	^R(12H)	Stop processing of the current operating mode

4 Rules to be applied

4.1 Sentence

4.1.1 Number of characters

A sentence contains less than 400 characters (including control codes[1]). If a sentence contains more than 400 characters without punctuation mark, it is truncated between two words to produce two or several sentences which will be less than 400 characters long[2].

4.1.2 Number of words

A sentence contains less than 40 words (control codes[3]). If a sentence contains more than 40 words without punctuation mark, it is truncated between two words to produce two or several sentences which will be less than 40 words long.

4.2 Word

A word contains less than 35 characters. Longer words will be truncated after the 35th character.

---

[1] *See chapter Control code specification*

[2] *Overflow may be caused by the translation of numbers and acronyms. For example the number 033544628, which has 9 characters, will have 46 characters after translation.*

[3] *See chapter Control code specification*

4.3 Character

A character must be coded in IBM extended ASCII or in ISO 8859-1[4].

Refer to appendix A for the translation of ASCII codes recognized by the system.

4.4 Dash

The presence of a dash between two words is used by the system to recognise a hyphenated word or to apply liaisons between the two words. The presence of a dash between two digits is used to recognise a scientific expression. The correct use of the dash is therefore very important.

4.4.1 Between words

- **Hyphen**

When the dash is directly connected to the words, it is recognized as the hyphen in a hyphenated word.

Example:

"anti-nuclear" will be pronounced "*anti-nuclear*"

When the dash is directly connected to the first word and just before a carriage return, it is used to apply a liaison between the two words.

Example:

Between lines :

"demonstration" will be pronounced "*demonstration*"

[4] *Depending on the platform*

• **Ignored**

When the dash is preceded or followed by a space character, it is ignored and translated as a space character.

Example:

"anti -nuclear" will be pronounced "*anti nuclear*"

4.4.2 Between digits

When the dash is preceded by a space character and directly connected to the second digit, it is pronounced "*minus*". In all the other cases, it is ignored and translated as a space character.

Examples:

"34 -35" will be pronounced "*thirty-four minus thirty-five*"

"34 - 35" will be pronounced "*three four thirty-five*"

"34 - 35" will be pronounced "*thirty-four thirty-five*"

"34 - 35" will be pronounced "*three four three five*"

In this last example, the dash will be pronounced "*minus*" if the control[5] \s is activated.

4.5 Punctuation

Punctuation plays an important part in the texts analysed by the system. It is necessary to put a space character just after the punctuation mark.

[5] *See chapter Control code specification*

4.5.1 List of pronunciations recognised by the system and their effects

Table 4-1

PUNCTUATION	*INTONATION*	*PAUSE*
.	falling	medium
;	falling	medium
:	rising	small
,	rising	small
!	falling	medium
?	rising	medium

4.5.2 Automatic breaks

If a sentence contains too many words or too many characters without punctuation mark, the system automatically inserts a break[6].

4.5.3 Full stop

A full stop is always considered as a punctuation mark if it is not proceeded by an abbreviation or by a number[7].

4.6 Acronyms and Abbreviations

4.6.1 List of acronyms and abbreviations of the system

The system does not deal with acronyms and abbreviations. It will try to pronounce the acronym or the abbreviation as a normal word.

[6] *See chapter Sentence*
[7] *See chapter Numeration*

4.6.2 List of acronyms and abbreviations of the user

List of abbreviations

See the *ABREVIAC.RGS* ASCII file.

Adding or modifying an abbreviation

See the chapter Abbreviations lexicon.

Note:

At the end of the sentence, the last point must be separated from the abbreviation by a space character.

4.7 Numeration

4.7.1 Numbers

- **Integers**

Examples:

"-12" will be pronounced "*minus twelve*"

"12" will be pronounced "*twelve*"

"123,343" or "123343" will be pronounced "*one hundred and twenty-three thousand three hundred and forthy three*"

"1,000,000,000" will be pronounced "*one thousand million*"

"123,78,890,556" will not be processed as an integer because the groups separated by a comma are not composed of 3 digits. It will be pronounced digit per digit with a break at the comma.

