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LICA

LONG ISLAND COMPUTER ASSOCIATION, INC.

President, AL STONE Vice President, BOB KOWITT Secretary, JACKIE TULUMELLO Treasurer, AILEEN HARRISON
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THE STACK

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PRESIDENT'S MESSAGE

One of the problems with human organizations is that they tend to perpetuate themselves. As I see it, LICA exists only so long as there is a demonstratable need for it. Our membership continues to grow, the sub-groups proliferate, and each month we receive much positive feedback on our choice of speakers and manner of presentation at our General Meetings.

Last month, we temporarily lost sight of why we and LICA are here. Yes, it is true that the latest version of our Constitution and By-laws, as submitted to the State of New York, has not as yet been approved by the paid membership. It is also true that seven persons were nominated as Executive Board members-at-large, although the proposed Constitution mentions only four.

Sometimes bureaucratic logjams must be "blown up", much as real logjams are removed. In our case, I am exercising one of the privileges of my office and declaring (1) all seven nominees are hereby invited to serve on our Executive Board; and (2) all paid members will receive copies of the draft Constitution and By-Laws at the January, February, and March General Meetings, and those paid-up members unable to attend any of those meetings may request copies by mail. A period of 10 minutes will be set aside during the three meetings for discussion, and an open vote for ratification will be held at the midpoint of the April General Meeting.

Speaking of paid members: We have instituted a membership card system, and fully intend to enforce the requirement that all General Meeting attendees have paid their dues for the current year. Our insurance demands it, and simple economics requires it. If you have any doubt about whether your dues are paid, call Al Levy. If your dues are unpaid, either mail them in to LICA or hand your check to Aileen Harrison. That's $12 ($6 for full-time students) and gives you both a subscription to The STACK and the right to run for and to serve as a club officer.

IBM IS NOT A QUICHE EATER

International Business Machines Corp. agreed on December 22nd to purchase 12% of the common stock of Intel Corp. for $250 million. IBM is currently Intel's biggest customer. The IBM PC uses the Intel 8086 and IBM has ordered an advanced 64K RAM chip to be designed for them by Intel. Many analysts feel that this financial deal could supply the incentive for Intel to come to market with the 256K RAM chip to be price/performance competitive with Japanese products. Astute hobbyists need a crystal ball to predict the sort of capabilities that should be available to us all in the very near future.

Ken Aupperle of Intel was to have spoken at our December General Meeting. His presentation has been rescheduled to February 18th.

THE SECRETARY'S REPORT DECEMBER 17 MEETING

The nominees for club officers were elected to office with no contest. However, we had a bit of a problem deciding how to elect 4 out of the 7 nominees for members at large of the executive commitee. It was finally decided to put off the election and publish ballots in the STACK.

Our speaker this evening was Kurt Keller from the Data Recording Products Division of 3M. He discussed the care and handling of diskettes, illustrated by slides. One interesting slide showed the effects of a magnet on a floppy. Now we know how not to treat our diskettes. He told us about 3M's head cleaning diskette with a cleaning solution that keeps the diskette from being abrasive to the head.

Mr. Keller also discussed the problem of static and how 3M solves it by selling fused conductive mats. On Long Island this isn't much of a problem with our high humidity. Has anyone had trouble with mold growing on their disks?

Aileen Harrison gave the treasurer's annual report on the finances of LICA. She told us that we are "in the black", thanks to our flea market, STACK ads and new membership dues.

Aileen, Al Stone and Al Levy have put a tremendous amount of work into LICA this year. As a result we are a larger organization, financially solvent, have a respected publication and most important, have a sense of direction for LICA in the future. It has been a pleasure to work with these people this past year. I think it is to the club's benefit that they will hold their same positions in the year to come. They work very hard for us.

My thanks to Aileen Harrison and LICA for the lovely sweater and card. All this was to thank me for being secretary this past year. I'm not sure I deserve it after misspelling words and listing the wrong nominee for vice-president last month.

It pleases me very much to turn over the position of secretary to Frank Davidoff. Not so much to get rid of my obligations (but it will be nice to listen to the speakers without scribbling notes) as to give LICA another capable officer who cares about the future of the club. It has been my privilege to know Frank for several years. He is a retired electrical engineer and is a staff consultant in the engineering department of the CBS Television Network. He has had a distinguished career in the field of television where he has been recognized by awards. Good luck Frank. I hope you have no problems communicating with Al Levy and the Poly. Take heart in the fact that his was the only Bulletin Board (mini though it may be), that we could talk to while going through the bitter/sweet tortures of installing our new modem.

