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For On-the-Job Computing

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***** NOTE THE NEW ADDRESS ABOVE *****

ABSTRACT

This document is an IBM Internal newsletter dealing with matters of interest to users of personal computers for IBM business reasons. It contains articles, written by the user community within IBM, that

- announce programs and techniques relating to personal computers
- query for existence of a program or process
- describe current Work In Progress (WIP)
- give early warning of problems
- express an individual's point of view (letter to the editor)

Articles may be submitted by anyone within IBM as long as they address one of the above areas and are not:

- confidential
- more than two pages in length
- anonymous

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This document is published on the first working day of each month. Please submit your input to the editor as early as possible for editing, but not later than five working days before the end of the prior month.

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EDITORIAL

If you didn't read this issues cover page, you need to. I have transferred to the System Products Division (SPD) and am on a six month assignment in Boca Raton. My new position is as Technical Staff to Joe Potts, Manager of ESB User Group and System Support, in the software publishing function for the IBM Personal Computer. I will be working on the automation of processes for ESB and on enhancing communication between ESB and its customers.

The future direction of this and other newsletters is not yet fully decided, but there will certainly be a newsletter. I will let you know in future issues as we make progress.

I have gotten a number of responses to my editorial last month on Local Area Networks. All responses were very positive and in agreement with the stated direction. Does anyone have an opposing view?

I have been receiving numerous contacts from people with Work In Progress (WIP) for the PC. Many of the projects are described in this issue. A few are confidential and are reserved for the one-on-one type of communication. Please continue to let me know what you are working on.

Please be aware that no formal technical review has been performed by the members of ESB on the contents of this newsletter, although I have personally read each item and fixed any problems I recognized. In other words, it is still up to the contributor of an item to be responsible for the accuracy of the submitted item.

My personal schedule for the end of March is going to make it impossible to put the April issue out on time, so plan on it arriving on April 15. I will be away from my phone and terminal from March 19th through approximately April 10th.

Keith Eckhardt

P.S. A number of network subscribers to this newsletter will receive multiple copies due to a cold start here during my publication process.

LETTERS TO THE EDITOR

EDITOR,

What is needed to implement a local area network? As usual, two things.

1. Hardware
2. Software.

I can hear you saying now, 'anybody knows that'. What I want to talk about is what is available now or in the near future that will let us do this. None of this information is based on unannounced products, although some of it may not be readily available.

Hardware for Local Area Networks

The hardware needed for a local area network can be divided into 3 major areas.

1. Transmission technology. This is the interconnection hardware, both the interconnecting media and the communication adapters.
2. Local work stations. These can be Personal Computers or other devices.
3. Specialized shared network resources. These can be the fast dasd, other network gateways, high speed printers, and anything else that is too expensive or too specialized for everyone to have.

Transmission technology is the most common point of disagreement, but the most readily available such is defined by the IEEE-802 local area network preliminary spec. (Otherwise known as Ethernet*). The network is a baseband broadcast bus that uses Carrier Sense Multiple Access/Collision Detection for arbitration. Its speed is variable up to 20 Mbits/sec. The Xerox implementation is at 10 Mbits/sec. This should be sufficiently fast for the time being. The only local area network that is currently available from IBM is a ring network called LCC. It is very new and there isn't much software available for it yet. It also only works with Series/1. There has been quite a bit of discussion in the trade journals about Ethernet* adapters on a chip. I believe that they will be available in the near future and will be compatible with the 8088 processor.

A Local work station is anything that has a network adapter on it.

Specialized shared resources can be a local work station with a unique device attached or a specialized device like a file server.

Software for Local Area Networks.

The method of software interconnection that appears the simplest to me is to make all devices within a local area network appear to be directly connected to

each local work station. This involves implementing network functions as system primitives and then building all device access methods using these primitives. This has been successfully done in CF/II for the Series/1 for their pseudo-disks.

Another item about the system software. INTEL is now advertising an operating system called iRMX/86 for the 8086/8088. It is a multi-tasked realtime operating system with features like time management, storage management, and interrupt processing. Many of the functions are in ROM's that may be purchased separately. The ad also claims that iRMX/86 supports Ethernet*.

* Trademark of Xerox corporation.

Ken Aaker, MVS(RCHIS1/D568KDA), Rochester, TL 456-6086

EDITOR,

I received the PCN8202 newsletter and was very interested in the editorial. I am in New Systems Engineering, SPD Boca Raton. My prime area of responsibility is the 4987 Programmable Communication Subsystem (PCS).

I strongly agree with the view of the PC as an intelligent terminal and am trying to stimulate interest here to begin work on a network as you described. The data concentrator/cluster controller would be a 4987 PCS or a Feature Programmable Attachment in a Series/1.

I would be interested in any development activity in this area. I also would be willing to assist anyone attempting to attach the Personal Computer to a 4987 PCS.

Jerry Camerota, VM(BCRVM1/VM014271), 22T/031-3, Boca Raton, TL 443-4582

CONTRIBUTIONS

8203-01 BE(A)WARE OF BASIC HOUSECLEANING

I thought your PC Newsletter readers would be interested in this bit of advice:

Beware of BASIC's "Housecleaning" operation. On page 4-91 of the BASIC manual (FRE Function) it says:

"BASIC will automatically do a housecleaning when it is running out of usable workarea. You might want to use FRE("") periodically to get shorter delays for each housecleaning. Be patient: housecleaning may take a while."

This is misleading, and quite an understatement. In my application on a 128K PC, I have about 3.5K of program, and 44K of data loaded into string arrays. During processing, BASIC stops without warning for seven and a half minutes! for housecleaning. This time is dependent on the amount of data and not on amount of fragmentation (i.e. FRE("") always takes seven and a half minutes even if housecleaning was just completed).

During the housecleaning operation, the PC appears dead. Nothing works but PRINT SCREEN, RE-BOOT, and possibly PAUSE. (The first few times I tested only the re-boot ability). I have since structured the program to load the data without interruption, and have removed nearly all string assignment statements. (This places a severe limitation on string handling subroutines.)