- **Decimal numbers**

There are correct if there is no space character between the point and the numbers (for instance, "36.55" is correct, but "36 .55" and "36. 55" are not).

Examples:

"4.56" will be pronounced "*four point five six*"

"-3.4" will be pronounced "*minus three point four*"

".456" or "0.456" will be pronounced "*oh point four five six*"

"1,234,456.123" will be pronounced "*one million two hundred and thirty-four thousand four hundred and fifty-six point one two three*"

"1912. 123" will be pronounced "*one thousand nine hundred and twelve (pause) one hundred and twenty-three*"

• **Ordinal numbers**

An ordinal number is a number terminated by 1st, 2nd, 3rd or 4 (5, 6, 7, 8, 9, 0) th.

Examples:

"21st" or "21 st" will be pronounced "*twenty-first*"

"22nd" or "22 nd" will be pronounced "*twenty-second*"

"23rd" or "23 rd" will be pronounced "*twenty-third*"

"24th" or "24 th" will be pronounced "*twenty-forth*"

4.7.2 Time

Examples:

"5h" or "5h00" or "5:00" will be pronounced "*five o'clock*"

"5h46" or "5:46" will be pronounced "*five forty-six*"

"5h15" or "5:15" will be pronounced "*a quarter past five*"

"5h30" or "5:30" will be pronounced "*half past five*"

"5h45" or "5:45" will be pronounced "*a quarter to six*"

"23h45" or "11:45 p.m." will be pronounced "*a quarter to midnight*"

4.7.3 Duration

Examples:

"5h45mn" will be pronounced "*five hours forty-five minutes*"

"1h1mn" will be pronounced "*one hour one minute*"

4.7.4 Date

In British English the date format is as follow : three or two numbers separated by points or slashes.

Examples of British English dates:

"16.03.1994" or "16.3.1994" or "16/03/1994" or "16/3/1994" will be pronounced "*the sixteenth of March, nineteen ninety-four*"

"16/03/94" will be pronounced "*the sixteenth of March, ninety-four*"

"16/03" will be pronounced "*the sixteenth of March*"

"45/09/1989" will not be processed as a date because 45 > 31 and will be pronounced "*four five oh nine one nine eight nine*"

Examples of American English dates:

"03.16.1994" or "3.16.1994" or "03/16/1994" or "3/16/1994" will be pronounced "*the sixteenth of March, nineteen ninety-four*"

"03/16/94" will be pronounced "*the sixteenth of March, ninety-four*"

"03/16" will be pronounced "*the sixteenth of March*"

"09/45/1989" will not be processed as a date because 45 > 31 and will be pronounced "*four five oh nine one nine eight nine*"

4.7.5 Currency

Examples:

"£1.25" or "1.25£" or "1.25 £" will be pronounced "*one pound twenty-five*"

"$1.25" or "1.25$" or "1.25 $" will be pronounced "*one dollar twenty-five*"

4.7.6 Telephone numbers

Examples:

"535 39 35" will be pronounced "*quinientos treinta y cinco* (pause) *treinta y nueve* (pause) *treinta y cinco*"

"91/535 39 35" and "(91) 535 39 35" will be pronounced "*noventa y uno* (pause) *quinientos treinta y cinco* (pause) *treinta y nueve* (pause) *treinta y cinco*"

4.7.7 Scientific expressions

The scientific expressions with the characters "+, -, *, \, =" are processed only if the control[8] \s is activated.

Examples:

"10+5 = 15" will be pronounced "*ten plus five equals fifteen*"

"10-5 = 5" will be pronounced "*ten minus five equals five*"

"10*5 = 50" will be pronounced "*ten multiplied by five equals fifty*"

"10/5 = 2" will be pronounced "*ten divided by five equals two*"

4.7.8 Combination of digits and others characters

Examples:

"(02) 123454" will be pronounced "*oh two one two three four five four*"

"(12) 2345-456" will be pronounced "*one two two three four five four five six*"

"ab12xy" will be pronounced "*a b one two x y*"

[8] *See chapter Control code specification*

5 User lexicons

5.1 Exceptions lexicon

The characters in the user lexicon files must be coded in IBM extended ASCII.