Jackie T.

MONTHLY MEETINGS

All meetings, except IBM PC/UG and 6800 UG are held at the New York Institute of Technology, Old Westbury Campus. LICA meets each month on the third Friday evening at 8:00 in Room 508, Building 500. See the back cover of the Stack for map and directions.

Our next general meeting will be held om the 20th of January. Please attend! Copies of the Constitution and By-Laws will be distributed to all PAID UP members. With any luck, elections will be held for all officers and board members.

Here's wishing YOU a Happy New Year A.L.

IBM USER'S COLUMN-By Erik Klein

This month a few interesting things happened with my keyboard. Addressing these problems might help anyone in the same boat I was in (foreshadowing ... notice the tense). As well I have two new pieces of software that I will talk (very) briefly about and I will also be reviewing the Quadram board and its software.

IBM Software Shorts

What puts Shamus to shame? What makes Apple Panic panic? What makes Choplifter sink...? Missle command can't command! Defender has no defense! and Space Invaders has been annexed! What, you might ask, is this nut writing about? It's Microsofts Flight Simulator and it is the best game out yet on the IBM PC. It's fast, fun and full of action packed realism and for fifty bucks it's a slightly expensive steal. It is written using IBM's hi rez graphics so the color board is necessary.

Over the past few months a company called Infocom has been introducing prose games for just about all major brand computers such as IBM, Apple and Atari. Their product line includes the Zork adventures (one, two and three), Starcross and Deadline. Of these the best that I have seen is Deadline. In Deadline you are an inspector on the case of the suicidal (murdered ?) millionare Mr. Robner. When you buy Deadline you receive in the official dossier the following items :
A myriad of official memos, a lab report, a coronors report, a letter from Mr. Robner's lawyer asking you to take the case, a glossy photo of the location of the crime,a list of all of the suspects , a package containing the cause of the death (some pills), an instruction book, a reference card and of course a disk containing the program. You start the case at eight A.M. and you have until eight P.M. to solve it(not real time). During the day you are free to roam the house and the grounds. You may ask questions of the many characters, search for clues or you may send items out to be tested. Your freedom is not limited but you may be killed by a suspect who feels that you are doing him wrong. In short (this was supposed to be short wasn't it?) Deadline is an excellent game of very high quality. If you have the color board your best buy would be MS Flight Simulator and Deadline; if you have only the green screen then Deadline is great. Both products sell for about fifty dollars.

Problem Report

My problem for this month has been that I have had no problems. My machine is running perfectly and I have two great new pieces of software. Playing the red barron and Sherlock Holmes is fun but it's been boring here at nutcase mansion (pournelle overtones) without something to scream about.

The top story tonight follows:

Marvin Friefeld the IBM PC Sub-group chairman and roving genius has discovered the secret behind IBM's keyboard and ,Using his vast engineering knowledge and his knack for bending paper-clips, he has developed a method for fixing it. His tools?... A dentists probe, a screwdriver and (you guessed it) a bent paper-clip. The procedure may be acquired from Marvin himself. WARNING: This procedure doesn't always work and it voids the IBM warranty.

Hardware Review

Are you short of memory? Do you want to communicate with other computers and hook up to Compuserve and The Source? Do you want to see listings of your programs, Visi-calc worksheets etc.? Do You want to know what time it is? If so read on. There are many memory boards on the market today but few offer the features of the Quadram Quadboard. With this board you get a parallel printer port, an RS-232 port, a real time clock, room for 256k of memory, and all of the software needed to test the board and set the clock. In addition to all of this you get a program that lets you allocate a portion of memory for a superfast disk. The parity checking on the memory is switch selectable and you can specify any starting address for the memory. The Parallel port and RS-232 ports are both compatible with IBM's. The clock is extremely accurate and has a battery to keep it this way even with the power off. The memory can be put in with any increment of 64k and it is parity checked just like IBM's. The board was one of the first out and it can be purchased almost anywhere and often for less then its $595 price tag.

FREE ELECTRONIC DRIVE

by Howard Rachlin, IBMPC USERS GROUP OF LICA

Part of the problem with software is it's cost. Pricing of software, or any product, is determined by dividing the forecasted sales volume by the costs and profit desired. The quantity you expect to sell is obviously an important factor inyour pricing. Most software companies developed their pricing when the computer base was small and therefore the market was limited. This has resulted in high prices in many cases and in turn to significant illegal copying of copyrighted software (MICROPRO has estimated that they have only sold one out of every five copies of WORDSTAR being used).