Dick Bower, VM(GDLS2/BOWERRA), V31/6101 Endicott, TL 252-6783

(EDITOR: It would be easy to assume that this problem would be solved by adding more memory. However, BASIC uses a maximum of about 60K for program and data storage.)

8203-02 WORK IN PROGRESS - MULTIPLE BOARDS

We have several efforts under way for the IBM PC.

1. Etched 4 high full horizontal mother board designed for use in the Boulder developed CTS (Common Test System) utilizing the RCB (Rochester Common Bus) cards.

P/N = 1698198 EC = 999999W

Minimum order = 5 ea Cost = \$ 580.00

By adding a buffer card to the PC and replacing the processor card in the CTS board with a buffer card we can take advantage of currently available RCB cards.

2. DI/DO : By coupling an RCB DI/DO card via interposers to a Boulder developed buffer card , 48 bits of DI/DO capable of sinking 48 ma each (8226) is attained. The buffer cards are user transparent and

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allow software control of the mode as to input or output in groups of 4 or 8 bits (INTEL 8255 mode 0). This mother board will accept 2 ea RCB DI/DO cards and 4 ea buffer cards with out adding yellow wires to provide up to 192 buffered DI/DO points. By adding a few yellow wires , a 3rd RCB DI/DO card and a 5th buffer card can be added for an additional 48 bits of DI/DO.

3ea 16 bit timer / counters (INTEL 8253) are available on each RCB DI/DO card. I am in the process of writing software for these timer / counters at this time.

I currently have 192 DI/DO bits functional with the PC.

I have diagnostics written in BASIC to perform a full functional test (all valid mode words with data hex AA and 55) on these 192 DI/DO bits.

3. ANALOG IN : Up to 3ea of the Boulder developed analog in cards can be installed in the mother board for a total of 48 channels. This card is 16 channel, single ended, 0 to +5 volts with 12 bit resolution and uses a Burr-Brown MP22BG chip. This card has not been implemented on the PC at this time. I expect a write timing conflict.
4. SERIES/1 INTERFACE : This is a 16 bit unidirectional interface with handshaking. Though not implemented at this time it should meet the current CTS average data rate of 20 K Bytes/sec for Series/1 memory operation and 8K Bytes/sec for Series/1 disk operation.
5. A portion of the DI/DO and analog are currently being planed for use on the Boulder manufacturing floor as an automated quality inspection tool. This should prove to be a very cost effective application.
6. SOLID-STATE IMAGER : Near future plans include attaching a GE TN2500 digital camera with or with out frame buffer to the PC. This camera provides 256 bytes by 256 bytes of grey level data per frame and is planned for use as an automated print quality diagnostic tool.

Dave Heussmann, VM(BLDVM1/H343444), 965/010-3, Boulder, TL 263-7453

8203-03 CT8086 - AN INTEL 8086 SIMULATOR ON VM

CT8086 (Conversational Trace for the Intel 8086) is an interactive processor intended for debugging system code. It consists of a simulator for the 8086 and a translator/interpreter for the CT command and procedural language. (CT exists for other architectures).

CT8086 aims to let the user set up a test at whatever level is necessary, so that any program environment and any convenient command and display interface can be defined.

The instructions and logical interfaces of the 8086 are simulated. Code can be followed instruction by instruction, module by module, or at any defined level. Machine instructions and cycles can be counted. Stops can be set up on any condition arising during a test. The user can dump program values in standard formats or can write a procedure to display data in any format.

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The user can write procedures to simulate program interfaces, and to provide whatever interactive control is needed for testing. The procedural language can be used to make the command language extendible.

Please notice that I am extremely reluctant to supply the source for CT; among other reasons, it is a language and does requires some control.

On the other hand I am very happy to supply the program, documentation, and advice, and to get any feedback at all.

John Bennett, VM(WINH6/HIV0), Hursley, X5498

8203-04 MYSTERIOUS SIDE EFFECTS FROM SCREEN-SWITCHING ON THE IBM PC:

The Basic manual's discussion of how to switch between the B/W display and a display connected to the color graphics card is incomplete, as well as unenlightening. Problems, such as lost cursors, invisible print, etc., which result from switching repeatedly between two screens, result from inconsistent information which the BIOS routines have developed about the video display(s) status.

Bit 5 in the byte at absolute location 410H signals the presence of the B/W display. Switching it off (AND 20H) will allow the BIOS routines to do whatever you like to the color display. Switching it back on again (OR DFH) would restore things to normal, EXCEPT that

The 30 bytes from absolute 449H thru 467H contain status information which gets changed when things are done to the color display. The sensible procedure is to copy this area into a safe place, switch off the B/W bit, do your color things, switch the B/W bit back on, restore the 30 bytes to absolute 449H, and proceed.

G.Hollenbeck, VM(GDLS2/HOLLENG), 952/0404, Endicott, TL 252-6248

8203-05 DISPLAYWRITER/PC DOS/BASIC COMPATIBILITY

I am considering the purchase of a DOS/BASIC software package for the Displaywriter. The objective is to extend the utility of the D/W and to enable it to run Basic application programs written on the PC.

There are two primary choices:

1. CP/M-86 DOS from Digital Research with their CBASIC-86 (compiler).
2. MS-DOS from Microsoft (similar to or same as used on PC) with their MBASIC

Microsoft plans to release their D/W products in late March.

I also intend to add the communications feature to our Displaywriter so that we can use it for secretarial activities like phone listings and LONESTAR communications.

Our VM support group is looking at the software required to enable the D/W to be connected to VM.

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If anyone has preceded me on this activity, or has any information that may help, please contact me.

G.Hollenbeck, VM(GDLS2/HOLLENG), 952/0404, Endicott, TL 252-6248

8203-06 EVALUATION IN PROGRESS OF THE IBM PC FOR DESIGN AUTOMATION

EDS (Engineering Design Systems) plans to evaluate the IBM Personal Computer for use as a distributed data processing machine within the EDS Architecture. EDS is a system of electronic design automation applications.

Questions to be addressed include the following:

1. System service requirements
2. PC classification - 3277 with intelligence, graphic intelligent terminal, or standalone processor
3. programming language - PASCAL, BASIC, Assembler
4. minimum system configuration within EDS environment
5. electronic design automation (DA) application feasibility, characteristics

Anyone who is evaluating the Personal Computer for Design Automation application development is asked to contact me. Information on planned activities would be appreciated.

