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CELEBRATING THE APPLE II

II ALIVE

CELEBRATING THE APPLE II

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CRASH & BURN: DEALING WITH ERRORS & CRASHES PART 2

PAST PERFECT: THE HISTORY OF THE APPLE II

INTERVIEW WITH MIKE WESTERFIELD OF THE BYTEWORKS

RIGHT CONNECTIONS APPLE II

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SOUND LOGIC

A LOOK AND LISTEN AT THE WORLD OF APPLE IIGS SOUND

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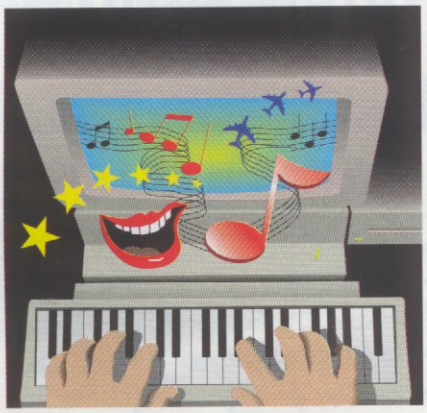

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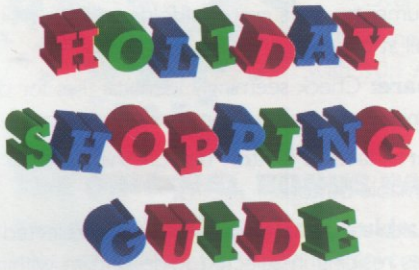

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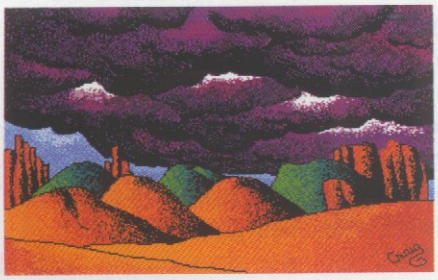

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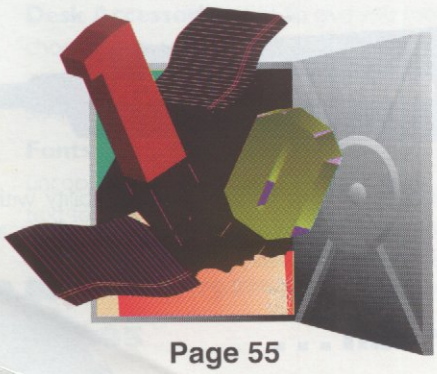

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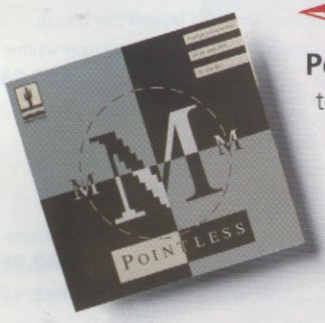

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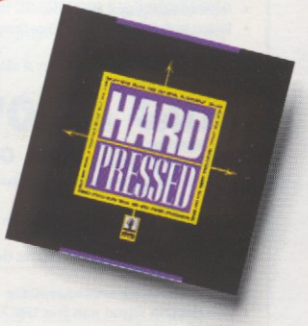

HardPressed 1.0 If you're always searching for more disk space, then you need HardPressed – the best disk compression software for your Apple IIGS. It virtually doubles the space on any type of disk. Your 40 MB hard drive will be able to store 80 MB, or a 2 MB RAM disk can store 4 MB! HardPressed works behind the scenes, transparently compressing your files as you save them. When you open a compressed file or launch a compressed application, HardPressed automatically expands it for you.
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ANSWER: It's a distinct possibility. I've never seen this kind of problem, and I would never expect to see it on a IIGS that's functioning normally. Try booting your computer with the Shift key held down—if AppleWorks operates properly when Shift-booting, then you have some kind of software conflict. It's possible, I guess, that the RamKeeper could cause the problem, but I don't see how. (You could always try taking it out.) Anyone else have any ideas?

