A2 DMS II User's Manual

Introduction

Congratulations on purchasing A2 DMS II. You have the only wavetable synthesizer for the Apple //e, IIc, and IIc+ computers that is suitable for performance use. (A2 DMS II can also be run on an Apple IIgs, but the advanced sound capabilities of the IIgs permit much more "modern" music synthesis.)

It supports up to 8 voices which can be selected and played (monophonically) from the Apple keyboard, and it can be used to "record" a performance for later playback.

Requirements

A2 DMS II requires an Apple //e, IIc, IIc+, or IIgs computer with 80-column capability, at least one 5.25" floppy disk drive, and a color or monochrome monitor. A patch cable suitable for connecting either the Apple //e cassette output port or the Apple IIc or IIgs headphone jack to an amplifier or mixer is also desirable, but not necessary.

Getting Started

Before using A2 DMS II, you should make a copy of the diskette. Put away the original diskette, and use the copy as a safeguard against damage. You can use any Apple II disk copy utility to make a copy onto a 5.25" DSDD diskette. Don't try to use an HD diskette, because the Apple drive cannot record to it. (It's also worth pointing out that Apple II diskettes cannot be copied by conventional means on any non-Apple II, so don't even try!)

Now that you have a fresh copy of the diskette, put it into a bootable disk drive connected to your Apple and turn on the power. The program will boot to a startup screen, then in about five seconds, it will load the voices into memory and run the synthesizer. You will know the synthesizer is ready when you hear it play the first four notes of Beethoven's Fifth.

You can try it out now by playing some notes using the Apple keyboard!

What's New with A2 DMS II?

If you are already a user of the original version of A2 DMS, you already know how A2 DMS II works, with just a couple of differences. The command key to quit the synthesizer, which used to be "X", is now "Q". "X" is now used to switch the synthesizer to control by the serial port. The keyboard is inactive after switching to serial control, but the synthesizer responds to all characters sent to the serial port just as if they had been typed on the keyboard. So you can switch back to keyboard control from serial control by sending an "X" to the serial port.

This command key change makes A2 DMS II more compatible with the commands of DMS Drummer II.

Using the Synthesizer

If you have a monitor attached (and you probably should while learning A2 DMS II), you will see the following screen:

The middle of the page shows the layout of all the **playable keys** of the synthesizer and how they map to piano keys. The lower "manual" plays one octave lower than the upper, and the entire range of the synthesizer can be shifted up or down several octaves by using the up and down arrow keys.

Near the bottom of the page, the **available voices** are listed with the numbers that correspond to them. The active voice is shown with its corresponding digit displayed in inverse—in this case, voice 1, Acoustic Piano. The active voice can be changed at any time by holding the Shift key and pressing the corresponding digit key.

The bottom line of the screen displays **synthesizer status**: the current octave of the lower "manual", whether it is currently recording or playing (an inverse R or P following "Rec/Play"), and how many pages are left to record music. The ">" means more than ten "pages" of 256 bytes (each page is enough to hold about 40-50 notes). If the number of available pages for recording music falls below ten pages, a digit from 9 to 1 will be displayed, and recording will stop automatically if all the space is used.

Command Keys

The upper part of the screen shows the **synthesizer command keys**. Here is a fuller description of their actions:

(sp) = Record/Pause	Pressing the Space bar starts or pauses recording of music that you play. After pausing, pressing the Space bar again resumes recording where you left off.
P = Play	Shift-P plays the music that has been recorded. You can continue recording where you left off after playing.
<up> = Up 1 octave	Up Arrow shifts the keyboard up one octave. (Note that higher octaves may lose much of the timbre of the voice.)
<down> = Down 1 octave	Down Arrow shifts the keyboard down one octave.