Greg Miceli, VM(TDCSYS2/B29GFM), 196/503-93C, East Fishkill

8203-07 QUERY FOR PERSONNEL ORIENTED APPLICATIONS FOR THE IBM PC

I am interested in finding out if anyone is considering the IBMPC for personnel oriented applications. I am particularly interested in the recruiting phase(i.e., matching applicants to positions and scheduling interviews, etc. Any info at all would be appreciated.

Bill Eilmes, VM(CHARSPA/EILMES), 01G/654, Charlotte, TL 474-3504

8203-08 QUERY FOR INFORMATION ON USING THE IBM PC AS AN APL TERMINAL

We are interested in using a PC as an APL terminal attached to VM/CMS.

1. Is anybody doing that, and what problems are they finding?
2. How convenient (difficult) is it to reprogram the character set and get the APL character set (and are there enough characters to get the whole thing?)
3. Has anybody bothered to change the ROM's on the printer so the printer will print the APL character set? Is it easy, impossible, in-between?

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Any information that anybody has on this subject would be MOST appreciated. Thanks.

Lee Jones, VM(MANVM1/MPF5LFJ), D97/120-023, 9500 Godwin Dr., Manasses, Va 22110, TL 725-5685

8203-09 PASCAL TUTORIAL MANUAL

Someone recently showed me a SPLENDID new book on Pascal. It's hot off the press, and, in my judgement, would be very appropriate as a textbook for a Pascal course.

The book is "Oh! Pascal!", by Doug Cooper and Michael Clancy, published by the University of California. About 450 pages.

It treats both batch and interactive Pascal applications, and starts off not with language details, but with a discussion of program design and structure. It is well written and well type-set (one of the authors did the typography).

It is intended to be helpful to any Pascal user, regardless of the implementation he is using. It describes the major differences between implementations and tells what's good to have and what's not. There's a place where you can write in the idiosyncrasies of your own system. The bulk of the text, however, looks perfectly general. And it's easy to read and understand - much more of a tutorial than a reference manual, and written for the guy who wants to learn by sitting down and trying things out for himself.

Blair Martin, VM(GDLS2/MARTIN), U05/032, Endicott, TL 252-8680

8203-10 FORUM FOR IBM PROGRAMMERS USING 8088 / 8086

I want to make contact with other IBM programmers with 8088 or 8086 experience. I am sure that there is a lot of experience within the Corporation which could be shared to save time and effort in the future. I am especially interested in the diagnostic programming aspects.

If you can help, send me a short note on your experiences and thoughts for the future on this subject. In a short while I will circulate the list of names and attempt to coordinate some productive exchanges of ideas.

Dave Martin, VM(WINH6/HDS17), IBM UK Labs, Winchester, UK. EXTN 5616

8203-11 HIGH-QUALITY PRINTER FOR THE IBM PERSONAL COMPUTER

The attachment of an IBM (Correcting) Selectric II to the IBM PC can provide letter-quality printing capability. However, the speed and mechanism of the Selectric indicate its use as a supplement to the system printer.

ESCON is offering IBM Selectric connection capability at a special price for IBM employees. A brief description of their product follows.

This product allows connection of any model IBM Selectric to any computer with a parallel (Centronics compatible) or serial RS232 output port. The IBM PC printer adapter presents such a parallel port; the serial I/O adapter presents a serial port.

The "mechanical assembly" is a custom design electromechanical unit which fits precisely within the typewriter. A ribbon cable is led out from the typewriter case and connects with a box housing the "electronic interface". This, in turn, is cabled to the computer using a cable available from ESCON or one built to their specs.

Mechanical assembly:

- Does not change appearance of Selectric I, II, or Correcting typewriter
- Does not affect manual operation or alter key touch
- No permanent modification - uses existing screw holes
- Typewriter remains eligible for warranty and service (ESCON has a letter on file from IBM to this effect.)
- Six 30 volt solenoids pull bails for character selection; four more pull space, newline, print and shift; typewriter protection on power-up
- Two more solenoids are available for the backspace and tab. (Note: use backspace for underlining; tab for speed or columns)

Electronic interface:

- Microprocessor-based control of the solenoids and computer-interface.
- 6802 microprocessor, RAM, 2708 IKEPROM, 6522 VIA IC, 6821 for parallel interface, and 6850 for serial interface, packaged in an aluminum enclosure along with power supply and toggle switch.
- 96 characters are buffered in the RAM.
- Output speed is 12.5 cps; automatic delay on carriage return.

Hewlett-Packard has many of these units in operation as DP printers - they are very happy with the ESCON product but point out that the Selectric requires maintenance to keep it within specs. H-P does their own maintenance. I have a list of manuals used to maintain the IBM Correcting Selectric II.

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The most convenient way to order is with a direct phone call to Rod Winchell, Sales Manager Phone: California (415) 820-1256. Outside California (800) 227-2148 or write to him at ESCON Products, Inc.; 12919 Alcosta Blvd.; San Ramon, CA 94583

The most convenient way to pay is by MasterCard or Visa. ESCON will also ship UPS collect or accept orders prepaid by check. IBM purchase orders will be billed net 30 days FOB San Ramon, CA.

Neither I nor IBM suggest that you buy or not buy this unit; neither I or IBM suggest that this unit will work or not work to your satisfaction; neither I nor IBM endorse this unit or company; there are other companies with products to connect the IBM Selectric to the IBM PC; you should select the unit best suited for your application; etc....

As for myself, I have ordered an ESCON unit: Mechanical and electronic, parallel cable, backspace and tab.

For the moment, I will act as the information coordinator for high-quality printing using the IBM Selectric and the IBM PC. Pass on your tricks and experience in this area.