QUESTION: When I print a text file to disk as ASCII, AppleWorks 3.0 splits the lines. What was one long line in AppleWorks becomes two shorter lines in the text file. I am designing a *HyperStudio* stack which reads certain kinds of text files and need to know how to fix this. How many characters are in a line of ASCII text?

Michael Vinca
Erie, PA

ANSWER: Asking how many characters are in a line of ASCII text is like asking how much coffee is in your cup right now—it's going to vary. AppleWorks should print to disk the way you need if you select "Standard text format with Tabs" or "Spaces substituted for tab stops" when you print the text file to disk. You should not select "Returns after each line." ■

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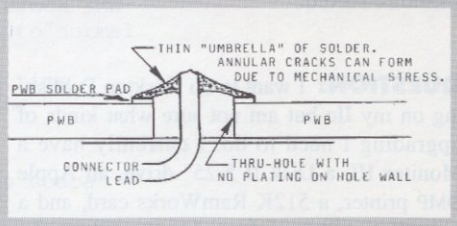
A IIGS KEYBOARD CONNECTOR PROBLEM

by Buzz Bester, Guest Tech

Here's an occasionally-needed keyboard connector repair that "smells of solder!"

The standard Apple IIGS keyboard has two ADB (Apple Desktop Bus) ports. The keyboard cable (which goes to the computer) and the mouse cable connect to these ports. When one or the other of these connectors develops an intermittent open-circuit, it manifests itself by "freezing" the mouse pointer wherever it happens to be. The symptom is not unlike a software hang-up, though it's caused by a hardware problem.

I was able to buy a used IIGS at a scandalous price because that connector fault, undiagnosed, depreciated its value. I soon found that a temporary fix for the intermittent open-circuit was to wiggle the faulty connector. The problem, however, did not go away and it became necessary to remove the keyboard from its case for closer examination. The simple disassembly described under "Sticky Keys," *II Alive, July/August, page 20,* exposes the connectors. There is no need to remove the keycaps.



As a trained Metallurgical Engineer, and having worked on solder-joint reliability for 20 years, it seemed to me the "faulty connector" was most likely a faulty solder joint at one or more of the five places that the connector (socket) was soldered to the printed wiring board (PWB). Close examination showed that the solder joints were one-sided, pad-to-pin. There was no thru-hole plating so the joints were thin, umbrellas of solder—a type of joint known to develop cracks when stressed. Enough stress could be generated by simply plugging and unplugging the cable to propagate a crack across a solder joint over a period of time.

