

Transcript of  
**Apple II Hardware Forum Conference**

Held on AppleLink

August 19, 1989

**Guest: Dr. Ken Buchholz on building a "Vanilla" hard disk drive!**

[AFL TracyP]

Good evening everyone! Welcome to the AppleLink Pippin Auditorium and the Apple II Hardware Forum Conference! Your hosts tonight are Tracy Poe [AFL TracyP], Leader of the Apple II Hardware Forum, ably assisted by Gayle Kersey [AFA GayleK], on loan from the Apple II Education Forum. (Not really, she volunteered :). We have a great show tonight, including a special guest, but before we begin, let's quickly run through how the auditorium works.

[AFL TracyP] The Pippin Auditorium is one of a unique group of rooms here on AppleLink. Its large capacity allows you to attend special events like this one with hundreds of other AppleLink members. The number at the top left of your screen shows the number of onstage participants. The number at the top right tells you how many are in the audience with you. To minimize confusion and keep the event running smoothly, the chat line at the bottom of your screen has been disabled. However, we welcome and encourage your questions and comments during the course of the conference.

[AFL TracyP] To send us a question or comment, just select the "Ask a Question" option from the "Auditorium" choice on the menu bar at the top of your screen. Since it's possible for several people to send items at the same time, there may be a delay in broadcasting your questions or comments.

[AFL TracyP] In the last few months, a new concept has been sweeping the Apple II world: Build Your Own Hard Disk Drive. Given that pre-built drive mechanisms have been readily available, the only thing the end user has to do is build up the subsystem. It's a comparatively easy task, and among those spearheading the campaign to get every Apple II user to build a hard drive is our guest tonight, Dr. Ken Buchholz.

Dr. Ken, through regular contributions to AppleLink-Personal Edition, and via his Washington Towne Crier BBS in New Jersey has been "spreading the gospel" of Vanilla SCSI Drive building since early this year. Recently, Dr. Ken has dug up information on building your own SCSI Tape Backup, and will also share that with us tonight. Ken, it's good to have you with us tonight!!

[DrKen] Thank you Tracy. Glad to be here!

[AFL TracyP] What got you started on the idea of building your own hard drive?

[DrKen] To be honest, cost. When WTC needed a larger (65 meg) hard drive I couldn't see spending another \$950 mail order. I also was envious of the Blue World's cheap peripherals, and decided to give it a go myself. Hence the Vanilla drives - at about a \$300 savings!

[AFL TracyP] Quite impressive!

[DrKen] A friend brought over a generic Seagate drive he placed in a generic case and we connected it to my CMS card, and it worked like a charm. I ordered the Seagate ST277N SCSI drive and Tulin case, and away I went. The first one cost me about oh, \$650.

[AFL TracyP] Did you go right away to the Seagate drives, or did you consider others?

[DrKen] Well, I opened up my CMS drive and noticed they were using Seagate drives. It appeared that they did nothing special to the drive -nothing on the board was altered. If that were the case, which is was, then they did all the interfacing with their card. Thus, I purchased a second CMS card and went with Seagate drives. Seagate provides a 1 year warranty, so I wasn't concerned with warranty issues on building my own.

[AFL TracyP] OK, we have a couple of questions from the audience...

[AFA GayleK] LanceG wants to know about the //c, DrKen. He says, *"Will this tell how to build a hard drive for a iic?"*

[DrKen] Unfortunately, I know of no way to build a vanilla hard drive for the //c. The vanilla drives I assemble use the Apple or CMS SCSI interface cards, which can not be used in the //c.

[AFL TracyP] The only drive I know about for the Iic is the CT-20c, made by Chinook.

[DrKen] That's correct at this time.

[AFL TracyP] It uses their standard SCSI-type drive, then they built a proprietary translator circuit that translates the SCSI protocol to Smartport protocol for the Iic. It also plugs into the smart port on a GS.

[AFA GayleK] ChrisMIPS has a general question tonight. He asks, *"Ken, where did the term 'Vanilla' come from?"*

[DrKen] Its my favorite flavour! Actually, the term "vanilla" means "generic" or no-frills "brand".