A 'new idea' has surfaced....free software. FREEWARE, PO Box 862, Tiburon, CA 94920 apparently started it with their introduction of PC TALK, a communications program. They have been joined by B&L FREE PROGRAMS, 226 South Cole, Boise, ID 83709 who recently introduced an electronic disk program. The way these programs are obtained is to send the company a formated disk and a self addressed envelope. They return your disk with a copy of the software 'FOR FREE'. If the program isn't useful then you erase it or you can pass it along to someone else (Yes, they allow copying of the software and distribution to others)!! If however, you (and/or others who have copied it) think it's just what was needed, they have a suggested 'contribution' each user could send them. This contribution serves two purposes. It repays the programmers for their efforts and also serves to demonstrate what you, the market, wants and can use. Those programs that receive support from you will then receive continued effort from the programmer in the form of enhancements, updates, etc. Those programs not adequately supported with contributions will be allowed to die. This type of distribution is less expensive than the 'normal' method, but more importantly, it gets the program into the greatest number of hands. This means the 'quantity sold' factor is high and the requested 'price' is therefore most reasonable.

The first entry from B&L FREE PROGRAMS is called appropriately FREE1. This program allows RAM to be used as an ELECTRONIC DISK . While this is not exactly a new idea (several manufacturers of multi-purpose expansion boards also provide this) it is one of the few programs available that will work with any memory expansion board. At a 'suggested contribution' of $15, it is certainly the least expensive ! It requires at least 192k and preferably 256k of memory. It then converts 160k into an electronic drive designated DRIVE C: . This then acts exactly as if you have an additional single sided, double density drive ... except that it is 50 TIMES FASTER ... absolutely quiet ... and doesn't exhibit any wear no matter how extensive your I/O from the drive.

Use of the electronic drive is simple. FREE1 is added to your DOS disk and is then part of the booting procedure. The computer then always thinks it has a DRIVE C: in addition to your mechanical drives. DRIVE C: is then formated and finally, the desired program transfered to it, using the standard DISKCOPY or COPY commands (obviously, therefore it can not be used with programs protected against copying).

The electronic disk is most advantageous when used with programs requiring considerable input and output from the disk. Database management systems, for example, where files are constantly being retrieved, changed, and returned are much faster in their operation. Word processing and spelling programs also run much faster (ie. checking this article with SPELLSTAR took 64 seconds with the standard drive and only 32 seconds using the electronic disk). From initial investigation it appears that SPELLGUARD, SPELLSTAR, VOLKSWRITER, dBASE II, AND SUPERCALC all work using the electronic disk. I'm sure most other programs do as well.

Secretary's Report-IBM PCUG Meeting of 12/10-Cindy Freifeld

Ken Aupperly spoke on the 8087 chip. William M. Blake, 667-7000, spoke on the BYTE WRITER. It was proposed that local dues should be $10 per year and $5 for students to support our own newsletter and reminder notices. A vote was held and the motion was carried. Four single sided double-density disk drives are for sale; for more information contact:
Howard Rachlin 757-9783, Ed Boyce 864-4802 or Norman Geller 883-1850

CATCH-22 ON THE IBM PC - by Marvin A. Freifeld

The explosion continues. There is a bewildering array of programs to accomplish just about anything one could possibly want to do in or for business. However I am troubled; the IBM PC can be a great number cruncher, especially if it is outfitted with the 8087 and properly designed programs to take advantage of the tremendously increased capabilities. Quite naturally these increased capabilities would extend the power of the IBM PC to the scientific and engineering worlds. It would do far more then that however, it would give the people who use spreadsheets the ability to update complex programs in a twinkling.

The games market could present more realistic three dimensional moving displays because of the greatly enhanced computational powers of a properly outfitted IBM PC. ANY program which is processor bound due to numerical computation could be tremendously aided by the 8087.

Addition and subtractions can be done in approximately 1/5 the time. The costs of software development and modification are so high that the software developers will develop the neccessary programs and program modifications ONLY if their is a broad base of potential users. The users will only buy the 8087 individually if their is at least one program that they want to use it with. CATCH-22!!!