5.1.1 Using the lexicon

The exception lexicon permits the user to modify the pronunciation of a word or a group of consecutive words. Some English or foreign words, which are badly pronounced in accordance with the basic rules for English pronunciation, can be added in the exception lexicon.

The pronunciation writing uses a pseudo-orthographic method : it consists of writing the pronunciation with English alphabetical codes. For example, the pronunciation of the French word "Toulouse" can be written "toollooze".

5.1.2 Adding an entry to the lexicon file

With a text editor the user can add an entry to the exception lexicon. The exception lexicon is a file called USERENG.EXC in the installation directory. The maximum length of the lexicon depends on the available RAM resources[9].

An exception and its pronunciation must be written on one line (less than 256 characters long). An exception can contain five words and it is necessary to write the same number of words in the exception field than in the pronunciation field.

Writing punctuation marks in the exception field is forbidden. It is therefore impossible to add an abbreviation or an acronym in the exception lexicon. It is not necessary to respect the alphabetic order. Finally the look-up words are case-sensitive, unless the option "/i" is specified.

[9] *Depending on the platform*

Key characters list:

The characters "//" indicate a comment which stop at the end of the line.

The character ":" separates the exception field from the field of its pronunciation.

The field between the characters "<" and ">" is the pronunciation field.

The characters "##" indicate a word boundary in the exception pronunciation field.

The characters "/i" are optional and permit to ignore case.

Example:

// Beginning of the file

Toulouse : <toollooze> /i

ELAN Informatique : <elan##informatic> /i // french company

// End of the file

Note:

5.2 Abbreviations lexicon

After modifications the exception lexicon must be reloaded in memory.

5.2.1 Using the lexicon

If the abbreviation is written in the left column of the file, it will be translated as indicated in the right column. The translation writing of abbreviations uses a pseudo-orthographic method. For example, the translation of the abbreviation "U.S.A." can be written "United-States-of-America".

5.2.2 Adding an entry to the lexicon file

With a text editor the user can add a entry to the abbreviation lexicon. The abbreviation lexicon is a file called ABBREVIA.RGS in the installation directory. The maximum length of the lexicon depends on the available RAM resources[10].

[10] *Depending on the platform*

An abbreviation and its translation must be written on one line (less than 256 characters long).

It is not necessary to respect the alphabetic order. Finally the look-up words are case-sensitive.

Key characters list:

The characters "//" indicate a comment which stop at the end of the line.

The space character or the tabulation separates the abbreviation field from the field of its translation.

The character "-" indicates a word boundary in the abbreviation translation field.

Example:

```
// Beginning of the file
G.B.        Great-Britain
U.S.A.      United-States-of-America
// End of the file
```

Note:

After modifications the abbreviation lexicon must be reloaded in memory.

6 APPENDIX A : List of ASCII codes translated

6.1 7 bits ASCII Characters

Decimal ASCII code	*Character*	*Recognised as / translated by*
0	^@ (NUL)	ignored
1	^A (SOH)	marker
...	...	ignored
9	^I (HT)	separator of word
10	^J (LF)	separator of word
...	...	ignored
13	^M (CR)	separator of word
...	...	ignored
32		separator of word
33	!	exclamation point (mark) / pause
34	"	ignored
35	#	ignored
36	$	sign / *dólar*
37	%	sign / *por ciento*
38	&	sign / *y*
39	'	ignored
40	(	punctuation / pause or separator of phone number
41	)	punctuation / pause or separator of phone number