[AFA GayleK] JayJ 89m has a related question. He says, *"How reliable is a 'Vanilla' drive?"*

[DrKen] The vanilla drive is just as reliable as a "brand name" drive which uses the Seagate drive mechanism. Seagate offers the 1 yr warranty, as do most of the commercial vendors. You lose nothing going the vanilla route, except you will have to deal directly with Seagate should the drive itself sour on you. Other than that, you're covered - remember, you ARE using brand name components (Seagate, Apple) - the "brand name" on a commercially-assembled drive is just that - the brand name of the vendor who does the assembly...

[AFL TracyP] I understand that you've done several presentations at user groups, usually with someone who has purchased the components, and you demonstrate the ease with which the drive can be assembled.

[DrKen] That's correct. I have a member (or memberS) purchase the components beforehand, and at the presentation, they join me on-stage. I never touch the hardware once we begin the assembly they do it entirely themselves. (Just to prove I have no 'magic touch'.)

[AFL TracyP] As near as you can in this "faceless" medium, can you run through the necessary steps, beginning, if you can, with how to shop for the components?

[DrKen] Sure thing. First, shopping for a drive. If you are going with Seagate, you want a drive whose id number is STxxxN, such as the ST277N (65 meg size). Buy from a well-established firm, such as Hard Drives International. Also, you need a case with power supply - Tulin makes a nice case, and there are several other vendors. In purchasing a case, get one with at least 30 watts power supply (if you are only going to use it with 1 drive). If you will be going with 2 drive eventually, get a 60+ watts power supply. Also get one with a fan, if possible, and the best case design is one in which the hot air from the power supply is NOT drawn over the drive bay(s) themselves. I recently picked up a beautiful case for \$40 with 60 watts power supply it was originally made for IBM type dual floppy drives. Check the computer faires and flea markets - bargains can be had! On the assembly - a piece of cake. If you can use a Philipshead screwdriver, you CAN do it yourself in 10-15 minutes tops. Here's the abbreviated cookbook directions:

(I'm going to assume using a Tulin case - other cases are quite similar and the general directions are the same)

First, you need to mount the drive in the case. Usually 4 screws do the trick and are usually provided with the case you purchase. Next, you need to connect the communications (ribbon) cable from the back of the case (where the external connector is) to the drive itself. When the drive is facing you with its board facing down, the red line on the ribbon cable goes on your right side. Usually the connector coming from the back plate had a notch on top, and the connector on the back of the drive is notched-out so that the connection can only be made in the correct way. Next, connect the 4-prong power connector from the power supply to the drive. This is a D-shaped connector and can only be connected one way. Fool-proof! Finally, if your case allows setting the SCSI ID numbers from dip switches or jumpers on the back of the case, connect the cable coming from this to the back of the Seagate drive. The Seagate manual describes this connector. If your case does not have this feature, you can simply leave the SCSI ID pins blank (empty - not jumped) and this will do you just fine. Once you have these connections made, you can close up the case and you're ready to connect to your Apple SCSI Interface Card. Its THAT easy.

[AFL TracyP] You recommend the Apple SCSI card now?

[DrKen] Most definitely. The one nice feature of the CMS card that is absent on the Apple card is the ability to turn ON both hard drive and CPU simultaneously. The CMS card will "wait" until the drive is up to speed before continuing. The Apple card does NOT have this feature, and thus you must turn the hard drive ON and allow it to come up to speed BEFORE turning your computer ON. But, the Apple card allows you to take full advantages of GSOS System 5.0, so if you're using a //gs, go with the Apple card.

[AFA GayleK] G00fy Guy is interested in saving money. (Aren't we all? :) He asks, *"How much money would you save (percentage-wise) in building your own drives?"*

[DrKen] Hi Guy. I have seen prices for the Seagate ST277N 65 meg drive for about \$489. If you add a Tulin case/power supply for \$119 and an Apple SCSI card for about \$100, you come up with \$708. You can then add another drive later on for simply the cost of another drive - the Tulin case and Apple SCSI card will allow 2 drives (Apple card will allow up to 7 drives actually), so the cost of adding another hard

drive later on (or a tape backup system) is then fairly cheap. Compare \$700 to the price of commercial 65 meg drives for the difference.