What is needed is an announcement of at least one important language or one important number crunching program that uses the 8087 to start the ball rolling. An announcement from IBM of the fact that the IBM PC does support the 8087 (it certainly does!!) might be enough to start the ball rolling. An announcement of support from one of the spreadsheet manufacturers would most likely be enough to kick off the process. It would serve to boost their sales because it would make their programs operate much faster. Won't somebody please start the snowballing process! It will be irreversible and can only do a tremendous amount of good for the sales of both the software AND the hardware.

Software Review by Barry Freifeld

Have you ever dreamed of flying an airplane, doing hair-raising acrobatic maneuvers, or engaging in dog-fights with biplanes. It is all now possible with the Microsoft Flight Simulator, a program that is as entertaining as it is realistic. This program is sure to make all other microprocessor flight simulators crash into the ground (*). For $50 dollars I would have to say this piece of software is the steal of the century.

As you begin to fly, your eyes will be amazed by the dazzling graphic effects. The screen is updated quickly and accurately. In your flight capabilities are over twenty airports, each one fully operational and creatively designed with its own unique layout. Included are several three dimensional structures such as buildings and towers. There are four times of day to fly in besides the four seasons. To fully set weather conditions there are two cloud layers and 3 wind shear layers. All of these factors and many more can be set up by the user.

The first thing you might note when you open up your flight simulator is the documentation. It is a well written book that spares the reader the obscure avionics terms but gives him a hundred pages of condensed flight instruction. The program itself runs on 64K. The user is able to make one backup copy. One bad point, although minor, that should be mentioned is the lack of joysticks. Instead of joystick control of the yoke (the steering wheel) the plane is controlled by the function keys that make up the numeric keypad. This is well compensated for by the intelligent keyboard layout that Microsoft employed. It is brilliantly written for speed and realism by Bruce A. Artwick, President of Sublogic Company. After inviting a group of friends over to observe and use the flight simulator it received excellent reviews.
Name:Microsoft Flight Simulator Type:Educational Game Manufacturer:Microsoft Corporation
System Needed:64K IBM, Color/Graphics Card,1 Disk Drive Price:$50
(*) Editor's Note: Hey Barry, did you ever see the flight simulator at East Coast?

PET MODEM INTERFACE

Phil Cochems will shortly be using a Motorola 6850-based three- wire modem interface as described in "Best of MICRO, Vol. 3", pp 267-269. He asks if anyone has a better circuit which will allow for full handshaking protocol. Call him at (516) 333-4213.

NEWSLETTER DIRECTORIES

Andrew R. Alaways, 306 West 46th St., NYC, NY 10036 is offering a list of publishers of newsletters relative to computers. This work is loose-leaf and is sold on an annual subscription basis at $70 ($60 for cash). His listing for LICA and The STACK, submitted to us several times for proof-reading and correction, contained a mass of errors and misinformation.

The STACK is exchanged for several dozen other computer hobbyist groups' newsletters. What we have found over the years is that these few are the cream of the crop, that is, the only ones written in an intelligent, adult manner and containing truly useful original or reprinted information relative to the hobby. When such useful data are received, we pass them on to you through The STACK, or at our monthly General Meetings.

TRENTON COMPUTER FESTIVAL SEEKS SPEAKERS

This event will be held on Saturday and Sunday April 16th and 17th, 1983. As ususual forums and talks will be scheduled. Should any LICA member wish to volunteer for a presentation, they are advised to call Bill Hopkins of the ACGNJ days: (609) 426-5888 or evenings: (201) 752-4634.

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This is the time to renew your membership. 1983 dues are due. Members wishing to pay dues via the U.S. MAIL should send all checks to Aileen Harrison, 36 Irene Lane East, Plainview, N.Y. 11803

The Stack is now available at the following locations:

Compu-Aid	222-68 Braddock Ave.	Queens Village
Computerifics	14 Cold Spring Road,	Syosset
ComputerLand	79 Westbury Ave.,	Carle Place
Computer Microsystems	1196 Northern Blvd	Manhasset
Cousins Video	1238 Hicksville Road,	Massapequa
Future Visions	70 Broad Hollow Rd (Rte 110),	Melville
L.I.Computer General Store	103 Atlantic Ave,	Lynbrook
Programs Unlimited	20A Jericho Tpke,	Jericho
Programs Unlimited	Smithtown Mall	Smithtown
Software Emporium	151 Mineola/Willis Ave,	Roslyn Hghts
The Video Lady	416 S Oyster Bay Road	Plainview

When visiting these dealers, please mention that you are a member of LICA. The Stack is looking for ads, the dealers are looking for customers. The members of the Long Island community should support local merchants who in turn support us. If you have anything to contribute to the Stack, messages can left on my office phone via voice or modem. (516) 293-8368.

