Many readers have expressed an interest in back issues. The March/April and January/February 1980 issues are now available for $1.00 a piece. The 1979 issues are no longer available individually. These are being consolidated into a Best of 1979 volume. Other than the information contained in those issues all corrections will be made plus a new index to provide quicker reference to material. Readers who already have those issues will gain only the quick reference mentioned above.

The price for Canadian and US subscribers is increasing to $6.00. The Postal Service will be increasing the rates later on in the year so this is one reason for the increase. Another reason is to give a little overhead to allow some slight format changes in future issues.

George Sellers passes along the following comments on Basic. Have you ever inadvertently pressed the "5" when you are in the monitor mode and have a Basic program loaded in memory? Addresses 80-2 should have 4C 00 B9 and $212-213 should be the address of the next (2nd) Basic program statement. If these are fixed pressing "6" will allow one to reenter Basic.

Ron Riley offers the following. Litronix is offering a kit of parts to make an intelligent display similar to Aim 65 for $155. It comes with 16 digits and is expandable to a 40 digit display by plugging in more DL-1416 readouts. They also offer three application notes of interest, one is "The Intelligent Display" and the other two are Application Notes 9A and 13. Write Litronix 19000 Homestead Rd Vallco Park, Cupertino, CA 95014.

Once again I need feedback from you the reader. Some questions appear below. All you have to do is drop me a postcard with all the questions answered. Easy enough?

Do you have an Aim?
How much memory?
Do you have the Basic Rom?
Do you have the Assembler Rom?
Do you have the PL-65 Rom?
Which language do you use the most?
Why did you purchase the Aim?
What peripherals do you have?
What changes would you like to see?
What magazines do you read?
Are you a novice, intermediate, good or excellent programmer?
Comments.
Comments.
Comments.

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The price for The Best of 1979 will be $6.00 and will be available by the end of June. Please don’t write for it before hand unless you are willing to wait! The rate for foreign subscribers is $12.00.

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Renumber

Steve Bresson
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RENUM is a Basic program to renumber
Basic programs. It is based on a PCT pro-
gram in Personal Computing, March 1979, by
Mark Zimmermann.

Renumbering is a built-in command in
many of the larger Basic. It is useful
when a program has been modified exten-
sively, when you wish to insert lines within the
program, or in cleaning up a listing so
that it looks nice and is easy to follow.

The program is started with RUN 65000.
It asks for the START and END line numbers
of the block to be renumbered. Then you
supply the new line number to start num-
bering that block, and the increment. The
original program renumbered the whole
program with a start of ten and an incre-
ment of ten. I felt that the ability to
renumber any block would be a nice addition.
It enables you to offset subroutines on
100 or 1000 boundaries, which makes it
easy to remember what subroutine is where,
and to easily distinguish between unrelated
portions of the program.

As written, storage for 100 line numbers
is provided. Those of you with more
memory may wish to set MX to a larger value
to accommodate larger programs.

Since you probably won’t want to save
RENUM at the end of every program you use
it on, you have three alternatives:

1) Delete it by hand each time.
2) Save a text file on tape. On each
line duplicate one line number
from RENUM. End it with CTRL Z
when you load this file, it will
overwrite RENUM.
3) Go in and change the Basic pointers
so it does not know RENUM is part
of the program.

I attempted the last method, from Basic,
but had problems when I tried to change
the End of Basic pointer at $75/76. However,
if all you want to do is save the program,
it is enough to change the line pointer
for line 65000 to $0000. This may cause
problems if you try to RUN or change the
program, but it will not hurt the LIST or
SAVE. It will list up to that point and
quit. After the SAVE you can POKEx the
values back in and have use of RENUM again.
As shown, the change would be made by a
RUN 65900. (See Listing)
Review
Mel Evans
1027 Redeemer
Ann Arbor, MI 48103

Here is a report on the new Beta 32K Ram. It's great! (Model 6502DM 32K dynamic Ram, Beta Computer Devices, PO Box 3465, Orange, CA 92665, $419 + $3 UPS).