[AFA GayleK] Coach101 wants to know, *"What are the risks/problems in swapping the "innards" of an Apple 20SC with a larger/faster drive from SeaGate? Is there a common form factor for the SeaGate STxxxN series?"*

[DrKen] Coach - Well, I'm not too intimately familiar with the Apple drives but from what I know, if they use a Seagate drive, you should be able to swap it with a larger Seagate STxxxN drive with no problems that I know of. Without the drive proper, the rest is simply case, power supply and fan.

[AFA GayleK] ChrisMIPS is also interested in saving money. He asks, *"Concerning the Tulin A-Hive...is it cheaper to simply build your own power supply and box from parts rather than buying the pre-assembled A-Hive?"*

[DrKen] Chris - Yes it is. But check out local computer faires and shows. The \$40 case I purchased - originally for dual IBM floppy drives can't be beat for price. The cost of the power supply alone is worth more than \$40!

[AFA GayleK] G00fy Guy wants to know, *"Can you take an internal hard drive and make it into an external hard drive?"*

[DrKen] Depends on which internal hard drive you're talking about. If you're talking about a Vulcan or one of the others for the Apple // line, its either not easily done or can't be done. I'll turn the tables on you and ask why you would want to do something like that...

[AFA GayleK] JayJ is interested in Tape Backups. He asks, *"I've heard about the Vanilla Tape Backup and Tim Grams tape backup program from your BBS, but is that as cheap and easy as the Vanilla Hard Drive?"*

[DrKen] Hi Jay. The key to assembling a tape backup system is (1) the "right" tape drive and (2) finding a case with power supply which does not give interference. The Tulin case works just fine, but the CMS, MacCrate and the generic case I purchased do not too much interference. But other than that, it is as easy as the hard drive.

[AFL TracyP] Tim, BTW is in the audience.... And now he's onstage! Hi Tim!

[Tim Grams] Hi Tracy and everyone.

[DrKen] Hello Tim! BTW, I forgot to respond to Jay's second question and yes, it is actually cheaper for the tape drive than the hard drive. We got our tape drives (new) for \$299 for the 40 meg size.

[AFL TracyP] I thought since we were on the subject, we'd give you a chance to mention about how people can get your Tape backup program.

[Tim Grams] HDTAPE is available directly from me for \$35. Address: PO Box 462283, Garland, TX 75046

[AFL TracyP] Great! Can you give us a quick rundown on its operation? Is it a "driver?"

[Tim Grams] It is a combination driver and tape backup utility. This was done because it was the easiest and fastest way to make a tape backup program available to the Apple II user. It is basically an image backup/restore. It runs under ProDOS 8, but you can backup any partition on the SCSI bus. You can backup any standard ProDOS volume for that matter. In addition to backup and restore, HDTAPE now has a tape/disk compare feature as well as a tape readability verify. Also present on the GS version is an installable driver to allow you to extract a file off of the archive tape with Cat Doctor, CopyIIplus... etc. The //e version (which is spinning tape but not finished) will have to have its own file utility program I'm afraid. Its why its taking so long to get that out.

[DrKen] Tim - What's the per meg backup time for hard drives?

[Tim Grams] I believe it around 2.5 to 3 min/meg. On the //e, the lower clock speed will result in times around 5 min/meg. On a future GS/OS version, I hope to cut that of course.

[AFL TracyP] Back to user questions...

[AFA GayleK] Tim, AFL FrankD has a question for you. He asks, *"For Tim: If it runs under ProDOS 8, then it won't backup the last two volumes on a HD formatted for 4 partitions in one slot, right? And if that's true, any plans to upgrade it to allow that?"*

[Tim Grams] Even though it runs under ProDOS 8, I access the card firmware directly so that you can get to the other partitions no problem.

[DrKen] (Tim's one smart cookie!)

[Tim Grams] blush..

[AFL TracyP] Indeed!! :)

[AFA GayleK] Tim and Ken, JayJ has a question about Tape Backup systems. He asks, *"Tim or Ken, Can the tape backup system be used as a normal device like a hard drive or a disk drive?"*

Tim Grams

As a matter of fact, once you install the P8 driver you can read and write from any P8 program. Writing to tape is very very slow though.