Bob Creasy, VM(PALOALTO/CREASY), Palo Alto, TL 465-3140

8203-12 BASIC MACHINE LANGUAGE SUBROUTINE DEBUGGING

The description in Appendix C of the BASIC manual which describes how to debug a machine language subroutine will not work. If you wish to test a machine language subroutine, I suggest doing it as follows:

1. Assemble your program and link it. Be sure to answer NO to the question: "Link Low (Yes)?" to insure that your program will be set up to load at the top of memory.
2. From DOS mode, type: "DEBUG BASIC.COM". For a 64K machine, you must reserve space within the BASIC program segment. To do this, use the DEBUG "N" command to set the BASIC /M parameter:

N /M:xxxxx

Substitute a value for xxxxx that restricts the size BASIC will use for program and data storage. For example, &H8000 will tell BASIC to limit its use of storage to 32K. The value that you specify must be enough to contain your program and all buffers specified when you invoke BASIC.

3. Display the registers (R command) and note the values in the CS and IP registers (it should be 049F and 0100 for BASIC). You should also note the SP and SS values.
4. Type: N pgmname.EXE (where pgmname is the name of your program after it has been linked).
5. Type: L This will load your program into high memory.
6. Use the R command to get the values of CS and IP for your subroutine. Note these values for later use.

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7. Use the R CS command to reset CS back to 049F (or whatever value it has in step 3).
8. Use the R IP command to reset IP back to 0100 (or whatever value it had in step 3).
9. Do the same for the SS and SP registers. (I don't know if this is necessary, but it won't hurt.)
10. Use the G command to start BASIC. You may set a breakpoint or two in your subroutine by entering the address after the "G". Note that you must specify both a segment and an offset (such as 1FE0:20) for each breakpoint.
11. When you get the BASIC prompt, load your BASIC program and set up the DEF SEG commands ahead of your CALL or USR statements to agree with the segment where your program was loaded (see step 6 above). Note that the syntax of CALL requires that you set a numeric variable to the offset value and use that variable in the CALL statement. It will not work with a literal value! An integer variable is the most efficient.
12. Each time that your program is invoked and a break point is reached, DEBUG will get control. To continue execution, type G.

(EDITOR: Once a breakpoint is encountered, the original program code is restored. You must set the breakpoint again if you want to stop again.)

With some subroutines you may be able to use the procedure in the manual (except for saying BASIC.COM rather than BASIC), but the above procedure should work for any program. I believe that the reason mine would not is that the code segment started at a displacement of 0 instead of 100.

After your subroutine is debugged, you can use DEBUG in the above manner to get it into memory and start BASIC. You may then use the following BASIC program to create a version of your subroutine that your BASIC program can BLOAD:

```
10 DEF SEG=&Haaaa ' aaaa = subr. load address
20 BSAVE pfname.BIN,offset,length
   ' Replace offset and length with correct
   ' values and pfname with the name you will use
   ' in BLOAD. The .BIN suffix could be
   ' anything else within the system
   ' restrictions.
30 END
```

Once you do the above, your BASIC program need only say:

```
nnnn DEF SEG=&Haaaa: BLOAD pfname.BIN: DEF SEG
```

to load the program.

R. S. MacDonald, VM(BLDVM1/MACDONAL), 55H/022, Boulder, TL 263-7447

8203-13 ATTACHING AN INTERMEC OPTICAL BAR CODE READER TO THE PC

I have attached an Intermec Model 9300 bar code reader to the PC via the communications card. It utilizes the RS-232-C interface with a special cable wired as follows:

Connector 1 (PC) (female)		Connector 2 (Reader) (male)
2	to	3
3	to	2
5,6,8	to	20
7	to	7
20	to	5,6,8

Note: Pins 5,6, & 8 are jumpered together on each connector. The cable uses standard 25 pin male and female subminiature D connectors. The Intermec reader is switch programmable for any combination of communications protocol desired at any acceptable baud rate. Full duplex operation is required as the PC does not work well with half duplex.

The BASIC communications support statements are all that is needed for programming support. Follow the asynchronous communications example in the appendix of the BASIC manual. I have tried it both with the asynchronous interrupt mode of operation (ON COM(x) GOSUB ...) and also with specifically testing for the ON EOF(x) condition. It works well with either.

Roger Davis, VM(BLDMCS1/DAVISRD), D846/002, Boulder, TL 263-4970

8203-14 VISICALC TECHNIQUES

Visicalc allows data file concatenation capability: A file loaded by typing "/ S L filename" will replace only those areas of the screen for which the file being loaded has data. It is, therefore, important to type "/ C Y" prior to loading to ensure there is no data remaining from the previous screen. In contrast, by moving data to an area not used by the next file to be loaded, data from both files can be concatenated. This method will preserve the calculation. If resultant data needs concatenated, save the screen data by typing "/ S # S filename". Now when you load "/ S # L filename" you will supply the coordinates the data is to be loaded to. Remember, this method (DIF) will save and load the results, not the calculations. (Refer to Append B in Visicalc Guide.)

Visicalc printed output: To print the screen with a modified font, use the following format:

```
/ P P sct ^ R lrc
      sct = setup-controls-and/or-text
      lrc = lower-right-coordinate
( ^ in text represents upper case 6, the carat)
```

For example, to print a screen in compressed font with a title of HEAD-ING, you would type the following:

```
/ P P ^ HOFHEADING ^ R K20
```

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The K20 is the lower right coordinate in this example. (Refer to Appendix A in Visicalc Guide.)

Visicalc uniform column format handling: With the use of Setup (a sub function of Print), which can be entered as often as you like, you may print the first line of the screen as a 70 (or more) character column and have a different column width for any other line. For instance, if I had a 50 character title in coordinate A1 and the rest of my screen was formatted to the default 9 character column, I would type the following:

```
HOME key
/ G C 50          sets column width to 50.
/ P P A1         print the contents of A1.
/ G C 9          sets column width to 9.
/ P P F15        print columns A-F and rows 1-15.
```

John Howard, VM(BLDVM1/HOWARD), 52Y/022, Boulder, TL 263-6679

8203-15 3277 EMULATOR WORK IN PROGRESS.

Let's assume that you have a 3277 display terminal in your office (or wherever). Let's unplug your 3277 (from the wall and from the coax), replace it with a PC, and plug that same coax into your PC. (You have, of course, already plugged a 3277 ANR card into your PC.) IPL the PC with the 3277 Emulator and you now have all of the 3277 function available on your PC. Your PC can now be used as a 3277, as a PC, or as BOTH.