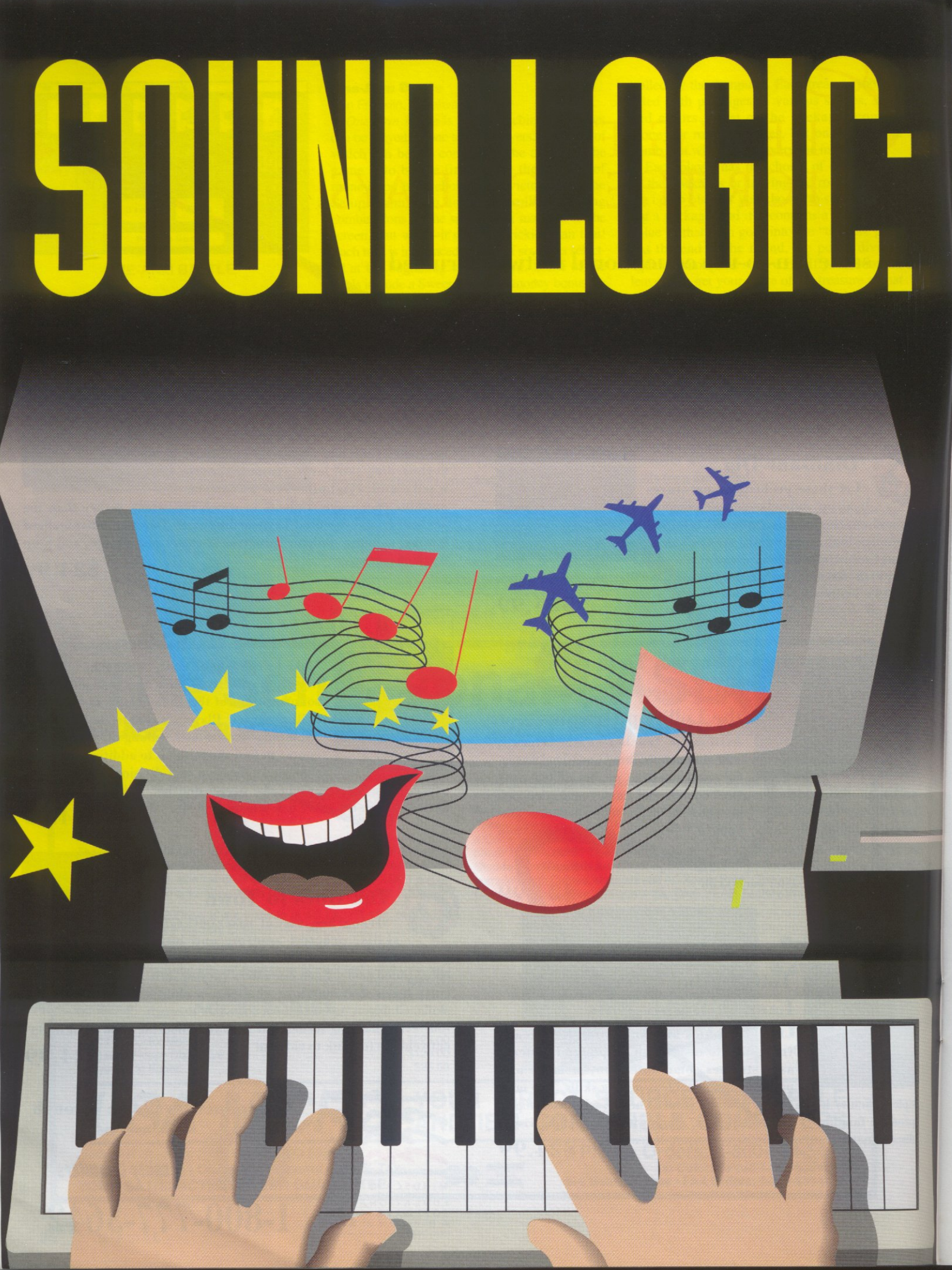
The diagnosis was simple; however, the fix required some dexterity and some experience with reworking faulty solder joints. Readers not having these qualifications might consider a qualified repair shop rather than risk damaging the PWB.

With skill and courage you can proceed with this home repair, but you need to understand the hazards included in the following instructions. Standard "grounding" procedures should be used to assure that damage to circuitry will not result from static charges.

Wick away the old solder from each of the 5 solder joints until the connector separates from the PWB. A 700°F temperature controlled soldering iron is suitable; do not use a solder-gun since it is not controlled. Use fine solder-wick and minimize the wicking time to avoid damage to the PWB. It is important that the solder in the wick not be allowed to solidify before being lifted from the PWB because it is possible to pull solder pads from the PWB if the solder is not kept molten by continuous contact with the hot iron. After the connector has been separated from the PWB, wick away any old solder remaining on PWB pads and connector pins. These surfaces need to be retinned. If they are not bright, it is advisable to lightly abrade away contamination with a sharpened emery board—remember that PWB pads are thin copper foil and can be damaged with excessive abrasion. Re-tin the connector pins and PWB pads with a thin coating of fresh, bright solder. Use small diameter Sn60 or Sn63 flux-cored solder wire; if you apply too much solder here, you will need to be wick away some of the excess to permit reassembly of the connector to the PWB. Reassemble the connector firmly to the PWB and use tape or clamps to keep the connector snug and still during the re-soldering procedure. Re-solder the five connections. Examine the re-soldered joints to assure that no solder bridges exist, using a magnifying glass if necessary. Clean the reworked area by brushing with isopropyl (rubbing) alcohol and blotting away the excess.

Finally, observe that there is about a 1/10 inch gap between the end of the connector socket and the keyboard structure. Observe also that insertion of the cable into the socket tends to reduce the 1/10 inch gap once again stressing the solder joints and slightly bending the corner of the PWB. A 1/2 inch length of "popsicle" stick wrapped with 5 to 10 layers of paper tape will make an ideal shim to fill the 1/10 inch gap. This final recommendation is the easiest part of the project and will prevent recurrence of the malfunction by reducing future stress on the connector socket solder joints.