Decimal ASCII code	*Character*	*Recognised as / translated by*
42	*	sign / *estrella*
43	+	sign / *más*
44	,	punctuation / pause or decimal comma / *coma*
45	-	punctuation / pause or hyphen or sign / *menos*
46	.	punctuation / pause or date separation
47	/	date or phone number separation
48	0	digit zero
49	1	digit one
50	2	digit two
51	3	digit three
52	4	digit four
53	5	digit five
54	6	digit six
55	7	digit seven
56	8	digit eight
57	9	digit nine
58	:	colon / pause or time separation
59	;	semicolon / pause
60	<	ignored
61	=	sign / *es igual*
62	>	ignored
63	?	question mark / pause
64	@	ignored
65	A	A capital letter
66	B	B capital letter
67	C	C capital letter
68	D	D capital letter
69	E	E capital letter
70	F	F capital letter
71	G	G capital letter

Decimal ASCII code	*Character*	*Recognised as / translated by*
72	H	H capital letter
73	I	I capital letter
74	J	J capital letter
75	K	K capital letter
76	L	L capital letter
77	M	M capital letter
78	N	N capital letter
79	O	O capital letter
80	P	P capital letter
81	Q	Q capital letter
82	R	R capital letter
83	S	S capital letter
84	T	T capital letter
85	U	U capital letter
86	V	V capital letter
87	W	W capital letter
88	X	X capital letter
89	Y	Y capital letter
90	Z	Z capital letter
91	[	punctuation / pause
92	\	ignored
93	]	punctuation / pause
94	^	ignored
95	_	ignored
96	`	ignored
97	a	a small letter
98	b	b small letter
99	c	c small letter
100	d	d small letter
101	e	e small letter
102	f	f small letter
103	g	g small letter

Decimal ASCII code	*Character*	*Recognised as / translated by*
104	h	h small letter or time
105	i	i small letter
106	j	j small letter
107	k	k small letter
108	l	l small letter
109	m	m small letter
110	n	n small letter
111	o	o small letter
112	p	p small letter
113	q	q small letter
114	r	r small letter
115	s	s small letter
116	t	t small letter
117	u	u small letter
118	v	v small letter
119	w	w small letter
120	x	x small letter
121	y	y small letter
122	z	z small letter
123	{	punctuation / pause
124	|	ignored
125	}	punctuation / pause
126	~	ignored
127	□	ignored

6.2 8 bits ASCII characters

Decimal ASCII code	*IBM extended Character*	*Recognised as / translated by*	*ISO* 8859-1 *Character*	*Recognised as / translated by*
128	Ç	ignored	¦	ignored
129	ü	ignored	¦	ignored
130	é	ignored	‚	ignored
131	â	Ignored	*ƒ*	ignored
132	ä	ignored	„	ignored
133	à	ignored	…	ignored
134	å	ignored	†	ignored
135	ç	ignored	‡	ignored
136	ê	ignored	ˆ	ignored
137	ë	ignored	‰	ignored
138	è	ignored	Š	ignored
139	ï	ignored	‹	ignored
140	î	ignored	Œ	ignored
141	ì	ignored	¦	ignored
142	Ä	ignored	¦	ignored
143	Å	ignored	¦	ignored
144	É	ignored	¦	ignored
145	æ	ignored	‘	ignored
146	Æ	ignored	’	ignored
147	ô	ignored	“	ignored
148	ö	ignored	”	ignored
149	ò	ignored	•	ignored
150	û	ignored	–	ignored
151	ù	ignored	—	ignored
152	ÿ	ignored	˜	ignored

Decimal ASCII code	*IBM extended Character*	*Recognised as / translated by*	*ISO* 8859-1 *Character*	*Recognised as / translated by*
153	Ö	ignored	™	ignored
154	Ü	ignored	š	ignored
155	¢	ignored	›	ignored
156	£	ignored	œ	ignored
157	¥	ignored	¦	ignored
158	₧	ignored	¦	ignored
159	*f*	ignored	Ÿ	ignored
160	á	ignored	NBSP	ignored
161	í	ignored	¡	ignored
162	ó	ignored	¢	ignored
163	ú	ignored	£	ignored
164	ñ	ignored	¤	ignored
165	Ñ	ignored	¥	ignored
166	ª	ignored	¦	ignored
167	º	ignored	§	ignored
168	¿	ignored	¨	ignored
169	⌐	ignored	©	ignored
170	¬	ignored	ª	ignored
171	½	ignored	«	ignored
172	¼	ignored	¬	ignored
173	¡	ignored	-	ignored
174	«	ignored	®	ignored
175	»	ignored	¯	ignored
176	░	ignored	°	ignored
177	▒	ignored	±	ignored
178	▓	ignored	²	ignored
179	│	ignored	³	ignored
180	┤	ignored	´	ignored
181	╡	ignored	µ	ignored
182	╢	ignored	¶	ignored
183	╖	ignored	·	ignored
184	╕	ignored	¸	ignored