When the 3277 Emulator is IPL'ed, it finds the top of memory and loads itself into the top 16K bytes of memory. You may then IPL DOS (or any other system) into the remainder of memory and execute both the 3277 Emulator foreground and DOS background concurrently. The keyboard and display may be switched between the foreground/background with a simple keyboard sequence. You may, for example, transfer a file from the S/370 (or whatever) host to your PC through the 3277 Emulator, begin printing the file on the local PC printer with a DOS command, and continue 3277 Emulation while the background grinds away.

Features of the 3277 Emulator include all of those functions that you are accustomed to on your 3277: dual case alphabetic, insert mode, delete key, erase input, erase end-of-field, 12 PF keys, forward/backward tab keys, cursor positioning keys, intensified and non-display attributes, etc. The Emulator keyboard layout is similar to the layout when the PC is used as a PC; e.g., the insert key enters/exits insert mode, the cursor positioning keys on the numeric keypad position the cursor, the CAPS lock and NUM lock serve to lock the appropriate keys in upper case (except when the shift key inverts the CAPS or NUM lock state), etc. The function keys in conjunction with the alternate shift key are used to implement the 3277 unique keys: PA1, PA2, erase input, etc. Additional Emulator features include: the HOME key positions the cursor to the first input field, line 25 contains a scale line with a ghost cursor so you always know what column the cursor is in, insert mode accepts either nulls or blanks as field ending characters, the emulated screen may be printed with the print screen key onto the PC printer, the backspace key provides a destructive backspace, the delete key is typematic, and more.

What does it cost? The cost of the ANR card hasn't been nailed down yet, but it will be a few hundred dollars. Other "costs" include: the two

remaining DMA channels (1 and 3) are utilized by the ANR card, as are hardware interrupt levels 2 and 3. The amount of memory available to background functions is reduced by 16K bytes when the Emulator is loaded. The ANR card obviously takes up one of the 5 PC card slots. The Emulator software requires one software interrupt vector in low memory to effect foreground/background communication for file transfer.

What is the schedule? A prototype ANR card has been functioning in Endicott for some time now. Yorktown expects the first imbedded card from the vendor any day. Best guess is that the cards will be available in volume to internal users in 3Q82. Software is up and running now, more or less. All of the functions described above have been checked out, but, since I don't yet have an ANR card myself, the software interface to the ANR card is not yet debugged. Work on file transfer between the host and the PC is just beginning.

The ANR card and the 3277 Emulator are being developed as an IBM Internal tool. It is too early for you to ask for hardware, software, or documentation. The software and documentation will be suitable for distribution on the network when they become available. Follow-up notices in the newsletter will inform you of availability and ordering procedures.

Earl Franklin, VM(AUSVM2/FRANKLIN), 529/984, Austin, TL 678-8238

8203-16 COMMON TEST BED PROPOSAL

A proposal for a common hardware/software test bed is being made in IS&CG. This newsletter article is intended to inform you of the proposal and to solicit participation from interested business areas.

The proposal centers around the PC, which is connected to a host through the 3277 Emulator and ANR card, and is connected to the device under test through the Raleigh BUMP Box.

The proposal intends to meet the following objectives:

1. Hardware bring-up of newly designed devices,
2. Software development support (download, debugger, etc.) for the device, and
3. Automated regression testing of the device.

It is difficult for me to say very much more about the proposal without getting into IBM Confidential information, so let me ask potentially interested business areas to contact either Dan Kilpatrick in Kingston (8-373-3411) or me for further information.

Earl Franklin VM(AUSVM2/FRANKLIN), 529/984, Austin, TL 678-8238

8203-17 WIP - INSTALLING PC FOR BLIND PROGRAMMER

On February 3rd, we installed a PC for Pete Gibson, a blind programmer. The RS232 interface allowed connection to 'BRAILLE LINK'. The IBM 'BASIC' demo program 'COMM.BAS' worked perfectly using the DOW Jones option.

Next we plan to use an acoustical modem to connect to the IBM2955 (SIMILAR TO 2701). Further plans include:

- Emulate 3270
- Connection to S/370 MVS
- Printing of braille
- VO TRAX Type & Talk interface to PC

Jim Bunkley IBM FSD, 1322 Space Park Dr., Houston. TX 77058, TL 671-7435

8203-18 SENSOR BASED I/O INTERFACE FOR IBM PC

A General Purpose, Sensor Based I/O interface has been designed for the IBM PC. This implementation supports a 32 byte wide input and output. 64 individual I/O device selects are decoded for general purpose use and mapped from 300 to 31F Hex. These device selects may be exercised, by software, using the BASIC instructions INP(N) and OUT M,N. Appropriate re-drive and data bus buffering has been included so that the local PC Bus and control are not compromised by external circuitry.

This work was performed in conjunction with the development of an automated test system using the IBM PC as a tool driver. For any interest or additional information on this application, please contact,

Tom Perry, E89C/503, East Fishkill, ZIP 96E, TL 533-0209

Paul Anthony, E89C/503, East Fishkill, ZIP 96E, TL 533-1072

8203-19 2741 SIMULATION ON THE SYSTEM/23

I have a prototype communications program for the System/23 which makes it look like a 2741. It uses the S/23 ASCCAM and a special translation table, and does more translation in BASIC. It supports all the things you can do with a 2741 (on VM/370, for example) and more, including reverse break, double attention and print suppress. It runs well at 300 baud; I haven't tested it faster. I intend to add diskette I/O and a few more things, and offer it as an FDP. I would like some internal users to give me feedback on what else it needs.

I will send a diskette to anyone seriously interested in it.

Ed Brink, VM(DBSVM1/D20JEWB), 20J/031, ISG Menlo Park, TL 466-3197

(EDITOR: This may be a slight fudge in stated intent of this newsletter, but I included it because Ed tells me that the technique he used to make System/23 look like a 2741 should also work on the IBM PC. There

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are a lot of 2741 ports already existing on our VM and MVS systems. It would be great if we had code for the PC to make use of them.)

8203-20 QUERY FOR EXISTENCE OF HIGH SPEED BSC HARDWARE

I am looking for a high-speed (50k baud) Bi-Sync card for the IBM Personal Computer. Please contact me if you have any information on such a device.