SOUND LOGIC:



A Look & Listen at the World of Apple IIgs Sound

by Nate Trost

When the Apple IIGS was first introduced in 1986, it featured the best standard sound capabilities of any personal computer on the market. Although its competitors—the Macintosh, Atari ST and Amiga—went far beyond the simple boops and beeps of the original Apple II, none could match the IIGS.

The sounds of the orchestra float across the room, filling it with the gentle strains of a symphony. Suddenly, violins and oboes are interrupted by the jarring beat of a rock and roll soundtrack. A crowd cheers as laser blasts rock the building. Could this be a scene from a comedy sketch gone wild? No, just another routine workout for the Apple IIGS sound hardware!

When the Apple IIGS was first introduced in 1986, it featured the best standard sound capabilities of any personal computer on the market. Although its competitors—the Macintosh, Atari ST and Amiga—went far beyond the simple boops and beeps of the original Apple II, none could match the IIGS.

Even today, with a plethora of sound cards for MS-DOS machines on the market, the Apple IIGS built-in sound capabilities remain unmatched by most other personal computers. Only the very latest Atari and Macintosh computers go further than the IIGS with their built-in audio. Feats that require hundreds of dollars' worth of add-ons with other computers can be handled without breaking a sweat on your IIGS. With inexpensive hardware and software, you can push the envelope even further.

The Hardware

Before we discuss harnessing the audio horsepower of your Apple IIGS, let's take a peek under the hood and see exactly what makes the IIGS such a powerful performer.

Apple had originally planned to include only simple sound functions in the IIGS—a simple synthesizer that would be a substantial improvement over the old Apple II sound capabilities, but nothing spectacular compared to what we're used to. Fortunately for us, someone told them about the Ensoniq 5503 Digital Oscillator Chip.

The Ensoniq (say "n-sonic") 5503 is the same chip used in Ensoniq's Mirage sampler and ESQ-1 synthesizer, both professional musical instruments sold in the '80s. The Ensoniq chip allows the IIGS to play as many as thirty-two independent sound samples simultaneously. These samples are digital recordings of sounds, and can be representations of real-world sounds or totally artificial sounds designed completely inside the computer. The 5503's flexibility makes it perfect for use as a one-shot sample player (for example, playing back a Star Trek sample when you start up your computer) or as a synthesizer, building short samples of waves into more complex musical arrangements.

The 5503 has 64K of dedicated RAM which holds the sound samples. This RAM is accessible by both the IIGS microprocessor and the Ensoniq chip, thanks to the Sound GLU (General Logic Unit) chip, and is known as the DOC (Digital Oscillator Chip) RAM.

In addition to these chips, the IIGS features amplification circuitry that takes the output from the 5503 and drives the speaker and headphones. This circuitry was redesigned for the ROM 03 version of the IIGS to reduce the amount of noise and hiss in the outputs. There's also a sound connector on the IIGS motherboard which can be used to connect an external amplifier or a stereo card and to pipe signals into the chip for recording.

The System Software

All that hardware of the IIGS wouldn't make much noise without software to tell it what to do. To its credit, Apple didn't leave programmers to write their own sound tools. Over the past seven years, Apple has developed (and continuously improved) several software tools as part of the IIGS System Software.

The majority of these tools are part of the Apple IIGS Toolbox, a library of standard routines included in ROM and on the System Disk. The tools provide a standard way of developing Apple IIGS programs, and allow software developers to take advantage of the hardware's power without having to know every low-level detail of how the machine works. There are also tools for the everyday user—the Sound Control Panel is a prime example of this sort of tool.

Although the sound tools appear as anonymous tool files in the TOOLS folder on the System Disk, many games and applications rely on them. One of the first tools Apple provided for sound was the Sound Tool Set. The purpose of the Sound Tool Set is to give programmers an easy way to play digitized sounds (mostly useful for sound effects, not usually for music) in their programs. Apple built on

this base with the Note Synthesizer and Note Sequencer, which allow developers to add real music to their programs. Many of the games and music programs released for the IIGS rely on these tools to do the work of playing the notes of the music.

