MERGEWAV
(how to merge wave files "on the fly")

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1]. INTRODUCTION:

MERGEWAV is a Visual Basic module which, when added to any parent VB program, will facilitate "on the fly" merging of .WAV files. It must be accompanied by the inclusion of special global declarations.

When an application calls for the playing of a series of .WAV files, the usual approach is to use high level mmSystem APIs such as SndPlaySound, mciExecute, mciSendCommand or mciSendString. This is a perfectly adequate solution for applications which call for a single .WAV file to be output.

Where there are two or more .WAV files for sequential output however, the programmer may have difficulty using these APIs. Essentially, the processor must be told to wait until each .WAV file has completed execution through the use of a 'wait' flag, otherwise an instruction to play a .WAV file will cause the currently executing play to abort. Unfortunately, this procedure effectively halts all other processing. Again, this may not be a problem for programmes which are not intended to run concurrently, or have no other background tasks to perform, such as monitoring a data channel. The fact is however, if the processor remains tied up for the duration of the play, it may not be a tolerable situation.

Another difficulty emerges with the playing of a series of .WAV files where your application is generating variable messages. A good example is a talking clock where a string of digit words need to be generated. The transitions from one word to the next are not "seamless". While the API opens and closes each .WAV file with possible calls to the hard drive, there are obvious pauses and this can result in a somewhat stilted delivery. It sounds much better if the time is announced "ONE, TWO, THREE, FOUR" as a continuous string.

Obviously, one solution is to create strings for every time combination that you may want announced, but that's certainly most inefficient and well beyond the patience of any programmers I know, not to mention being beyond their HDD resources.

The answer is to have ten .WAV files, one for each of the digits in the range zero to nine inclusive. For any time combination, the four appropriate .WAV files are opened, merged into a new, temporary .WAV file and played from RAM.

The effects are immediately obvious. First, because the programme only has to play a single .WAV file instead of a series, the processor may be returned immediately to the next or some concurrent task, once the SndPlaySound command is issued. It is not necessary to flag a 'wait' with the high level command. Secondly, the audio which is generated is seamless. It will sound just like the string had been generated as an original file. Delivery is much smoother, quicker and realistic. The more you play with the generation of variable string audio messages, the more you will begin to appreciate this feature.

To merge .WAV files on the fly, you need to use the low level audio commands in the

mmSystem DLL. One look at the Multimedia Programmer's Reference manual will soon show you that this is a daunting task indeed.

Well, we've made it easy for you!

We have produced a utility called MERGEWAV which makes on the fly merging for VB programmers a snap. MERGEWAV is a module written as a sub which may be attached to any programme. Simply call the sub and pass the total number of files you want to merge and their names and the name of the temporary destination file. To demonstrate the capabilities of MERGEWAV, we have written a little routine called MERGECLK.

MERGECLK is a simple talking clock demonstrator (yet another!), which has been provided to show MERGEWAV in action.

Unlike all the talking clocks you have seen so far, the significant difference with MERGECLK is that it will allow for seamless transistions from one .WAV file to another in the transmission of a complete time message. At the same time, it facilitates the continued processing of other tasks, rather than being forced to halt processing until the playing of a series of .WAV files has completed.

When you run MERGECLK, you can have the option of running the clock with the merge feature turned on or off. A widget will indicate when the processor is tied up by the mmSystem tasks. With the merge feature turned off, the widget freezes until the sound play has completed. With the merge feature turned on, you will be able to detect the briefest pause in the widget while the actual merge takes place, then it continues during the playing of the sound string.

2]. MERGEWAV IN PRACTICE:

The programmer who interested only in the end result and not the means may simply include MERGEWAV into a program, pass the required parameters and expect a single merged .WAV file to be produced without any further understanding of the code functionality being necessary to achieve the task.

It is a simple matter to make use of MERGEWAV:
- add the MERGEWAV module to your program
- include the appropriate declarations in your global module.
- fill an array, Snd$() with the names of the .WAV files you want to merge
  (Include path names if necessary)
- assign a name to Merged$ for the resultant merged file.
  (Include path name if necessary)
- assign a value to SndFile% which should be equal to the number of array
  elements filled in Snd$().

  (eg. if Snd$(0) = ALPHA.WAV and Snd$(1) = BRAVO.WAV and you wish to
  merge these two file into TEMP.WAV, then Merged$ = TEMP.WAV and
  SndFile% = 2)

The call to do a merge is:
mmMergeWave Merged$, Snd$(), SndFile%

On return from the routine, a new .WAV file as specified by Merged$ will have been created, ready for you to play.