HEADER READER for the PET / CBM by Orrin S Edwards

This program will read the header on your PET/CBM tapes and let you know if its a Program or Data File. In addition it will provide the Start and End address for programs. (Decimal & HEX)

```
100   REM----------------------HEADER READER
110   REM                       (UPGRADE ROMS)
120   REM
130   REM                        ORRIN EDWARDS
140   REM                        (516)746-1216
150   GOTO170
160   H$=""
      FORY=1TO4
         A=INT(D/H(Y))
         H$=H$+MID$(C$,A+1,1)
         D=D-A*H(Y)
      NEXTY
      RETURN
170   POKE59468,12
180   PRINT"[c]";TAB(13)"$$$$$$$$$$$$$"
190   PRINTTAB(13)"[v]HEADER READER[ddd]"
200   PRINTTAB(10)"BY ORRIN S. EDWARDS[ddd]"
210   H(1)=4096
      H(2)=256
      H(3)=16
      H(4)=1
220   C$="0123456789ABCDEF"
230   PRINTTAB(7)"INSERT TAPE FOR WHICH YOU"
240   PRINTTAB(8)"WISH TO READ THE HEADER.[dd]"
250   PRINTTAB(8)"REWIND IF REQUIRED...[dd]"
260   PRINTTAB(8)"...THEN PRESS [v]RETURN[d]"
270   GETQ$
      IFQ$=""GOTO270
280   OPEN1,1,0
      FORX=1TO4
         A(X)=PEEK(634+X)
290   NEXTX
      PRINT"[cddd]"
300   IFPEEK(634)=4THENPRINT"DATA FILE"
                       GOTO380
310   PRINT"PROGRAM[dd]"
320   FORX=1TO2
         D=256*A(2*X)+A(2*X-1)
330      D1=D
         GOSUB160
340      IFX=1THENPRINT"START ";
350      IFX=2THENPRINT"[d]  END ";
360      PRINT"ADDRESS ="D1"DEC"TAB(30)H$" HEX"
370   NEXTX
380   PRINT"[dd]TITLE = ";
      FORX=639TO825
390      PRINTCHR$(PEEK(X));
400      IFPEEK(X)=32THENN=N+1
410      IFN>10THENPRINT"[dddd]"
                   CLOSE1
                   X=825
420   NEXTX
430   END
```

PROGRAM NOTES

Statements without line numbers are all typed on the preceeding line, separated by colons.

A character that is underlined is a shifted character.

Cursor characters that are imbedded in PRINT statements are shown in brackets as follows:

u - UP	d - DOWN
l - LEFT	r - RIGHT
v - RVS	o - RVS OFF

Do Not Type The Brackets!

PRESIDENT AL STONE ADDRESSING LICA

Where in blazes did I put that red suit?

SUB-GROUP	CHAIRMEN	PHONE(516)	Meetings Each Month
6502	Steve Perry	744-6462	
680X	Roger Kaucher	796-8746	
IBM	Marvin Freifeld	724-0574	2nd Friday 7:00
PET	Phil Cochems	333-4213	3rd Friday 7:00
S-100	Richard Wilson	747-4241	2nd Friday 7:30
TRS-80	Ed Zuilkowski	938-3320	2nd Friday 7:00
-	Now Forming	-	
Color Computer	S.Perry Jenkins	Box 62 Southampton NY 11968	
NEC PC-8000	Jerry Worthing	735-2952	

Micro Thoughts - Al Levy

PREJUDICE - BIGOTRY - CHAUVENISM et al.

Continuing my theme from the last issue of THE STACK, I feel that it is only fair to expose some of my background and life experiences. First, I come from a professional (SHOW-BIZ) music field. One is least likely to find prejudice amongst artists since the value of an individual is graded by talent alone. Yet, I can remember visiting our union floor and seeing "club daters" (Wedding,Bar Mitzpha,Country Club types), Jazz musicians, Latin musicians, Rock & Roll, Country, Broadway Show & Symphony Musicians all in very apparent - distinct sections of the room. Kind of like their own ghettos. Their are always some people who will "cross the line" but by and large most will not. For finding work this arrangement is most appropriate but there was more to it. If one was inquisitive enough to ask about some social mixing of the groups, and I was, some startling facts came to light. Many of the members of the seperate cliques believed that the other styles were only "junk" or "trash" and that those other fraternal brothers should not be admitted to a professional group! Would you believe that even within the Jazz clique the modernists would not recognize the talents of the Traditional people and vice-versa.