Next, Apple created the MIDI (Musical Instrument Digital Interface) Tool Set. MIDI is an industry-standard protocol for connecting synthesizers to each other and to computers. MIDI is not sound—instead, MIDI carries the "events" (note on, note off, etc.) which the performer generates as he plays a keyboard. The MIDI Tool Set gave developers of music sequencing programs a tool to bridge the gap between MIDI instruments and the IIGS.

To reduce the large amounts of memory and disk space required by digitized sound, Apple developed the ACE (Audio Compression and Expansion) Tool Set. With the ACE Tool Set, developers have an easy and standard way to compress large sound files. The ACE Tool Set even lets programmers choose the desired compression ratio (the more compression is performed, the poorer the fidelity of the sound when it is de-compressed).

One of the most innovative and amazing IIGS sound tool sets is also, sadly, one of the least used. The MIDISynth Tool Set, developed by a programmer from Ensoniq, improves on the abilities of the Note Synthesizer, Note Sequencer and MIDI Tool Set to provide an incredible base for music sequencing and stunning sound synthesis. With MIDISynth, the computer can actually become a synthesizer, sequencer, and MIDI instrument in one package. Unfortunately, to date, only a single application from Apple and a handful of games have taken advantage of MIDISynth's power.

In addition to all the programming tools, Apple has created several extensions and applications that give users the ability to take advantage of IIGS sound.

The Sound Control Panel is greatly improved in System Software 6.0. Previously, this control panel was limited to adjusting the pitch and volume of the standard system bonk. With System 6.0, the Sound Control Panel lets you customize your system by assigning sounds to various "events." Cows can moo when you start up your system; evil laughter can resound when you empty the trash in the Finder; Arnold Schwarzenegger can intone "I'll be back" when you shut down the system. Dozens of different events can be assigned to any sound file you wish!

Another Apple program released with System 6.0 is SynthLAB. SynthLAB is a music sequencing and playback program that uses the MIDISynth tool. Although simple, SynthLAB is a prime example of the power of MIDISynth. You can not only play SynthLAB songs created by other people, but you can also create original songs. If you have a MIDI-compatible musical keyboard, you can even compose songs with synthLAB from your keyboard!

Enhancing the Hardware

Although Apple threw in the kitchen sink when they designed the sound hardware, third-party vendors still had plenty of add-on opportunities, including the following.

Stereo Sound

One of the major shortcomings of the Apple IIGS sound system is the output. The small speaker inside the IIGS cannot do justice to the Ensoniq's sound quality. Sounds are distorted at high volumes, bass sounds weak, and the clarity leaves much to be desired.

With a simple Y-cable, you can connect the headphone jack of the IIGS to a set of amplified speakers or to your home stereo system. However, for a real boost in sound quality, you will want a stereo card. These cards not only permit the IIGS to be hooked up to an external amplifier, but also add support for true two-channel stereo sound, which many programs (including SynthLAB, SoundSmith, Out of This World, and dozens of other titles) automatically use. No special configuration is required once the sound card is installed.

Since the introduction of the IIGS, several different brands of stereo sound cards have been sold. The SoundMeister card, from ECON Technologies, is the only card currently available on the new equipment market. The others are all out of production, but you may be able to pick one up at a swap meet.

Digitizing

A sound digitizer card is a useful and fun add-on. With a sound digitizer, you can record sounds on your computer from a tape, CD, TV, VCR, microphone, or other audio source.

Most stereo sound cards include a digitizing feature—or offer it as an option. You can also use a slotless digitizer card like the one includ-

Figure 1: Apple IIgs Sound Hardware Add-ons

DEVICE	MANUFACTURER	EXTERNAL	DIGITIZING	MIDI IN/OUT	PRICE
SuperSonic	MDIdeas	Y	Optional (2)	N	N/A (1)
SuperSonic Professional	MDIdeas	Y	Y	N	N/A (1)
GStereo	Applied Ingenuity	Y	N	N	N/A (1)
Sound Ace	Parallax	Y	Y	N	N/A (1)
FutureSound	Applied Visions	Y	Y	N	N/A (1)
Sound Blaster	Applied Engineering	Y	Y	N	N/A (1)
Audio Animator	Applied Engineering	Y	Y	Y	N/A (1)
HyperStudio Digitizer	Roger Wagner Publishing	N	Y	N	(3)
Apple MIDI Interface	Apple Computer	N	N	Y	$99
SoundMeister	ECON Technologies	Y	Y	N	$79.95