Bill Walters, VM(STLVM3/WALTERS3), San Jose, TL 294-4467

8203-21 QUERY FOR ASSEMBLER SOURCE CONVERSION - ZILOG TO INTEL MNEMONICS

I am looking for information on converting Zilog Z80 assembler mnemonics to Intel 8088. If anyone has come across such information please drop me a line. Thanks,

John Ganio, VM(SPPVM1/GANIO), Tampa, TL 438-3074

8203-22 WORK IN PROGRESS ON PROGRAMS TO ASSIST IN IBM CLUB TICKET SALES

I am currently writing a series of BASIC programs to utilize the IBMPC for assisting IBM Club personnel in the sale of tickets to various club and recreational activities. Plans call for the following functions to be implemented.

- Maintaining an inventory of tickets available
- Processing and logging sales transactions during ticket window hours.
- Printing of receipts for activity fees where tickets are not issued.
- Daily accounting of all check and cash transactions for deposit.
- Daily balancing of ticket inventory with low inventory warning.

The goal is to provide a "friendly" user interface while providing accurate accounting of all transactions.

Bob Hamilton, VM(BLDVM1/HAMILTON), IPD Personnel, Boulder, TL 263-6575

8203-23 QUERY FOR IBM PC CONNECTION TO SERIES/1 EDX AS TTY

I am presently considering use of the pc as a Work In Process (WIP) reporting system within a manufacturing test center. Present test systems are driven with Series/1's, under EDX.

Rather than re-invent the wheel, I would like to know who might be using the PC in communication with a Series/1, under EDX version 3, with TTY 7850 hardware. Both PC and EDX programs would have to be created to support this need.

I already have the necessary hardware. I have connected the PC up as a terminal, but have not 'cracked' the proper escape sequence to get the attention of 'EDX'.

This mechanism will also fill my needs for host to PC communication, as I already have my Series/1 talking to our MVS 158 under PCIS.

Jack Cameron, MVS(BTVMAE/D814246), Test Systems Engineering, B68/617-2, Burlington, TL 435-3452

8203-24 WIP TO CONNECT A PC TO AN EXISTING INTERNAL LOCAL AREA NETWORK

We are currently beginning a project to build the hardware and software needed to connect a Personal Computer to a Network Control Unit. An NCU is an internal product that is used mainly in manufacturing areas to connect mini's to our host 370 systems. Its transmission speed is about 277,000 bytes/second over a coax. Its distance limit is about 5000 ft. The other internal products that will support this network are the Transmission Control Unit (12+ years old) and the Sensor Based Control Unit (PRPQ 5098). Projected completion is 1st or 2nd quarter of 1983.

Ken Aaker, MVS(RCHIS1/D568KDA), Rochester, TL 456-6086

8203-25 DI/DO CARD USING IBM PC GAMES CARD

I have build a DI/DO card by adding four TTL modules to the Games Adapter card using the built in wire-it-yourself area. The card that I have wired and am using has 8 ports - each port being an 8 bit bi-directional extension of the 8088 I/O bus. The address group that I am using is hex 248-24F (which is unused and not reserved in the system). We are using this card with external A to D converters to provide data logging capability to the IBM PC. This data logger was first connected on February 5 and has been running 24 hours a day since.

The card was wired in such a way as to leave the original joystick functions fully operational and, by wiring the additional modules slightly differently, the number of ports can be easily increased.

Dale Wagner, 28Y/004, Boca Raton, TL 443-7838

8203-26 PC PERFORMANCE NOTES

The September issue of BYTE contained an article describing a High-Level Language Benchmark. The best high level language running on an 8-bit machine was PL/I-80 on a Z80 processor which ran 10 iterations in 14.0 seconds. From there it went up to over an hour for some interpretive languages. I implemented the benchmark in IBM PASCAL and another STL programmer (I can't remember who) did it in IBM BASIC. I got the following results:

IBM PASCAL with run time checking off (LINE- DEBUG-):

Compile time: 1:15.
Linkedit time: 1:39.
Load time: 7.5.
Run time (10 iterations): 9.3 seconds.
Code size: 229
Constants size: 68
Data size: 8204
EXE file size: 32515

IBM PASCAL with run time checking on (LINE+ DEBUG+):

Compile time: 1:26.
Linkedit time: 1:42.
Load time: 8.0.
Run time (10 iterations): 98.0 seconds.
Code size: 512
Constants size: 68
Data size: 8204
EXE file size: 33152

IBM BASIC:

Load time: 4.6
Run time (Only ONE iteration): 200 seconds.
BAS file size: 384

Some Comments:

- IBM PASCAL runs lightning fast with run time checking off. Its somewhat slower with run time checking on.

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- IBM BASIC is slow compared to IBM PASCAL but fast relative to most 8-bit interpretive BASICS.
- I found that in large PASCAL programs (ESPF) that I could disable run time checking in just a couple of heavily used routines (the screen handler and some list processing primitives) and get most of the performance benefit.
- Note that the code size grew by about 2:1 when run time checking was turned off. Its grows 3:1 for larger modules where the prolog/epilog code is smaller relative to the size of the module.
- PASCAL EXE modules are fairly large. Run time checking appears to be ON in the PASCAL compiler and the PASCAL.LIB run time routines. This would account for the size of the PASCAL compiler and EXE modules.

Chuck Tribolet, MVS(STLMVS1/T811329), Santa Teresa, TL 543-3337

8203-27 FILE UPLOAD/DOWNLOAD NOTE

Due to differences in the host translate tables, files uploaded on VM cannot be downloaded on MVS and vice-versa. This applies to both the Asynchronous Communication Support program and Edgar Swank's 3101 emulator. I should have more info next month.