D = Delete recording	Shift-D deletes the recorded music. Note that **there is no "undo"** so a delete is final!
S = Speaker/cassette	Shift-S switches sound output from the Apple speaker to the cassette output or back to the speaker. The Apple IIc and IIc+ have only the speaker port. The IIc has a "headphone" jack that can be used to feed the speaker output into an amplifier or mixer. The Apple //e has both a speaker and a cassette port, but no headphone jack. The cassette output port is at microphone level for an amplifier or mixer.
Q = Quit synthesizer	Shift-Q exits the synthesizer and offers the option to save any recorded music to disk. If you don't want to save music, you can just press Return to restart A2 DMS II.
<shift-digit> = Use voice <digit>	Shift-<digit> selects voice <digit> as the active voice.
X = Toggle Serial/Keybd control	Shift-X switches from keyboard control to serial port (slot 2) control. If in serial control mode, Shift-X received on the serial port switches back to keyboard control. The message **Serial Control** appears in inverse on line two of the display when serial control is active,

Serial Control Mode

Serial Control mode allows A2 DMS II to be completely controlled by an external device that supplies characters to the Apple II serial port in slot 2. Typically, the external device will be a sequencer or a device that translates MIDI messages into characters providing equivalent control for A2 DMS II.

If your Apple II has slots, a Super Serial Card should be inserted into slot 2. If you have an Apple //c or //c+, the printer serial port on the back of the machine is the slot 2 port.

The external controlling device should send characters with 8 data bits, 1 stop bit, and no parity, at 9600 baud. Since there is no serial equivalent to the Any Key Down keyboard detection, any "sounding" character will continue to play as if the corresponding keyboard key is being held down. This continues until the controlling device sends a "key up" character to the serial port. Any non-sounding character will serve as a "key up" character. For example, "a", "f", "=", and "U" are all non-sounding characters which will end the currently sounding note.

Manual Mode

Until now, we have been using A2 DMS II in **automatic** mode, which uses defaults to bypass user input and prepare the synthesizer for performance—this can be done easily without having a display attached.

Manual mode is also available, and it offers more choices at the cost of requiring user input and an attached display.

As A2 DMS II is booting, at the bottom of the title screen, there is a prompt: **Press <Esc> for manual mode.** If you press the Esc key while this screen is being displayed, you will be presented with the option to either run the **Synthesizer**, run the **VoicePak Editor**, or exit to **BASIC**.

When you choose to run the synthesizer in manual mode, it will ask you which VoicePak you would like to load. The default VoicePak is "PACK1.VP" (the only VoicePak on the disk as shipped). If you just press Return at the prompt for a VoicePak, a catalog of the files in the current directory will be displayed. This can be handy if you can't remember the name of the VoicePak you want.

After you've chosen the VoicePak, you will be asked if you would like to load a saved music file. If you just want to go to the synthesizer, enter "n" or "N" and press Return. If you do want to load a music file, enter "y" or "Y" and press Return.

You will then be asked for the name of the music file you would like to load. Pressing Return will display a catalog, just as with the VoicePak choice. (The only music file on the disk as shipped is "START(.MUSIC)", which is the first four notes of Beethoven's Fifth.)

The VoicePak Editor

The other selection on the main menu, VoicePak Editor, can be used to configure the set of voices available to the synthesizer. A small selection of sampled instrument voices is included, plus the primitive square wave, sawtooth, and sinewave.

