COMvoice

by GENESIS

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*                  *
*     COMvoice     *
*                  *
* USER'S  MANUAL   *
*                  *
********************
```


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*                                    *
*  THIS UNIT IS WARRANTED AGAINST    *
*  ANY DEFECTS IN PARTS AND LABOR    *
*  FOR A PERIOD OF ONE YEAR WHICH    *
*  STARTS ON THE DATE SHOWN BELOW    *
*                                    *
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CHAPTER 1

1.1 INTRODUCTION

1.2 INSTALLATION OF COMVOICE

1.1 INTRODUCTION

The COMvoice speech synthesizer for the VIC-20 and CBM-64 provides the user with the ability to add spoken English prompts and responses to BASIC programs. The two main features of COMvoice are the phoneme based unlimited vocabulary and the new BASIC command created by COMvoice which makes programming speech as easy as using a PRINT statement.

There are many different methods which may be used to synthesize speech. COMvoice uses a method of speech construction which is PHONEME based. Phonemes are the basic sounds of speech which when added together in the proper sequence, form intelligible spoken English. By utilizing this method, COMvoice can create an unlimited vocabulary of words which is restricted only by the user's imagination.

To make speech synthesis quick and easy, COMvoice automatically gives the programmer a new BASIC command called SPEAK which functions similarly to a PRINT statement. This means that speech may be added to a program without the need to set up data fields, run special software and perform other complicated procedures.

COMvoice resides between memory locations $A000 to $BFFF hex in the VIC-20 and $8000 to $9FFF hex in the CBM-64 which is typically where game and other cartridge type programs reside. For this reason, COMvoice may not be used with this type of software and care should be taken when using COMvoice with expansion boards which allow the user

to have several cartridges plugged into the computer at the same time.

1.2 INSTALLATION OF COMVOICE

To install COMvoice on the VIC-20 or CBM-64, first turn the computer off and then simply plug COMvoice into the expansion port of the computer with the label facing upwards. The expansion port is the slot to the far right when viewing the computer from the FRONT.

Now that COMvoice is installed, the SPEAKER/AMPLIFIER supplied with COMvoice may be plugged directly into the speaker jack located at the rear of the unit.

After turning the computer on, COMvoice is ready for use.

CHAPTER 2

2.1 GENERAL USE OF COMVOICE

2.2 SPEAKING LETTERS

2.3 SPEAKING NUMBERS

2.4 USING PUNCTUATION

2.5 SETTING INFLECTION LEVELS

2.6 USING STRING VARIABLES

2.1 GENERAL USE OF COMVOICE

As stated in the introduction, COMvoice is as simple to use as a PRINT statement. After COMvoice has been properly installed, the computer may be turned on. After power up, COMvoice will respond with "COMVOICE READY". If this is not heard, the user should check for correct installation and volume setting. (NOTE: The volume is increased as the thumbwheel adjust knob is turned upward. Do not try to push the thumbwheel past its limit.) COMvoice's SPEAK command may be tested by entering the following line: (Include all of the spaces as shown.)

```
SPEAK"HELLO, MY NAME IS COMVOICE"
```

If the unit has been properly installed, the above line should be vocalized. At this point, the volume may be adjusted to suit the user by turning the thumbwheel knob located on the right side of the SPEAKER.

As shown by this example, COMvoice is accessed by the SPEAK command which vocalizes the text contained within the statement's quotes. There are some rules imposed upon the text which must be followed by the user to insure proper COMvoice operation. The SPEAK command will accept all words, separate letters, numbers and some punctuation. Improper characters and combinations will result in a SYNTAX error when the SPEAK command is executed.

It is important the the user recognize the fact that not all words that

are given to COMvoice will be pronounced correctly. This is due to the method that COMvoice uses to convert text into spoken English. COMvoice's software looks at the spelling of the word and uses a set of pre-defined rules to decide how the word should be pronounced. The closer a word is spoken to how it is spelled, the better COMvoice will pronounce it. For example, the word SIT would be pronounced very well whereas the word PIZZA would not.

If a word is not pronounced correctly, the user may spell the word differently so that the spelling better matches the desired pronunciation. For example, the word PIZZA could be spelled PEETZA to improve its sound. On typical English text, COMvoice will be approximately 95% correct in its conversion of text to speech.

Sections 2.2 through 2.7 describe how to use COMvoice to speak numbers and separate letters, change inflection levels, speak string variables, and use punctuation. It is recommended that the user perform the SPEAK commands shown as examples in these sections to further aid in understanding them.

The user should note at this point that since the SPEAK command is an actual BASIC statement, it may be used in programs just like any other BASIC statement. This makes adding speech capability to software extremely quick and simple and, when combined with the ability to speak string variables, very powerful.

When using the SPEAK command within programs, there is one difference that

the user should be aware of. If a SPEAK command is to be used with an IF statement, a colon must be placed between the THEN of the IF statement and the SPEAK command itself as shown below.