Chuck Tribolet, MVS(STLMVS1/T811329), Santa Teresa, TL 543-3337

8203-28 RELEASE 2 OF 3101 SUPPORT PROGRAMS READY

This is to announce the second release of the B3101/C3101 terminal support programs with the following revisions and enhancements:

- The Character Mode Emulator has been eliminated. The File Upload/Download commands from the Character Mode Emulator have been integrated into the Block Mode Emulator. Note that a native mode session (no PVM or VAMP3101) is still required for upload/download.
- Previously sent lines may be recalled on formatted as well as unformatted screens.
- PF7 & PF8 allow you to save and recall the contents of the screen.
- There is support for the 3270 Clear function and and for full screen reads through PVM/VAMP3101.
- The file up/download protocol has been modified:
 - On TSO/VTAM, the TERMINAL CHAR command has been incorporated into the XMITH/RDH CLISTS so that an ASCII/EBCDIC translate table compatible with VM/370 may be used.
 - An attempt to send EBCDIC characters from the host which cannot be translated into ASCII results in an error message and an abort of the transmission.
 - The left brace may now be sent from the host.

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- A PC file which contains unallowed ASCII characters will cause an error message and abort when an attempt is made to send it to the host.
- The CC emulator command adds the ability to send a PC file to the Host and at the same time create a HSH file at the PC so that subsequent updates may be made with the TC command. Previously, either the RC command had to be used, requiring the entire file to be sent back from the host; or a cumbersome procedure using an RC of a null file.
- The EX and WT emulator commands allow a series of host and emulator commands to be issued automatically from a user PC file, similar to a PC DOS BAT file. The WT command allows synchronization with the host.
- The Ascii encoding for Binary files has been improved from the simple hex encoding previously employed. The new encoding transmits groups of three or more directly sendable Ascii characters directly and compresses repeated characters.

Previous users of this package will NOT be automatically sent the new version. Please send requests by NETMAIL to the ID below. You can order the PC code sent over the network in either EXPORT or HEX format. EXPORT format can be downloaded with the Cambridge Terminal program and converted to binary by IMPORT version 1 or 2. HEX format can be downloaded directly to binary by the previous version of the C3101 program. If neither of these is available, send a blank diskette in a self-addressed mailer to the internal mail address below. Upload/Download HOST support for either VM or TSO/VTAM will be sent over the network. New HOST support is required for the new version of the PC B3101 program, which is not compatible with the previous C3101 program. Documentation can be sent over the network as SCRIPT output formatted for the 6670 FDP or as SCRIPT/GML input. You can get a hard copy of documentation by sending a self-addressed large envelope to the internal address below.

Edgar W. Swank, MVS(STLMVS1/S788281), D71/H20, Santa Teresa,
TL 543-3828

8203-29 WIP - OPTICAL BAR CODE READER TO PC TO S/1 VIA TTY ADAPTER (#7850)

I have attached an Intermec Model 9300 bar code reader to the PC via an asynchronous communications card and then attached the PC through another asynchronous communications card to a TTY adapter (feature #7850) on a S/1.

The bar code reader to PC cable is wired as follows:

Connector 1 (PC) (female)		Connector 2 (Reader) (male)
2	to	3
3	to	2
5,6,8	to	20
7	to	7
20	to	5,6,8

Note: that pins 5,6, & 8 are jumpered together on each connector. The cable uses standard 25 pin male and female subminiature D connectors. The Intermecc reader is switch programmable for any combination of communications protocol desired at any acceptable baud rate. Full duplex operation is required as the PC does not work well with half duplex. The cable is attached to the asynchronous communications card in I/O expansion slot #1 on the system board. This card is modified per Service Procedure G008 to permit another address for the card. Your internal site coordinator should have a copy of this procedure.

The PC to S/1 cable is wired as follows:

Connector 1 (PC) (female submin D)		Connector 2 (S/1) (Berg connector)
2	to	A04
3	to	B06
7	to	B05
5,6,8,20		

(**EDITOR:** I discovered that the above table is incomplete too late in the publishing cycle to get it corrected. Please see the author if you need the details.)

The asynchronous communications card to attach to the S/1 is plugged in I/O expansion slot #4 of the system board on the PC. The TTY card is jumpered for 2400 Baud and EIA data mark minus.

The **TERMINAL** statement needed in the S/1 sysgen is:

```

$SYSLOGB TERMINAL DEVICE=TTY,ADDRESS=00,CRDELAY=4, X
ATTN=NO,ECHO=NO
    
```

BASIC Programming example:

```

10 SCREEN 0,0
20 WIDTH 80
30 KEY OFF
40 CLS
50 CLOSE
60 OPEN "SCRN:" FOR OUTPUT AS 1
70 LOCATE ,,1
80 OPEN "COM2:2400,0,7,2" AS #2 'ASYNCH CARD TO WAND
90 OPEN "COM1:2400,0,7,2" AS #3 'ASYNCH CARD TO S/1
91 PRINT "ENTER DATA WITH OPTICAL WAND"
100 Y = 0 'DUMMY INSTRUCTION
110 IF EOF(2) THEN 100 'LOOP FOR EOF
120 FOR X = 1 TO 50 'DELAY TO ALLOW ALL
130 NEXT X 'BYTES TO BE READ
140 DATAIN$ = INPUT$(LOC(2),#2) 'READ WAND DATA
150 PRINT DATAIN$ 'WRITE TO SCREEN
160 PRINT #3,DATAIN$ 'WRITE DATA TO S/1
170 GOTO 100
    
```

S/1 EDX Programming Example:

```

WAND PROGRAM START,300
START ENQT TTY
      READTEXT DATA,MODE=LINE
      DEQT
      PRINTTEXT DATA
      PRINTTEXT SKIP=1
      GOTO START
      PROGSTOP
TTY IOCB $SYSLOGB
DATA TEXT LENGTH=80
      ENDPROG
      END
    
```

Roger Davis, VM(BLDVM1/DAVISRD), D846/002, Boulder, TL 263-4970

8203-30 WORK IN PROCESS TO MATE A PC TO A BIOMATION K101D LOGIC ANALYZER.

We are presently in the early stages of developing a test development/verification and diagnostic support tool using an IBM PC and a Biomation Model K101D logic analyzer (via RS232 interface). The intent is to be able to use this system both logically and remotely (via modem and/or host tie-in). Dialog is requested with anyone working in, or interested in, this type of application.

Carl Ellison, VM(ENDCMPVM/ELLISON)

Tony McHugh, V07/014-2, Endicott, TL 252-2915.