I make reference to music only because most families can identify the references. Is there a family today without a generation gap? Which teenager has not told his or her parents that teenage music was the thing, and what the parents liked was "old-fashioned" and corny? What about the "serious" music reviewer? Has he listened to the GRATFUL DEAD or BOZ SCAGGS without quivering? Just for the record, the London Symphony is dedicating an entire concert to the music of FRANK ZAPPA this week. Take the time to contemplate your own feelings.

In the micro world we find much the same thing. Which of us is not convinced that the system we use is absolutly the best? What does "best" mean? I like to ponder what is often called the negative compensating factor, usually called "TRADE OFFS." To my way of thinking, it hardly matters which brand of micro is purchased provided the software improves throughput, the hardware fits into the space allotted, and the computer user has little or no trouble with comprehending his or her role in the experience. What do words like "fast" and "powerful" mean? As compared to what?

All of this brings me to the subject at hand. When I joined LICA I though it would be nice to have a handle on the various operating systems, BASICS, and modes of operation of the most popular machines. This way I could converse and appreciate the advantages and disadvantages of each system. I am now asking the members of LICA to flex the muscles of this organization by assisting me to complete this project.

1) Let's explore each of the systems, from the lowliest to the most supreme.
2) I will take it upon myself to write up what is submitted by the members.
3) I have taken it upon myself (with permission from the original publisher) to re-print an article dealing with the PET and its special characters. The charts which accompany this article will be published in next month's STACK.

I do not own a PET but I would like to read it's BASIC language. Who amongst you do I hear volunteering to tell all about your favorite computer?

Happy holidays, happy New Year, and happy computing. Al Levy

All About PET/CBM Character Sets

Louis F. Sander
Pittsburgh, PA

Commodore's unique assortment of graphics characters, combined with their numerous ROM sets and keyboard configurations, make the various PET and CBM character sets maddeningly hard to comprehend. Occasional inaccuracies in published documentation have confused the situation even more. But as of today, the mystery is over – this article describes all the PET/CBM character sets in specific detail, and shows how they relate to each other and to the standard ASCII character set used by many other manufacturers. Such information will be useful to any PET/CBM owner wanting to get past the beginning stages of programming, and will be invaluable to anyone using the IEEE bus or the user port to communicate with a non-Commodore device.

First, some definitions. Many computer devices can display a group of symbols, or *characters*, on paper or on a CRT. The symbols so displayed are called *printing characters*, and they consist of letters, numbers, punctuation marks, special characters, etc.

Within a given piece of hardware, each character is represented by a pattern of bits, which can be stored, manipulated, and transmitted electrically. The binary numbers corresponding to these bit patterns are called *character codes*. In the PET and CBM, all character codes are 8-bit binary numbers, and they are usually referred to by their decimal equivalents.

For example, the code for a PRINTed asterisk (*) is 0010 1010 binary, or 42 decimal. Eight bits allow 256 different codes, which can be represented as decimal numbers in the range 0-255 inclusive. A given code can represent different characters in different machines, or even within one machine, depending on context. In the PET/CBM, for example, different codes are used to put a given character on the screen by PRINTing or by POKEing.

Some character codes do not represent a *printed* character at all. Instead, they instruct the hardware to take a certain non-printing action. These codes are called *control codes* or *control characters*. RETURN, CURSOR DOWN, and RVS are some familiar PET/CBM control actions. If you have ever made your machine do a RETURN by executing the statement PRINT CHR$(13), you have used a control code (the 13) to generate a control action (the RETURN).

A device's *character set* is its complete set of printing and control characters, along with their associated codes. Many computer devices use a standard character set called *ASCII*, pronounced *ask-ee*, which stands for American Standard Code for Information Interchange.

ASCII and the PET/CBM character sets have quite a bit in common, but there are large differences between them which have to be resolved whenever a PET/CBM is to communicate with an ASCII device. The information in this article will allow you to resolve these differences quickly and accurately in your own programs.