1 No longer sold or actively supported, may be available used
2 Digitizing is optional with piggyback card that plugs into SuperSonic card
3 Included at no extra cost in the HyperStudio software package along with microphonea

ed with *HyperStudio*. It won't provide stereo sound output, but it also won't take up a slot. Generally, these cards are merely pre-amps to boost a microphone signal to the level required by the Ensoniq chip, which does the actual digitizing work. (The digitizing feature on most stereo cards works similarly—except for the Audio Animator, which had its own digitizing hardware which was of significantly higher quality than the Ensoniq's. If you're into recording your own sounds, see if you can pick up a used Audio Animator.)

You also need software to digitize sounds. Most such software also has editing features which will allow you to cut and paste sounds together. If you buy a new digitizer card, it will come with its own software. If you purchase a used digitizer card and the original owner has lost the bundled software, you can still digitize by using one of several general-purpose GS sound programs, including U.S.E. and AudioZap. These programs will be discussed in detail in our next installment.

Once you have the digitizer and the software, you're all set. There are many programs you can use to take advantage of all the custom sounds that you can record, so be sure to tune in next issue to learn about them.

MIDI

As we mentioned earlier, MIDI is a standard that allows electronic instruments to share music performance data with each other. Since only the notes are transmitted, not the actual sound, it's easy to edit your music when it's stored in MIDI form, changing the sound on your keyboard or synthesizer as the notes play until you find exactly the right sound.

While nearly all keyboards that cost more than $100 have MIDI, they're not the only kinds of instruments that can talk MIDI. Drum machines and electronic drum pads, guitar synthesizers, and even wind controllers (sax or flute) are available with MIDI. And since MIDI is a standard serial data stream, computers can easily talk MIDI, too.

With a program called a sequencer, the computer functions as a tapeless tape recorder. You can record your performance, then correct your mistakes (even auto-correcting notes played out of time with a feature called quantizing) and play it back. While playing back your first track, you can record a second track—in effect, playing a duet with yourself. Depending on the kind of keyboard or synthesizer you have, you might even be able to use a different sound for each part.

When you're using a MIDI sequencer, your computer is generally not involved in making sound (unless you are using software, like SynthLAB, which is specifically designed to convert incoming MIDI messages into sound). MIDI therefore requires one or more external synthesizers, besides the computer. (Once you have one keyboard, you can buy additional "sound modules" which are basically MIDI-driven synthesizers without keyboards. You can play these instruments, via MIDI, with your main keyboard or via computer.)

To send and receive MIDI data, your computer needs a MIDI interface. The simplest and most popular such interface is the one sold by Apple. However, other interfaces, such as Opcode's Midi Translator, are compatible with Apple's, while being less expensive and sporting more features. These interfaces plug into one of your computer's serial ports. You may also run across some MIDI cards that go inside the computer, such as Passport's. The AE Audio Animator, in addition to its stereo and digitizing features, also has a MIDI interface.