[AFL TracyP] That's why we left cassettes behind so long ago, right??? :)

[Tim Grams] I do want to say though that you can't do it from MSDOS!

[AFA GayleK] AFL FrankD asks, *"If you leave all the SCSI # jumper pins blank, what SCSI# does the drive default to? This could get important under utilities like Prosel 16. :)"*

[AFA GayleK] He has another question for you. He asks, *"You mentioned power supply interference in some of the brand name cases... What KIND of interference? Looked at it on a scope? And have you tried building a power supply filter to remove the interference?"*

[DrKen] SCSI ID 0 is given with all pins left open...

[Tim Grams] Magnetic interference is a problem too. Watch how close the CRT's are etc.

[DrKen] It appears to me to be magnetic interference since aluminum foil wrapped around the drive sometimes alleviates the problem...

[AFA GayleK] AFL Dennis asks, *"On GSOS - alot of backup progs are having problems with the new resource forks. Have you overcome that?"*

[Tim Grams] No. The GS/OS version will have to address that. The image backup/restore is ok though.

[AFL TracyP] Ken, you mentioned using Seagate drives in your Vanilla package. What, if any, differences would there be if a person wanted to use another type drive, say a Conner, a Western Digital, etc etc.....?

[DrKen] I have no personal experience with other than Seagate, but others I know have indeed used non-Seagate SCSI drives with no problems. Miniscribe and Quantum seem to be popular these days...

[Tim Grams] I'm using a Miniscribe drive.

[AFL TracyP] Would those manufacturers have information included in the package on how to build a system with one of the enclosures you mentioned?

[DrKen] Most, like Seagate, do but its geared toward IBM... Oops... I didn't fully read your question: building a vanilla system using one of the cases I mentioned - no, the info provided by the drive manufacturers is usually geared to installation in an IBM PC/clone... sorry 'bout that!

[AFL TracyP] OK, we've run out of questions and time simultaneously. For more information about building your own Vanilla SCSI drive and tape backup, see the Apple II Hardware Forum library files on the subject. You'll find them in the "New Files" or "Articles and Transcripts" libraries.

[AFL TracyP] For continuing discussion of topics such as this one we invite you to the "Let's Discuss.." message board in the Apple II Hardware Forum. There, you can read what others have to say about problems, solutions, tips, etc. and post your own questions and comments. There is a wealth of information on the message boards.

[AFL TracyP] The complete transcript of this and all previous Hardware conferences will be (are) available in the Apple II Hardware Forum Software Library under the "Articles and Transcripts" or "New Files" category. To reach the Hardware Forum quickly, press "Open-Apple-K" and use Keyword-AHW.

[AFL TracyP] Weekly informal chats are held in the Apple II Hardware Conference Room on Saturday nights at 9:00 PM Eastern. We welcome your frequent attendance at these informal meetings where the ideas and debates can sometimes get really exciting! :) Next week we'll be back in the normal and informal Hardware Conference Room holding an Open Forum. Our topic will be "Inside the Box: Anything related to your main Apple II Computer!" See you there!

[AFL TracyP] Special thanks tonight to AFA GayleK for pinch hitting as question puller tonight! Also thanks to Tim Grams for jumping in with some timely information!!

[AFA GayleK] Always glad to help you out, Tracy. :)

[AFL TracyP] The next Apple II Hardware Forum Auditorium Event will be Saturday, September 9th at 9pm Eastern here in the Pippin Auditorium. Our special guest that night will be Michael Wagner of Video Technology, makers of Laser Computers. Laser just introduced a new Apple compatible computer, and Mike will be here to discuss it, and hopefully share some good news about being able to log onto AppleLink-PE with a Laser Computer!

[AFL TracyP] Thank you for being with us tonight. And a special thank you to Dr. Ken Buchholz for helping us learn the secrets of building our own Vanilla SCSI hard drive! Goodnight!!

[AFL TracyP] Glad you could all be here! It's been a GREAT show!!

[DrKen] Thanks for having me Tracy and Gayle!

[Tim Grams] Happy to make it. Good show.