The Printed Set

Now let's look in depth at the PET/CBM character sets. To keep things simple, we'll first investigate the *printed character set*, or the complete set of symbols that PET/CBM can display on its screen. The Character Set Demo program will allow us to do just that. Type it in and RUN it right now, being sure to include the semicolon at the end of line 210. If you have an 80-column machine, you need to substitute line 310 for line 200.

If everything has been entered properly, you'll see 256 evenly-spaced characters on the screen. You'll also see the notation "59468 = 12" (or 14), indicating the current contents of memory location 59468. Press any key several times, and observe that the notation alternates between 12 and 14, and, as it does, some of the displayed characters alternate as well. As you press a key, the demo program is changing the contents of 59468, and PET/CBM is changing certain printed characters as that happens. No character codes are being altered at all.

We are demonstrating that every PET/CBM has *two* sets of printing characters. A given character code will produce characters from one set or the other, depending on a number POKEd into 59468. A 12 in that location produces what is often called the "standard" set of printing characters. It is the same in all PET/CBMs, and we will call it Character Set S, for "standard." POKEing 59468 with a 14 produces what is often called the "alternate" character set. This nomenclature is ambiguous, because there are two *different* alternate character sets. Which one you have depends on the ROM set installed in your machine. In this article, we'll call the alternate character set installed in the Original

PET ROMs Character Set A0, for "alternate, original," and the alternate character set in all other ROMs Character Set A. These two alternate sets contain the same characters, but in a different order, as we will see later on.

About 75% of the characters in all three sets are identical. Sets S, A, and AO differ only in the characters produced by the alphabetic keys A through Z, and in four other characters, all graphics. At "power on," graphics keyboard PET/CBM's have Character Set S enabled, while machines with business keyboards have Character Set A.

Character sets can be switched by POKEing 59468 with 12 or 14, or with other numbers as well. Numbers having a binary representation of the form XXXX 110X will produce character set S, while any other number will produce your machine's alternate character set. In machines having the GRAPHIC and TEXT commands, these can also be used to switch character sets.

Now back to the demo program. Without touching the keyboard, study the characters displayed on your screen. Notice that there are 256 characters, all different, and that the first 128 of them are repeated in reverse field to make up the second 128. (There may seem to be two identical SPACE characters, but there aren't – the second one is SHIFTED SPACE, and your computer treats it as a separate character altogether.) This is the complete set of printing characters from the currently activated set. In other words, you are looking at every character your machine can display at this moment.

Now press any key and study the characters in the other set. Again, there are 256 unique symbols, 128 regular and 128 in reverse field. Press a key several times, and notice which characters change as the character sets are toggled. If you count them, you'll find 60 characters that change – 30 regular and 30 reverse field. Note which ones they are, and notice that certain combinations of characters can never be on the screen at the same time, the HEART and the lowercase "s," for example.

You have now seen every character that your machine is able to display. All other PET/CBM's have the same printing characters, but in some machines they are gotten at in a slightly different way. Altogether, there are 316 different characters, 256 of them available at any one time.

Since we've now looked at the complete repertoire of printing characters, let's look further into character codes, the other part of the character set. A character can be displayed on PET/CBM's screen in one of three ways: by POKEing a code into a screen memory location, by pressing a key, or by executing a PRINT statement. Additionally, your machine can send characters to, or receive them from, devices connected to the IEEE, user, recorder, and memory expansion ports. In every case, character codes are used to specify which character is to be displayed, recorded, or transmitted.

The Screen And CHR$ Sets

Our demonstration program POKEd characters to the screen, using the 256 character codes from 0 to 255 inclusive, which produced 256 different printed symbols. POKEing a 1 gave an A, a 2 gave a B, and so on through all the printed characters. This particular combination of codes and characters is valid *only* for screen POKEing, and is summarized in Table 1. We'll call it the *Screen POKE Character Set.*

All other character manipulation in the PET/CBM uses a completely different group of codes to print these same characters, and it is summarized in Table 2. Many of the printing characters and control functions in this set can be activated directly from the keyboard, and all of them can be activated by using the CHR$ function. We will call this the *CHR$ Character Set.*

Some people call it PET ASCII, but that terminology is misleading – PET/CBM's CHR$ character set has twice as many codes as ASCII, and only about half of the 128 ASCII codes have the same meaning in the ASCII and CHR$ character sets!

All PET/CBM keyboard and PRINT operations use the CHR$ character set; it is also used whenever characters are sent to or received from external devices such as printers, files, or modems. If you tell PET to send an asterisk to your printer, it will, in fact, send 0010 1010, or 42 in decimal notation. And whenever PET receives a 42, whatever the 42 may have represented in the sending device's character set, PET interprets it as an asterisk.