It's on a little 4-1/2 by 6 inch board that draws less than 1 amp of 5V only (the other voltages are generated on-board). It comes with an ingenious right-angle connector that allows it to fit either behind or below the Aim board, and either way, the expansion edge connector is still available for other things. With a little trimming of the Enclosure Plus connector hole, it fits in the enclosure under the Aim with room left over for another board.

All refresh is automatic on-board, so it behaves like static ram. And each 4K block is individually addressable to any 4K boundary, so you can make it contiguous with Aim ram by putting it at $1000-40FF. Aim 65 BASIC now responds with 3634 Bytes Free. Doesn't that "Bytes Free" give you a feeling of unlimited power?

I got mine four days after a phone order, wired the connector for "under", wired the header for $1000-40FF, plugged it in, and it's still working six months later.

May/June 1980 TARGET 3
Dale Lowery
431 Redwood Dr.
Pasadena, CA 91105

Here are some assembly routines used to get to individual or specific characters in the display. HXASC is NUMA, part of the monitor, with output to a buffer rather than to the AOD. PNHWL creates the pinwheel effect in character 20. You should call a 1/2 second delay between PNHWL calls or it will look like a star. PBUF contains the ASCII characters 1/-.A.

I always JSR RCHEX in assembly code especially in any sequence calls for keyboard input. This way you can get out of a program without doing a reset.

RA=\$AC00
RB=\$AC02
;DIXCH
;SUBROUTINE OUTPUTS
;DATA TO EXPLICIT
;DISPLAY DIGIT
DIXCH PHA;SAVE DATA
TYA ;GET DIGIT WORD
ORA \$80
STA RA
TAY ;SAVE A IN Y
PLA ;FULL DATA
EOR \$80 ;MASK OUT CURSOR
PHA ;SAVE DATA
STA RB ;DISPLAY IT
TYA ;GET DIGIT ADDR AGAIN
EOR \$80 ;SET w=0
STA RA
ORA \$7C ;SET CE=1
STA RA
LDA \$FF ;SET W=1
STA RA
PLA ;GET DATA AND...
RTS ;RETURN

;TO USE DIXCH AS
;INDEPENDENT
;SUBROUTINE
;CALL=LDA ASCII DATA
;LDY DIGIT ADDR WORD
;JSR DIXCH

;FNHWL
;PBUE=4 BYTES
;XSAV = 1 BYTE
;CONTENTS OF PBUF=
;\$31,\$2F,\$2D,\$5C
FNHWL JSR PHXY ;SAVE
INDEXES (\$EB9E)
LDX XSAV ;GETCHARINDEX
LDA PBUF,X ;GET
; CHAR
LDY \#3C ;SET DIGIT
; 20 INDEX
JSR DIXCH ;DISPLAYIT
INX ;UP INDEX
CPX \#4 ;DONE 4?
BNE RUN ;NO-GO?ORIT
LDX \#0 ;YES-RESET
RUN STX XSAV ;SAVE
; CHAR INDEX
JSR PLXY ;GET PMC
; INDEXES
;PLXY=\$EBAC
RTS ;RESUME

;DISPLAY ADDRESS
; DIGIT WORD
; 01  7B
; 02  7A
; 03  79
; 04  78
; 05  77
; 06  76
; 07  75
; 08  74
; 09  6F
; 10  6E
; 11  6D
; 12  6C
; 13  5F
; 14  5E
; 15  5D
; 16  5C
; 17  5F
; 18  5B
; 19  5D
; 20  5C

;TO USE HXASC AS
;INDEPENDENT
;SUBROUTINE
;CALL=LDA DATA(HEX)
;LDX BUFF INDEX
;JSR HXASC

6502 Assembly Language Programming by Lance A. Leventhal from Osborne/McGraw-Hill. $12.50 plus $1.00 handling (non-US or Can-$4.00) C/O Donald Clem
Lunar Lander

Steve Bresson
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Hanover, MD 21076

This version of Lunar Lander is suited to the Aim 65 because of the way it uses the display. The only things shown during a game are; the altitude (miles), the speed (MPH), and the fuel (pounds). The program expects that PB7 and PB6 of the user VIA are tied together—It uses these to implement the real time clock.

