# ⚂ National Semiconductor

# DTSW-500 DIGITALKER® Vocabulary Selection System (DVSS)

## Product Description

The DIGITALKER Vocabulary Development System (DVSS) is a CP/M™ software package which provides 500 highly intelligible English words in a male speaking voice. These words are intended for users of National Semiconductor's DIGITALKER MM54104 Speech Processor Chip. The package provides a complete software environment that allows users to create speech PROMs containing a vocabulary of words, phrases, or sentences put together from the 500 words supplied.

The DVSS package consists of 2 floppy disks and a user's manual. The first disk contains the speech data archive and the second contains the system software. Both floppy disks are standard 8" single-sided, single density disks written in CP/M format.

In a typical application, a user would start by developing a vocabulary for his envisioned talking product. This vocabulary could be composed of a list of single words, phrases, or sentences. A standard CP/M text file is created containing the vocabulary list using any CP/M based text editor or the editor provided with the DVSS. This vocabulary list is checked to assure that all words on the list are contained in the current archive. Missing or misspelled words are flagged and the user must then return to the text editor to make corrections.

The DVSS software creates what is called a work file for the vocabulary from an error-free vocabulary list. This work file can then be submitted to the ROM image building routine. The output is a ROM image file in binary format. This file in turn can be used to program PROMs.

In order to use the DVSS software, a user needs a computer system that runs CP/M-80 and that has two 8" single density floppy disk drives. Also necessary is a CRT terminal with both upper and lower case capability. (Note that this configuration can actually be thought of as a model of the computer system on which DVSS will operate. There are however computer systems which don't exactly match this model that will run DVSS.)

The DVSS programs are easy to use. A complete instruction manual and tutorial examples ensure that even a person unfamiliar with speech or programming will have little difficulty in producing vocabulary lists and speech PROMs.

The speech ROM images produced by the DVSS system will be nearly as memory efficient as speech ROMs produced at the National Semiconductor Speech Lab. The data rate for ROMs containing more than 50 words will be approximately 1200 bits per word. (Smaller speech ROMs result in a slightly higher data rates.)

## Features

■ Create your own speech EPROMs
■ Choose words from a large database
  — 500 words to start
  — Future library expansion
■ Build sentences and phrases
■ No previous knowledge of synthetic speech required
■ Runs on most CP/M machines
■ Supports MM54104 Digitalker Speech Processor Chip

## Functional Description

### THE SPEECH DATA ARCHIVE

The speech data disk supplied with the system contains 500 words. (Consult Table 1 for a listing of these words.) Each word stored on the floppy is a self-contained, stand-alone, playable entity. Adding further standard vocabulary or even custom words to the archive is a simple operation which is discussed in the software section below.

### THE SOFTWARE

The DVSS software is a CP/M 2.2 applications program written in BDS C which will execute on most CP/M 2.2 compatible computers. The software requires the service of a CRT terminal.

### OPERATING ON SPEECH DATA ARCHIVES

The speech data archive is the basic unit on which all the software operates. The system, as it is shipped from the factory, consists of a single speech data archive containing 500 words. The archive architecture, however, makes it very easy to add to or create new archives from existing ones. This capability is useful in a number of situations. For instance, as more standard words are released by National Semiconductor, a user may wish to make a new archive that contains the entire standard word library. Or, if the full speech data archive has become too cumbersome or too large for storage on a single floppy, a subset of the full archive can be selected to create a new more manageable archive.

The word archival software allows the user to obtain a variety of information about the contents of any archive. For example, the user can generate an alphabetical listing of all words in the archive. All of the lists generated by the DVSS can be output to any of the standard CP/M devices such as CON:, the system console, LST:, the system printer, or a file residing on any system supported disk.

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## PREPARING VOCABULARY LISTS

The central purpose of the DVSS system is building speech ROM images which (after conversion to some physical media such as EPROM or RAM) can be played by the MM54104. The first step in building a ROM image is to list the messages, i.e. the words and phrases, that are to be contained in the image. In order to create, and if necessary, correct, such a message list, any CP/M text editor (for example, WORDSTAR™ in "non-document" mode) may be used to create a file of the proper format (format specified in detail in the manual). The DVSS package includes a simple but powerful text editor that may be used in lieu of other CP/M editors.

## COMPILING VOCABULARY LISTS

After a vocabulary list has been entered into a file, it must be compiled. The compiler checks for existence of words in the archive and prepares a workfile for the image builder. Any missing words are pointed out for the user.

### BUILD SPEECH DATA ROM IMAGES

Once the user has successfully compiled the vocabulary list, a ROM image can be made of these words and/or phrases by using the ROM image builder. This function retrieves the raw speech data for each word in the vocabulary list, finds all redundancies; eliminates them; and packs the remaining data into a playable image.

## PROGRAM SPEECH DATA EPROMS

When the user has built a speech ROM image, he can program a physical PROM (or set of PROMs) to contain this image. The DVSS will directly support PROM programming on the local PROM programmer in STARPLEX™ systems. Speech ROM images are nothing more than CP/M files in binary format. They may easily be converted (with user supplied software) to other formats for use with other user supplied PROM programming hardware (for example, with a remote programmer connected to a serial port).