Decimal ASCII code	*IBM extended Character*	*Recognised as / translated by*	*ISO* 8859-1 *Character*	*Recognised as / translated by*
185	╣	ignored	¹	ignored
186	║	ignored	º	ignored
187	╗	ignored	»	ignored
188	╝	ignored	¼	ignored
189	╜	ignored	½	ignored
190	╛	ignored	¾	ignored
191	┐	ignored	¿	ignored
192	└	ignored	À	ignored
193	┴	ignored	Á	ignored
194	┬	ignored	Â	ignored
195	├	ignored	Ã	ignored
196	─	ignored	Ä	ignored
197	┼	ignored	Å	ignored
198	╞	ignored	Æ	ignored
199	╟	ignored	Ç	ignored
200	╚	ignored	È	ignored
201	╔	ignored	É	ignored
202	╩	ignored	Ê	ignored
203	╦	ignored	Ë	ignored
204	╠	ignored	Ì	ignored
205	═	ignored	Í	ignored
206	╬	ignored	Î	ignored
207	╧	ignored	Ï	ignored
208	╨	ignored	Ð	ignored
209	╤	ignored	Ñ	ignored
210	╥	ignored	Ò	ignored
211	╙	ignored	Ó	ignored
212	╘	ignored	Ô	ignored
213	╒	ignored	Õ	ignored
214	╓	ignored	Ö	ignored
215	╫	ignored	×	ignored
216	╪	ignored	Ø	ignored

Decimal ASCII code	*IBM extended Character*	*Recognised as / translated by*	*ISO* 8859-1 *Character*	*Recognised as / translated by*
217	┘	ignored	Ù	ignored
218	┌	ignored	Ú	ignored
219	█	ignored	Û	ignored
220	▄	ignored	Ü	ignored
221	▌	ignored	Ý	ignored
222	▐	ignored	Þ	ignored
223	▀	ignored	ß	ignored
224	α	ignored	à	ignored
225	ß	ignored	á	ignored
226	Γ	ignored	â	ignored
227	π	ignored	ã	ignored
228	Σ	ignored	ä	ignored
229	σ	ignored	å	ignored
230	µ	ignored	æ	ignored
231	τ	ignored	ç	ignored
232	Φ	ignored	è	ignored
233	Θ	ignored	é	ignored
234	Ω	ignored	ê	ignored
235	δ	ignored	ë	ignored
236	∞	ignored	ì	ignored
237	ø	ignored	í	ignored
238	ε	ignored	î	ignored
239	∩	ignored	ï	ignored
240	≡	ignored	ð	ignored
241	±	ignored	ñ	ignored
242	≥	ignored	ò	ignored
243	≤	ignored	ó	ignored
244	⌠	ignored	ô	ignored
245	⌡	ignored	õ	ignored
246	÷	ignored	ö	ignored
247	≈	ignored	÷	ignored
248	°	ignored	ø	ignored

Decimal ASCII code	*IBM extended Character*	*Recognised as / translated by*	*ISO* 8859-1 *Character*	*Recognised as / translated by*
249	·	ignored	ù	ignored
250	·	ignored	ú	ignored
251	√	ignored	û	ignored
252	3	ignored	ü	ignored
253	2	ignored	ý	ignored
254	■	ignored	þ	ignored
255		ignored	ÿ	ignored