The keyboard is scanned using the GET function. (Note: A special poke to 42111 is done so that the program does not hangup on the GET function).

The 1 thru 8 keys are held down to give a thrust of 20 to 200 LBS/SEC. If nothing is pressed, then no thrust is applied. The 'C' in the first column indicates the coarse fuel scale is used. By holding the F(fine), V(very fine), or S(super fine) keys down, the thrust produced by a given key can be changed. (Hit 'C' to go back to the coarse setting).

Your rating will determine the quality of fuel used. A higher rating gives less thrust per pound of fuel. If the game goes too slow for you, hit 'U' to speed things up, and 'D' will slow things down.

Another feature of this version is that it doesn’t use the approximation method used by the others I’ve seen. Instead, it uses the exact value obtained by integration. This is more exact, but requires that you have the LOG function available. (A series approximation to the LOG is easily done, however).

With each flash of the display, the time since the last update has been found, the new speed calculated, and the keyboard scanned.

Product

PL/65 for the Aim 65.

PL/65 is designed to improve the productivity of the programmer and to increase program reliability. Control statements such as conditional execution (IF-THEN-ELSE), conditional looping (FOR-TO-BY), coupled with a simplified block capability, support structured program design techniques.

Tape Recorders

Ron Riley
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Flint, MI 48504

Here are a few comments on tapes and tape recorders. They should help to eliminate some of your mass storage problems.

Use short cassettes because long tapes are too thin and also cause tape speed variations. Don’t use the 3 for a dollar bargain tapes. I have had good luck with tapes from Microette Co. 777 Palomar Ave Sunnyvale, CA 94086. Sample tape is $1.00. Ten tapes for $7.50, and 50 for $32.50. These are C-10 tapes (5 minutes per side).

Several tape recorders work well with the Aim. Some are:

GE 5145 with counter aprox. $50
GE 5121 with counter aprox. $47
GE 5003 cheap aprox. $18 to 27
Sears 934 depends where purchased

I strongly recommend these especially the ones with a tape counter.

From personal experience I can say that Lloyds recorders don’t work very well with the Aim. Note that the price of the C recorder isn’t a good indication of its usability with an Aim. The Lloyds unit that I was trying to use was about $45 and therefore about the same price as the GE unit with similar features yet the GE unit works and the Lloyds doesn’t.

Announcement

The PL/65 compiler generates assembly language code. In addition, PL/65 allows assembly language instructions to be incorporated in-line in portions of programs where timing or code optimization requirements are critical. The result is a system implementation language which has the power and flexibility of assembly language and structuring potential of a high level language.

The PL/65 is contained in two 4K byte ROMs which plug directly into the Aim 65. The price including user's manual is $125. The manual is available separately for $10.

May/June 1980 TARGET
RS-232

My approach to interfacing RS-232 terminals is quite simple. It uses only the TTL voltage levels and so is not a proper RS-232 implementation. It does work fine with my Aim running a DECwriter at 300 baud and also running into a serial port on an H/P 9845 desktop computer at 2400 baud. No handshaking is used.

Sending data from a RS-232 to Aim-65

Data is input from the terminal to the Aim through J1-Y. Input voltages are clamped between 0 and +5 volts by diodes CR8 and CR9. You may need to replace R24 with a 1.6K or larger resistor if the voltage level on 25 pin 5 won't swing low enough.

Sending data from Aim-65 to RS-232

Data is sent to the terminal from the Aim through J1-U. 25 pin 3 needs to be pulled up to +5 volts. This may be accomplished by connecting 25 pin 3 to +5 volts through a 3.3K resistor, which should still allow the TTY loop to work.