Note:
The call to mmMergeWave is a call to a sub and not a function. Therefore the parameters passed are not included in brackets and no value is returned. Error checking within the sub will soon let you know if the routine failed. A value is assigned for SndFile% so that you may nominate a varying number of files in the array Snd$(), up to the maximum size of the array which

is determined in the global module.

3]. BACKGROUND:

MERGEWAV is a module adapted from the AUSTRALIAN AVIATION INDUSTRY standard AUTO-UNICOM system. The proprietary terminal programme merge routines, developed in system C++ have been re-written in Visual Basic for ease of use and understanding by the wider VB programming community.

The AUTO-UNICOM (tm regd, pat pending) system transfers pre-recorded .WAV files to a radio transmitter for broadcast to pilots. Digitized voice messages comprising commonly used words and phrases are sourced from a bank of .WAV files. Included are elements such as the letters of the phonetic alphabet, eg. "ALPHA", "BRAVO", "CHARLIE", etc., numerals, eg. "ONE", "TWO", "THREE", etc. and special words, eg. "WIND", "SPEED", "DIRECTION", "KNOTS", etc. There are also short phrases such as "TIME CHECK", "WIND CHECK", "PREFERRED RUNWAY", etc. All .WAV files are digitized human voice. There are no "phoneme generators" in use, in the interest of quality audio. A local operator may also create his own messages concerning supplementary weather observations, availability of airport facilities, local hazards to aviation, services available, etc.

AUTO-UNICOM runs on a fast 486 platform with expanded I/O capability. AUTO-UNICOM monitors the data from a variety of sensors and **responds** to pilots via an air-ground radio system. Response messages are compiled "on the fly" using MERGEWAV from the library of .WAV files in memory.

AUTO-UNICOM uses a proprietry method of signalling to trigger a response, whereby a pilot is able to command the ground based equipment **on demand** to respond with the information required. AUTO-UNICOM is, (among other things), able to deliver comprehensive weather reports, VHF direction finder based tracks to fly to the UNICOM, report on the status of airport facilities and navigation aids, transmit pre-recorded messages stored by an operator, activate emergency services and establish radio/phone patch links.

Intended to operate mainly unattended, AUTO-UNICOM, for the most part sits and passively gathers data, responding only when prompted. It is truely an "EVENT DRIVEN" system. Since the airport operators are usually not computer literate, the "MAN-MACHINE INTERFACE" is made as simple as possible and is a prime candidate for the "GUI" environment.

(Expressions of interest in AUTO-UNICOM are invited from aviation industry representatives and a demonstration disc can be provided with comprehensive documentation for $40 U.S. plus post and pack. (see last page).

4]. HOW TO OBTAIN MERGEWAV:

We have provided MERGECLK as a shareware program distributed free of charge into the public domain for the purposes of demonstrating the capabilities of MERGEWAV. You may feel free to use MERGECLK at your leisure. If you redistribute MERGECLK, it must be distributed without charge for the program and in original archive form.

MERGECLK will periodically worry you with a reminder that you are using an unregistered version.

If you register MERGECLK, you will receive the following:

- source code for MERGECLK and a compiled version without the worry screen
- source code for the MERGEWAV module and global declarations
- a support document file which fully describes the functionality of the module
  and the techniques for merging .WAV files

The document is a short tutorial on techniques for merging .wav files and covers:
- the structure and manipulation of RIFF .wav format files,
- the use of GLOBAL memory,
- manipulation of GLOBAL memory segments, and
- comprehensive error checking for every stage of the process.

MERGEWAV has been made available as Shareware in the interests of better programming for Visual Basic and the development of Multimedia applications. The author may be contacted at the following address:

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YOU MAY REGISTER MERGECLK AND OBTAIN THE SOURCE CODE FOR MERGEWAV
PLUS THE TUTORIAL
ON PAYMENT OF $25 U.S.
BY BANKERS CHEQUE, MONEY ORDER, VISA, MASTERCARD OR AMEX
TO UNICOM AVIATION SYSTEMS (AUST) Pty. Ltd.

(Airmail postage and packing for overseas orders, please add $5 U.S. funds,
please specify 3.5" or 5.25" preference, high density only)

YOU MAY OBTAIN A DEMONSTRATION COPY OF THE AUTO-UNICOM
TERMINAL FOR NON TOWER CONTROLLED AIRPORT USE
ON PAYMENT OF $40 U.S. FUNDS
BY SIMILAR ARRANGEMENT