The EDIT.VOICEPAK program displays the contents of the current VoicePak and allows addition, deletion, and rearrangement of voices, as well as assigning instrument names to them. The keyboard controls for performing these actions are documented on the program's main screen, shown below:
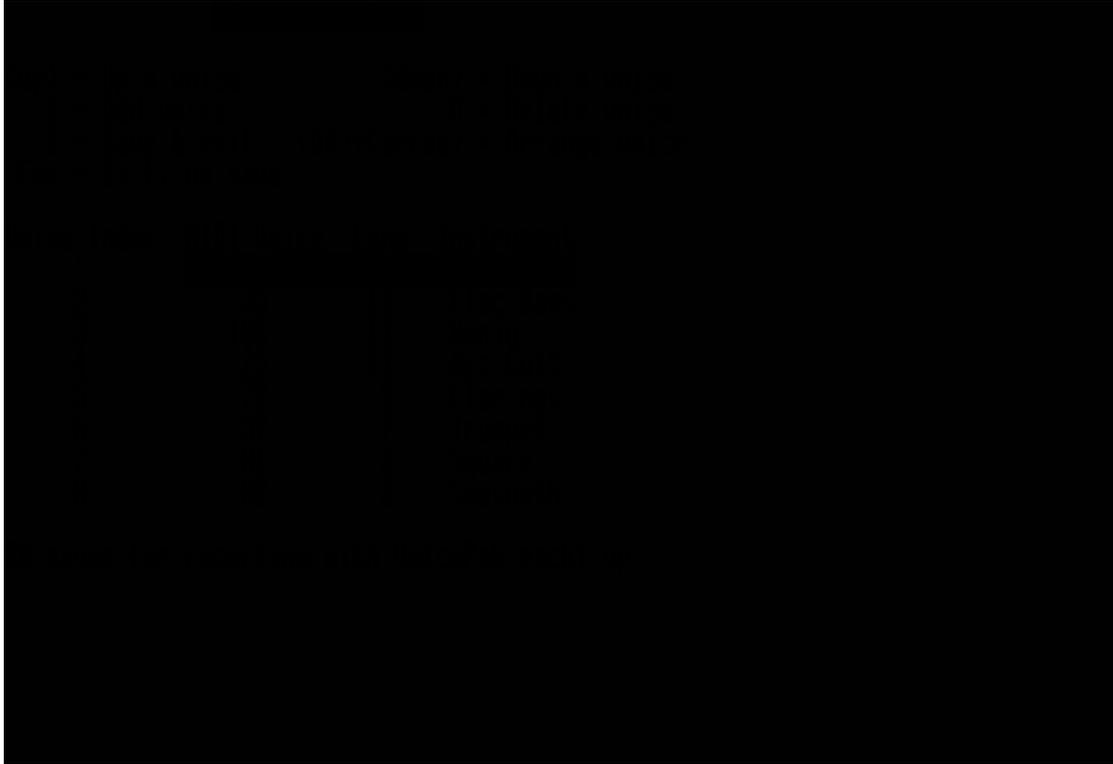
The up and down arrows move the cursor bar to select a particular voice slot. "D" deletes any assigned voice from the selected slot, and "A" adds a voice in that slot. Holding down the Open-Apple key and pressing the up and down arrows "moves" a voice up or down in the list, so it can be easily placed in a desired position.

The program requires that some voice be assigned as voice #1, and also requires that at least 3 pages of memory be left for recording music.

"S" saves a new VoicePak in its current state. When saving a VoicePak, a new name may be given or an existing VoicePak may be overwritten. All VoicePaks end with a ".vp" suffix. The Esc key can be used to exit the VoicePak editor without saving any changes.

Voices

Voice files are stored in the VOICES directory, and are named "V.n", where n is the MIDI "patch number" (0..127) corresponding (approximately) to the instrument. The included voices are:

Voice Number	Instrument name
6	Acoustic Piano
12	Vibraphone
25	Acoustic Guitar
35	Electric Bass
57	Trumpet
72	Clarinet
81	square wave
82	sawtooth wave
83	sine wave
106	Banjo

This table can be displayed on the screen by running the program VOICE.LIST on the disk from the BASIC prompt.

Audio Output

A2 DMS II audio output defaults to the built-in speaker. The output can be toggled between the speaker and the cassette output by pressing "S" while in the synthesizer. The cassette output, which is only available on the Apple //e, is at a "microphone" level, and so must be connected to an amplifier or mixer to be useful.

Needless to say, the quality of the sound is much better if it is reproduced by an external speaker or amplifier, or through headphones. Users of Apple //c and IIgs machines have the advantage of a built-in speaker/headphone jack, but Apple //e owners would do well to adapt their machines for external output.

Although the raw output is a pulse-width modulated 22kHz pulse train, the highest usable audio frequency present is about 5kHz. Therefore, if the output is fed into an amplifier, it is appropriate to adjust the tone control or equalizer to reduce high frequency response accordingly. This will make it easier on your amplifier and speakers (and your young listeners) even if you cannot hear the 22kHz "carrier" tone. ;-)