```
10 IF X=0 THEN:SPEAK"ZERO"
```

When using the IF statement with other BASIC commands, this colon is not needed.

2.2 SPEAKING LETTERS

When the name of a letter of the alphabet is to be spoken, the letter should be placed in a SPEAK statement with a SPACE BEFORE IT AND AFTER IT as shown below. This line pronounces the first five letters of the alphabet.

```
SPEAK"A B C D E"
```

Notice that no spaces are needed between the first quote and first letter or the last quote and the last letter. THE QUOTES APPEAR AS SPACES TO THE RULES WHICH DECIDE HOW TO PRONOUNCE THE TEXT CONTAINED WITHIN THE QUOTES.

If the five letters in the example were not separated, COMvoice would try to pronounce it as one word "ABCDE".

2.3 SPEAKING NUMBERS

COMvoice gives the user the ability

to speak numbers over the range -999,999,999 to +999,999,999. A number which is to be spoken must be entered without commas or spaces. A minus sign may be placed before the number to indicate a negative value. A period may also be used to designate a decimal point and any number of digits may be placed after it.

When a number is to be used in a line along with words or other numbers, a SPACE MUST BE INSERTED BEFORE AND AFTER THE NUMBER to insure proper pronunciation. To exemplify these rules a list of right and wrong ways of using numbers with the SPEAK command are shown below.

RIGHT:

```
SPEAK"1 2 3 4"
```
This will say "ONE TWO THREE FOUR"

```
SPEAK"1234"
```
This will say "ONE THOUSAND TWO HUNDRED THIRTY FOUR"

```
SPEAK"THE ANSWER IS -12.345"
```
This will say "THE ANSWER IS NEGATIVE TWELVE POINT THREE FOUR FIVE"

```
SPEAK"123456"
```
This will say "ONE HUNDRED TWENTY THREE THOUSAND FOUR HUNDRED FIFTY SIX"

WRONG:

```
SPEAK"123456789123"
```
The number is too large and will not be

pronounced correctly.

SPEAK"THE ANSWER IS3.1415"
There is no space between the word IS and the number.

SPEAK"32IS THE ANSWER"
There is not space between the number 32 and the word following it.

SPEAK"123 . 4567"
There should not be any spaces before or after the decimal point.

SPEAK"- 3.14159"
There should not be a space between the minus sign and the number.

2.4 USING PUNCTUATION

The COMvoice user may increase the quality of the speech through the use of punctuation. The two characters available for this purpose are the comma and the period. When inserted in a sentence, a comma gives the equivalent delay of FIVE spaces, and a period, the delay of TWELVE spaces. There are no restrictions on where a period or comma may be placed within a sentence. The rules that determine how to pronounce words treat the commas and periods as spaces. Some examples of how to use punctuation are shown below.

SPEAK"HELLO, HOW ARE YOU TODAY"

SPEAK"THE FIRST ANSWER IS 23. THE SECOND

ANSWER IS 5."

Notice in the second example that the periods after the numbers are not treated as decimal points. This is due to the spaces after each period. If numbers had directly followed the periods they would then be spoken as decimal points.

2.5 SETTING INFLECTION LEVELS

COMvoice allows the user to change the inflection, or pitch, of its voice between four different values. This is done be placing a number from 1 to 4 within parenthesees, ie. (1) (2) (3) or (4) at any place in a sentence where the user desires a change of pitch. When COMvoice encounters one of these symbols within a sentence, it changes the pitch of the voice to that level until another change is encountered. COMvoice always starts out at level 1, which is the lowest pitch of the four values, whenever a new SPEAK command is executed.

The inflection symbol MUST HAVE A SPACE BEFORE AND AFTER IT for proper operation. Some examples of right and wrong use of inflection are shown below.

RIGHT:

SPEAK"1 (2) 2 (3) 3 (4) 4"
This counts 1 2 3 4 while increasing the pitch.

SPEAK"DO (2) YOU KNOW THE ANSWER"
This uses the pitch change to make the sentence sound more like a question.

WRONG:

SPEAK"DO(2)YOU KNOW THE ANSWER"
No spaces around the inflection change symbol.

The inflection change is typically used to stress parts of a sentence and to make sentences sound more like questions when this is desired. The best way to learn how to effectively use this function is by experimenting with it.

There may be times when the user wishes to change pitch within the middle of a word. Since the inflection symbol must have spaces around it, this cannot be done direcly, however, the user may split up the word into two parts and insert the inflection between them. For example, if the word "ANSWER" were to be pronounced with the second syllable at a higher pitch than the first, it could be done as follows:

SPEAK"AN (2) SER"

By breaking words up and adding inflection changes, the speech produced by COMvoice can be made to sound much more natural.

2.6 USING STRING VARIABLES

A very useful function which

COMvoice supplies to the user is the ability to speak string variables. For those that are not familiar with string variables, they allow the user to store a string of characters under a variable name and are designated by a dollar sign at the end of the variable name. Examples of string variable names are X$, NUMB$, A1$, etc.

COMvoice allows the user to set a string variable equal to a set of characters and then speak the variable itself. For example, the two statements below will speak the exact same thing.