8203-31 QUERY FOR PC GRAPHICS UTILITIES

I am interested in finding out if anybody is working on using graphpak, panel2 or similar graphic utilities on the pc.

From what I know, a 3277 emulator card is on it's way to production; with that, and with the fact that the monochrome and color display can be accessed simultaneously, it seems possible that the IBM P.C. can simulate the function of the graphics attachment of the 3277 and the costly Tectronics 618 (with color too!!!!).

It looks to me that in order to do that, somewhere, a different translation routine has to be written. I am only a user of those utilities and I really have no ideas exactly how it dump the data down. If anyone is or will be working on this, please let me know.

Ronnie Tong, VM(CLTVM/TONGRC), 62I/201-3, Charlotte, NC, TL 474-4973

8203-32 TECHNIQUE TO CREATE MULTI-STRIKE CHARACTERS ON THE IBM PRINTER

Listed below is a BASIC program that demonstrates one way to produce double or triple strike characters on the IBM 80cps printer. For this technique to work correctly, you must

1. Use the WIDTH statement to tell BASIC to allow up to 255 characters to be sent to the printer without sending a linefeed (LF).
2. Create a print string that is 80, 160, or 240 characters long.
3. LPRINT the string.

In the example below, the letters "ace" are overstruck with minus signs, the zero is slashed, odd numbers are triple struck, and some strange new characters are printed.

Print overstrike example

```

10 WIDTH LPT1: ,255
20 S$=SPACE$(80) 'Create a string of 80 blanks
30 L1$="abcdef 0123456 | 0 o 0 ( < + "
40 L2$="- - - /1 3 5 - - ' + ) > - "
50 L3$=" 1 3 5 - - "
60 REM Create a 240 character string
70 P$=LEFT$(L1$+S$,80)+LEFT$(L2$+S$,80)+LEFT$(L3$,80)
80 LPRINT P$

```

Keith Eckhardt, VM(BCRVM1/VM527482), 8P8/227-2, Boca Raton, TL 443-6510

8203-33 INPUT MODE ADDED TO ED FULLSCREEN EDITOR

As a creature of habit, I had a hard time adjusting to using the F9 key to create a new line for input while using ED. I solved the problem by redefining the F7 and F8 keys to provide an "input" mode similar to the 370 fullscreen editors.

The technique involves using F7 to redefine the RETURN key as an "insert line" key (like F9) and using F8 to restore it to normal operation. To make this change to your copy of ED you must edit the ED.PRO file as follows:

```

f7 = (cursor command) (begin line) (erase end line)
      'def ret = (insert line)' (execute)
      (command toggle)
f8 = (cursor command) (begin line) (erase end line)
      'def ret = (begin line) (down)' (execute)
      (command toggle)

```

Note: In the above example, parentheses were used instead of brackets for printing purposes since many printers do not have the brackets. Use square brackets when typing in the changes. Also, each definition must be typed as a single line and not folded as above.

Save the file and return to DOS. From now on, when ED is invoked, the new definitions of F7 and F8 will be in effect. At any point during editing, when you have multiple lines to enter, press F7. Then enter your

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data, using the RETURN key to advance to the next line. This "input mode" works differently than other editors such as SPF since you don't have to leave "input mode" to move somewhere else in the data and begin "inputting" there. Press F8 to leave "input mode".

Try it! I think you'll like it.

Keith Eckhardt, VM(BCRVM1/VM527482), 8P8/227-2, Boca Raton, TL 443-6510

8203-34 HINTS AND KINKS FROM STAN

RGB Displays: First of all please note that the price of the Electro-home 1302-2 RGB display from Anthem Electronics is no longer \$530. I am looking for another source for this model(which is already being put to good use at several sites).

Lightpens: We have tried two lightpens and have found them both to be very good. The resolution on both the HEI and the Symtek is very close to one PEL. For those of you not familiar with this type of (high quality) light pen circuitry, circuits exist in both the pen and on the color graphics card which are of sufficient bandwidth and sensitivity to enable the detection not just of characters or points written on the screen but detection of the raster scan. This then gives you the capability of, in effect, writing on the screen with the lightpen. The price range of these pens is from \$90 to \$300. What pens have you used and what are your applications?

VisiCalc: I have been receiving lots of requests for passing along the Visi- Calc models I have. Please send me a disk and an addressed envelope and I will expedite your request. Also send me any models you have developed and I'll put them in the "library."

Sort: Last month's "APB" for a good PC sort worked and thanks to Jerry Malin we now have a very nice heap sort. Jerry mentions that a shell sort might be faster but he hasn't implemented that yet. Again, an envelope will get you hard copy.

DOS Fixes: A service update diskette has been sent to site coordinators which fixes both the DOS timeout while handling RS232 printers as well as a couple of problems with the Customer Diagnostics and the Advanced Diagnostics while testing the Async card.

WEST COAST COMPUTER FAIRE

If you're in the area or otherwise can get to San Francisco Mar. 19-21, you will be treated to what I have found to be one of the best of the micro computer shows. There will be a session on the IBM PC; The IBM Personal Computer: It's Impact & Potential in the Microcomputer Industry.

With...Ben Dyer from Peachtree on "The P.C. and the Small Business Applications Market"

Bill Gates from Microsoft on "P.C. - It's Impact on the Microcomputer Industry"

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Seymour Rubenstein from Micropro International on "The P.C. as a Productivity Tool in the Office of the Future"

John Katsoras & Jim Handy from Digital Research on "The IBM P.C. in the CP/M World"

Bob Lingren from DataMac on "Add-in Memory & Mass Storage for the IBM P.C."

Dave Wertman from Tecmar on "The IBM P.C. Hardware Peripherals Market"

Dave Burnell & Jim Edlin on "A Publishers View of the IBM P.C."

and Ab Abbly from ComputerLand Corporate on "The IBM P.C. and It's Impact on Retail Computer Sales"

There are sessions on UNIX ,UCSD Pascal etc., etc.,etc. I wouldn't miss this show for anything. 600+ booths have been sold also.)

Please note that I am on a new node, STLVM11.

Stan Rosenfeld, VM(STLVM11/ROSENFEL), V30/G25, Santa Teresa,
TL 543-3690