## AUDITIONING SUPPORT

Customers who are using the DVSS to experiment with DIGITALKER speech, can easily obtain a speech system in which to play their EPROMs. National sells a simple board (DT 1058) and a software upgrade (DT 1060) that enables the original DIGITALKER demonstration board (DT 1000) to play up to eight 16k EPROMs (or 4 32k EPROMs) (see the DT data sheets for more information on these products.) There are also vendors who build DIGITALKER based add-ons to various computers which can accept speech EPROMs. These boards allow a user to play speech EPROMs under computer control (users of these boards might also want to use the DT 1058 PROM board). A list of such vendors is available on request from National.

### DTSW- 500 Word List

| | | | |
|---|---|---|---|
| 0 | add | blocking | converter |
| 1 | address | blue | cool |
| 2 | adjust | brake | copy |
| 3 | after | budget | correct |
| 4 | again | building | cost |
| 5 | air | buoy | count |
| 6 | aisle | busy | cross |
| 7 | alarm | button | customer |
| 8 | alert | by | cut |
| 9 | all | c | d |
| 10 | alternate (adjective) | call | d. c. |
| 11 | amp | cancel | danger |
| 12 | ampere | capacitance | data |
| 13 | an | car | date |
| 14 | and | case | day |
| 15 | announcement | caution | december |
| 16 | answer | cease | decrease |
| 17 | april | celsius | default |
| 18 | arrival | cent | degree |
| 19 | ask | centi- (prefix) | delay |
| 20 | assistance | centigrade | demonstration |
| 30 | astern | centimeter | deposit |
| 40 | at | change | depth |
| 50 | attention | channel | dial |
| 60 | august | check | did |
| 70 | authorize | circuit | disable |
| 80 | auto | clear | divide |
| 90 | available | close | dollar |
| 100 | average | code | door |
| 1000 | away | cold | down |
| a | b | comma | e |
| a. c. | back | command | east |
| a. m. | barometric | common | ed (suffix) |
| able | basement | communication | electric |
| abort | bath | complete | electricity |
| accumulate | battery | condition | else |
| acknowledge | been | configuration | emergency |
| activate | before | connect | enable |
| active | between | continue | end |
| activity | black | control | enter |

entry
equal
er (suffix)
error
evacuate
examine
exit
extreme
f
fail
failure
far
farad
fast
february
feet
fifth
fight
fire
first
floor
flow
forward
friday
from
frontal
fuel
fuse
g
gallon
gas
get
going
good
gram
gray
great
green
group
h
half
have
hello
help
here
hertz
high
hit
hold
home
hour
house
hurt
i
if
in
inactive
inches
incorporated
incorrect
increase
ing (suffix)
insert
interface
intruder
invalid (not valid)
is
it
j
january

july
june
just
k
key
keypad
kilo-
l
leave
left
less
level
lie
light
lime
limit
line
link
listen
load
lock
loop
low
m
march
mark
may
meg- (prefix)
mega- (prefix)
message
meter
micro
mile
milli- (prefix)
millimeter
million
minus
minute
miss
model
modem
module
monday
monitor
more
move
my
n
nano- (prefix)
near
need
next
night
no
normal
north
not
notice
november
number
o
o'clock
october
of
off
ohm
okay
on
onward
open

operator
optical
or
other
out
over
over-range
p
p. m.
pair
pan
parent
pass
past
per
percent
phone
phone number
pico
place
play
please
plus
point
pound
power
program
present
press
pressure
pull
pulse
push
put
q
quarter
r
rain
range
rate
re- (prefix)
reach
ready
receive
receiver
record
red
remove
repair
repeat
replace
reset
resistance
response
restore
return
reverse
right
ring
room
route
run
s
safe
saturday
second
secure
security
select
send

sensor
september
sequence
service
set
short
should
side
sight
sink
slow
smile
smoke
sound
south
space
span
spare
speed
spell
squad
ss (suffix)
stair
star
start
station
status
steam
stern
stop
store
storm
stream
street
sub
subscriber
sunday
supervisory
switch
system
t
tank
tape
target
tear
teen
temperature
temporary
terminate
test
th (suffix)
than
thank
thank-you
that
the
thee
then
there
therm
thermal
third
this
thursday
tide
time
tip
today
tone
total

| | | | |
|---|---|---|---|
| touch | unit | wake up | wind (long i) |
| tracking | unknown | warm | wish |
| traffic | unlock | warning | with |
| transfer | up | was | within |
| trip | use | water | word |
| true | uth (suffix) | watt | work |
| trunk | utility | wave | x |
| try | v | wear | y |
| tuesday | voice | wednesday | yellow |
| turn | volt | week | yes |
| type | voltage | welcome | you |
| u | vote | west | your |
| un- (prefix) | w | what | z |
| unable | wait | will | zone |
| unattended | wake | wind (short i) | |