```
SPEAK"THIS IS A TEST"

A$="THIS IS A TEST":SPEAK A$
```

To add even more flexibility, the user should note that a numeric variable may be converted to a string variable via the STR$ function and then vocalized with a SPEAK statement as shown below.

```
X=3/8:X$=STR$(X):SPEAK X$
```

There are some rules that must be followed when using string variables with COMvoice. Since new string variables may be constructed by adding together other string variables, strings containing many characters may be created. COMvoice will accept string variables with as many as 194 characters. Also, only unsubscripted string variables may be used. COMvoice WILL NOT ACCEPT ANY STRING VARIABLE ARRAYS, for example X$(1,2), etc.

The last restriction of the SPEAK

command is that it will vocalize only one string variable at a time, as shown below.

WRONG:

```
SPEAK A$ B$ C$
```

RIGHT:

```
SPEAK A$:SPEAK B$:SPEAK C$
```

The user should note that the above example could also be executed as follows:

```
D$=A$+B$+C$:SPEAK D$
```

CHAPTER 3

3.1 SAMPLE PROGRAMS

3.2 PROGRAMMING PHONEMES

3.1 SAMPLE PROGRAMS

The following program prompts the user to enter two numbers and then speaks back the product:

```
10 SPEAK"ENTER THE FIRST NUMBER"
20 INPUT X
30 SPEAK"ENTER THE SECOND NUMBER"
40 INPUT Y
50 Z$=STR$(X*Y)
60 SPEAK"THE PRODUCT EQUALS":SPEAK Z$
```

The following program will speak the letters and numbers of the keyboard as they are pressed. Pressing any other key will result in an error.

```
10 GET A$
20 IF A$=""THEN 10
30 SPEAK A$
40 GOTO 10
```

The following program will sing part of a well known song:

```
10 SPEAK"(3) MARE (2) EE (1) HAD (2) A"
20 SPEAK"(3) LITTLE LAMB, (2) LITTLE"
30 SPEAK"(2) LAMB, (3) LIT (4) TEL"
40 SPEAK"(4) LAMB"
```

The following program will play a HIGH-LOW guessing game. The computer will pick a random number which the user must try to guess in as few tries as possible.

```
10 X=RND(0)
20 X=INT(1000*X)
30 SPEAK"ENTER YOUR FIRST GUESS"
40 INPUT Y
50 IFX=Y THEN 80
60 IFY>XTHEN:SPEAK"TOO HIGH, TRY AGAIN":
   GOTO40
70 SPEAK"TOO LOW, TRY AGAIN":GOTO40
80 SPEAK"THAT IS CORRECT."
```

3.2 PROGRAMMING PHONENES

As discussed in the introduction, COMvoice utilizes PHONEMES, the basic sounds from which speech is constructed, to create the words that the user hears when the SPEAK command is executed. The combination of phonemes that COMvoice assigns to a given word is determined by the text to speech algorithms in COMvoice's software.

There may be times, however, when the user wishes to access these phonemes directly without using the SPEAK statement. By speaking separate phonemes in the correct order, speech and sound effects may be created.

The subroutine below may be used to speak a string of phonemes that are picked by the programmer and inserted in their proper order in the string variable array, PH(K). Note that the variable X in the FOR statement should be equal to the length of the phoneme string.