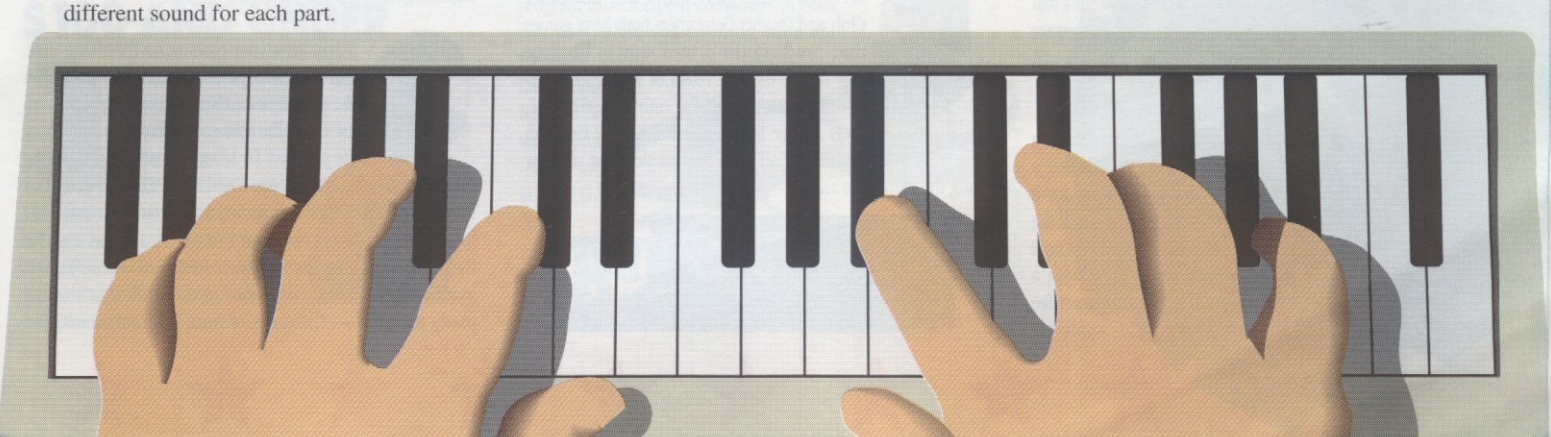
Using MIDI with the IIGS System Software requires a device driver. Apple includes drivers with System Software 6.0 for external (Apple) and internal (Passport) MIDI interfaces. Applied Engineering includes their own driver with the Audio Animator. The System Software also includes a MIDI Control Panel to let you configure your MIDI setup.

A discussion of MIDI instruments is well beyond the scope of this article. Looking through a music magazine or visiting a music store will give you an idea of what kinds of instruments are available and for what price. A MIDI compatible keyboard alone can range anywhere from a couple hundred dollars—to tens of thousands of dollars. As is usually the case, you generally get what you pay for.

Next on Stage...

Next issue we'll dive into the wealth of sound software available for your IIGS. There are dozens of great public domain, freeware, shareware and commercial products that can help you have fun with the 's' in your IIGS. See you then! ■

The Sound Control Panel is greatly improved in System 6.0. Previously, this control panel was limited to adjusting the pitch and volume of the standard system bonk. With System 6.0, the Sound Control Panel lets you customize your system by assigning sounds to various "events."



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while you're connected. Your modem should pick up the phone when it rings, and the other modem will try to make a connection. Once a connection is made, you shouldn't have any trouble sending or receiving files using Zmodem or another transfer protocol.

If you don't know with an IBM, you could upload your files to a local BBS, or to the personal file area or electronic mailbox of an account on a service such as GEnie, CompuServe or America Online using one of the computers. Then download the files using the other computer.

TRANSFER VIA A MACINTOSH

Strangely enough, a Macintosh makes an excellent peripheral for transferring files from Apple II to IBM format!

If you want to transfer Apple II data to a MS-DOS computer, begin by making sure your files are on a 3.5" ProDOS disk. Take that disk to someone with a Mac. The Mac must be a model with a high-density (1.44 MB) 3.5" drive. Use the Apple File Exchange program (AFE), which comes on one of the Macintosh system disks, to copy the files from the ProDOS disk to the Mac's hard drive. You can then easily write to an MS-DOS disk using AFE. AFE can also be used to format ProDOS or MS-DOS disks.

Some Macintosh models come with a program called *PC Exchange* which allows easy transfer back and forth between a Macintosh and a DOS computer by fooling the Mac into thinking that the MS-DOS disk is really a Macintosh disk. This lets you stick an MS-DOS disk into the drive and copy files to and from MS-DOS disks right from the Finder. The Macintosh LC IIe Card comes with a program which performs the same feat with ProDOS disks.

A program which doesn't come with the Macintosh, but which can be useful if your Mac friend has it, is *MacLinkPlus/PC*. It contains over 400 format translation combinations. Like *Cross-Works,* this program translates files so that other programs can understand them. The program is designed to translate between Mac to MS-DOS file formats, but used in conjunction with AFE's translations, it may be helpful.