There are 256 CHR$ codes, numbered from 0 to 255 inclusive, and the CHR$ character set differs substantially from the POKE set, although both can be used to display the same symbols. Here are the essential differences:

- Very few characters have identical POKE and CHR$ codes.
- There are no CHR$ codes for reverse field characters. Instead, the RVS ON/OFF key or its corresponding CHR$ codes are used to produce them.
- The CHR$ set includes 14 control characters (28 in 80-column machines and newer 40-column machines) in addition to its 128 printing characters.
- Since there are 256 CHR$ codes, and only

128 + 14 = 142 CHR$ characters (156 in some machines), many of the CHR$ codes have no meaning at all in the PET/CBM, and in many cases one printed character has two different CHR$ codes!

Table 3 shows the standard ASCII character set. It is presented in a similar format to Table 2, to facilitate comparison of the ASCII and PET/CBM character sets. Study the two tables carefully, and you'll see that PET/CBM has all but seven of the ASCII printed characters, (94-96 and 128-126), but often with different character codes.

You'll also notice that ASCII, being a seven-bit code, has no character codes above 127, and lacks many of PET/CBM's printing characters.

Because there are so many ASCII control codes, most ASCII keyboards use a special CONTROL key, similar to the SHIFT key, to generate them. CTRL A often sends a 1 code (SOH), CTRL B a 2 code (STX), CTRL C a 3 code (ETX), etc. Also, the meanings of the ASCII control codes, established with commercial message traffic in mind, are almost completely foreign to PET/CBM.

No wonder it's sometimes hard to use non-Commodore devices with your machine! But now that you have Tables 2 and 3, you can write programs for perfect conversions between ASCII and PET/CBM codes. Table 2 shows you exactly what code PET/CBM sends when a given character is transmitted, and Table 3 shows you exactly how an ASCII device will interpret that code. Conversely, Table 3 shows you the intended character representation of every ASCII code your machine receives from outside, while Table 2 shows which code it has to be converted to to have the same representation inside your PET/CBM.

Some Example Conversions

A few examples will illustrate the conversions. Suppose that your PET, with Character Set A enabled, is connected through a modem to an ASCII terminal, and that you are sending messages back and forth. The ASCII terminal sends the lowercase letter "a." Table 3 shows that the code actually transmitted will be 97 decimal, or 0110 0001. If your PET receives that code and displays it on the screen as a PRINTed character, Table 2 shows that it will be displayed as an exclamation point!

So you'll need some software in your PET that converts received ASCII input to CHR$ format before displaying it. In this case, whenever PET receives a 97, the program should convert it to a 65 before PRINTing it. Of course, the program should also be smart enough to convert (or not convert) any of the other ASCII codes between 0 and 127 so that they give the proper display on your PET.

Going the other way, suppose that you press the unshifted "b" key on your PET, and want the distant ASCII terminal to see it as a lowercase "b." Table 2 tells us that your PET will send a 66, which Table 3 tells us the ASCII terminal will interpret as an *uppercase* "B," which is not at all what you want. So your program has to convert the 66 to a 98 before transmitting it, and to make conversions on any other transmitted characters where it's appropriate.

If you study Tables 2 and 3, you'll be able to determine every sending and receiving conversion, and to write your programs accordingly. If the remote device has a character set different from standard ASCII (many of them do), all you need to do is compare it to Table 2, and you'll be able to program the conversions.

```
100 REM    *** CHARACTER SET DEMO ***
120 REM
130 REM SHOWS EVERY PET/CBM CHARACTER
140 REM (KEY PRESS CHANGES CHAR. SET)
150 REM
160 PRINT"{CLEAR}"
170 FORCH=0TO255
180 POKE(32768+2*CH+40*INT(CH/20)),CH
190 NEXTCH
200 FORI=1TO23:PRINT:NEXT
210 PRINTTAB(32)"59468=1";
220 IFPEEK(59468)=14THEN250
230 POKE59468,12:POKE33767,50
240 GETA$:IFA$=""THEN240
250 POKE59468,14:POKE33767,52
260 GETA$:IFA$=""THEN260
270 GOTO230
280 REM
290 REM ** LINE 200 FOR 80 COL. CMB'S:
300 REM
310 FORI=1TO11:PRINT:NEXT
```

.....but I cleaned the blackboard last time!

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