```
1000 POKE 57116,48
1010 POKE 57112,255
```

```
1020 POKE 57116,52
1030 FOR K=1 TO X
1040 POKE 57112,PH(K)
1050 POKE 57116,62:POKE 57116,54
1060 IF (PEEK(57116)AND128)=0 THEN 1060
1070 NEXT K
1080 RETURN
```

Lines 1000 through 1020 initialize COMvoice. Line 1040 writes the phoneme to COMvoice and line 1050 latches the phoneme in. Line 1060 waits for COMvoice to say that it is finished speaking the phoneme and then continues on.

The sample program shown below shows how to use the above subroutine to speak the word "HELLO".

```
10 DIM PH(8)
20 DATA 27,2,35,24,35,53,55,63
30 FOR K=1 TO 8
40 READ PH(K)
50 NEXT K
60 X=8:GOSUB 1000
70 STOP
```

Lines 10 through 50 fill the array with the phoneme data. Line 60 sets the X variable of the subroutine equal to the number of phonemes and then calls the subroutine. The user should note that any method may be used to fill the array with the phoneme data and that this program is only one example.

The phonemes that are available to the user are shown in the table below as the number which represents the phoneme, the phoneme symbol, the duration of the phoneme and an example word which contains that sound. This information was

obtained from the VOTRAX SC-01 Speech Synthesizer Data Sheet.

NUMBER	SYMBOL	DURATION (mS)	EXAMPLE WORD
00	EH3	59	jack(E)t
01	EH2	71	(E)nlist
02	EH1	121	h(EA)vy
03	PA0	47	NO SOUND
04	DT	47	bu(TT)er
05	A2	71	m(A)de
06	A1	103	m(A)de
07	ZH	90	a(Z)ure
08	AH2	71	h(o)nest
09	I3	55	inhib(I)t
10	I2	80	(I)nhibit
11	I1	121	inh(I)bit
12	M	103	(M)at
13	N	80	su(N)
14	B	71	(B)ag
15	V	71	(V)an
16	CH *	71	(CH)ip
17	SH	121	(SH)op
18	Z	71	(Z)oo
19	AW1	146	l(AW)ful
20	NG	121	thi(NG)
21	AH1	146	f(A)ther
22	OO1	103	l(OO)king
23	OO	185	b(OO)k
24	L	103	(L)and
25	K	80	tri(CK)
26	J **	47	ju(DG)e
27	H	71	(H)ello
28	G	71	(G)et
29	F	103	(F)ast
30	D	55	pai(D)
31	S	90	pa(SS)
32	A	185	d(AY)
33	AY	65	d(AY)

34	Y1	80	(Y)ard
35	UH3	47	miss(IO)n
36	AH	250	m(O)p
37	P	103	p(A)st
38	O	185	c(O)ld
39	I	185	p(I)n
40	U	185	m(O)ve
41	Y	103	an(Y)
42	T	71	(T)ap
43	R	90	(R)ed
44	E	185	m(EE)t
45	W	80	(W)in
46	AE	185	d(A)d
47	AE1	103	(A)fter
48	AW2	90	s(A)lty
49	UH2	71	(A)bout
50	UH1	103	(U)ncle
51	UH	185	c(U)p
52	O2	80	f(O)r
53	O1	121	ab(OA)rd
54	IU	59	y(OU)
55	U1	90	y(OU)
56	THV	80	(TH)e
57	TH	71	(TH)in
58	ER	146	b(ir)d
59	EH	185	g(E)t
60	E1	121	b(E)
61	AW	250	c(A)ll
62	PA1	185	NO SOUND
63	STOP	47	NO SOUND

* /T/ SHOULD PRECEDE /CH/ TO PRODUCE CH SOUND.

** /D/ SHOULD PRECEDE /J/ TO PRODUCE J SOUND.

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