TRANSFER VIA CONVERSION SERVICE

Some conversion services and service bureaus handle Apple II disks. You may have a hard time finding one, though. Check your local Yellow Pages. If you find a service that does support the Apple II, be sure to get the word out for the benefit of others trying to accomplish the same thing!

AFTER THE TRANSFER

Once you have your files transferred, there still may be a few steps to take. If your files came from a BBS or other online service, you may have to unpack them.

Apple II users who want to unpack MS-DOS .ZIP files will like *Angel,* by Tony Marques of Terrace, British Columbia, Canada. *Angel* requires at least an enhanced Apple IIe (that is, with a 65C02 processor) and 128K. Apple IIGS users will also be able to use PMPUnzip, a shareware program from Parkhurst Micro Products (2491 San Ramon Valley Blvd., Suite 1-317, San Ramon, CA 94583, USA, phone 510-837-9098). Both Angel and PMPUnzip can handle PKZIP 2.04 archives.

MS-DOS users who want to unpack *ShrinkIt* archives will find a MS-DOS version of *ShrinkIt* available under the name NULIB. Beware of versions earlier than 3.24, as they had problems making ProDOS filenames MS-DOS compatible. (ProDOS permits 15-character filenames; MS-DOS limits you to 8 characters for the filename and 3 for the extension, as in FILENAME.EXT.)

It is important to know that ProDOS and MS-DOS treat hard returns differently. ProDOS requires only a carriage return at the end of a line or paragraph, while MS-DOS requires a carriage return and a linefeed. If you are sending from ProDOS to MS-DOS, you will want to insert linefeeds before you send the file. If you are sending from MS-DOS to ProDOS, you will want to strip linefeeds after you send the file. On the Apple II side, linefeeds will show up in a text file as control-Js. In an AppleWorks word processing file, linefeeds will show up, as all control-characters will—as number signs (#).

Fortunately, there are many freeware and shareware utilities to strip and/or insert linefeeds—and the Mac AFE program and PMPunzip can handle this automatically. The file transfer protocol Zmodem also takes care of this transparently when transmitting text files. Apple II users can use Harold Portnoy's part freeware/part shareware program *Change-A-File,* Stowe Keller's shareware *LIST*, or Karl Bunker's freeware *LINEFEED.IR*; MS-DOS users can look to download ADDLF.EXE from CompuServe or CRLF.ARC from GEnie; both are free.

Apple II users transferring their files to MS-DOS may have some disks formatted under Apple's DOS 3.3 (not to be confused with MS-DOS 3.3, which is also referred to as DOS 3.3). You will find it quite an easy matter to transfer your DOS 3.3 data to ProDOS using the System 6 DOS 3.3 FST, Apple System Utilities, Copy II Plus, or the older CONVERT utility. The shareware program *Chameleon* will do all this, plus transfer files stored on Apple CP/M and Pascal disks, if you have any of those hanging around.

CONCLUSION

With the introduction of System 6.0.1, the Apple IIGS can read disks in MS-DOS format, in Macintosh HFS format, and of course in Apple II DOS 3.3, Pascal, ProDOS and GS/OS format. There are a wealth of other options, too, bringing us one step closer to cross-platform compatibility and to being one big happy computer-using global family. ■

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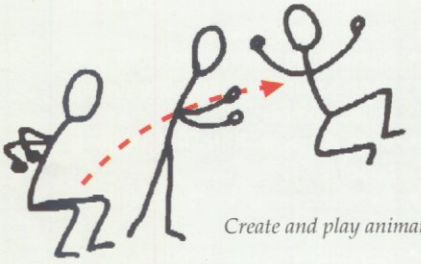

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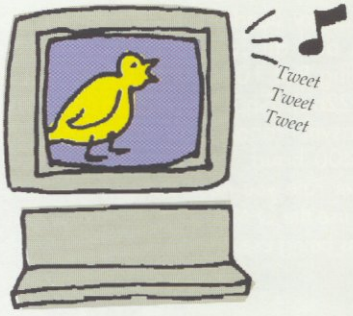

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