Aim Application

<table>
<thead>
<tr>
<th>Connector J1</th>
<th>RS-232 Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin Y</td>
<td>Pin 2</td>
</tr>
<tr>
<td>Pin U</td>
<td>Pin 3</td>
</tr>
<tr>
<td>Pin 1</td>
<td>Pin 7</td>
</tr>
</tbody>
</table>

Depending on the terminal, you may have to also connect pins 5, 6, and 20 on the DB-25 connector to +5 volts.

* These connections are for a terminal.
For a modem make up an adapter cable which reverses the connections to pins 2 and 3:

Y  2  2
U  3  3
1  7  7

Aim Term. Modem
J1 cable adapter
cable

Directing output to the serial port, but retaining input on the Aim keyboard. Designed to be called from Basic. Check baud rate in A417-A418.

* = OD00
LDA A9 ; Check for zero
BMI AIM
LDA #00 ; Assumes output
STA A406 ; routine starts
LDA #0F ; in OF00
STA A407 ; Change if desired
RTS

Aim LDA #05 ; Use Aim
STA A406 ; Display
LDA #EF ; and Printer
STA A407
RTS

* = OF00 ; Serial port output
CMP #0D ; Check for CR
BNE CR8D
JMP LF
CR8D CMP #0D ; Check for CR
BNE OUT ; not a CR
LF JSR EBA8 ; send the CR
LDA #0A ; get a LF
OUT JMP EBA8 ; send character
; and return
; to basic

Call from Basic
N=2:GOSUB 9200:REM OUTPUT GOES TO AIM
N=1:GOSUB 9200:REM OUTPUT GOES TO PORT
9200 POKE 144,15:POKE 15,13:XX=USR(N):RETURN

The patches may reside anywhere, but the POKEd address in line 9200 will have to be changed accordingly. Also if the patch at OFOO is moved be sure to change the listing at OD00 to point at the new address. If desired line 9200 could also POKE the baud rate into A417 and A418.

Note also the KB-TTY switch stays in the KB position.

TARGET Back issues- The two 1980 back issues are available for $1.00 a piece in the US and Canada, $2.00 elsewhere.

The 1979 issues are being consolidated into a best of edition and will be available shortly for $6.00, $12 outside US and Canada.
During a print cycle, the motor turns clockwise as viewed to the right. Its pinion (not visible here) engages the large spur on the transmission gear, turning it counterclockwise. The helical portion of the transmission gear meshes with the helical portion of the main cam and strobe disc assembly, turning it clockwise in this view.

The eccentric top of the main cam moves the follower assembly from side-to-side over a distance that corresponds to the width of two characters. The roller is kept in contact with the cam by a spring and return follower (omitted here for clarity). The thermal head is clipped into the follower assembly, and slides on the paper.

Around the periphery of the main cam is a worm that engages the paper feed gear, and drives it upward by one-dot height increments. Teeth on the right face of the gear drive the clutch, which is connected to the platen. The clutch protects the worm from damage caused by pulling on the paper.

The strobe disc on the bottom of the main control cam has four circular tracks. Four brush contacts (wipers) are held against these circular tracks. During a print cycle, the strobe disc rotates with the main control cam, and these wipers contact the tracks and send the strobe signals to the control electronics for selection. During a print cycle all wipers are in continuous contact with the circular track.

The next illustration shows the flexible flat cable, which is the connection point to the control electronics. The motor leads and ground wire are omitted here. There are seventeen positions; the center-to-center spacing is 2.54 mm (0.1 inch).

Also shown are the thermal head and the strobe cap. The thermal head, flat cable, and strobe cap and wipers are one assembly, which is easily removed from the printer if necessary.
Product Announcements

Applied Business Computer Co. introduces an advanced Floppy Disk System for the Aim-65 Microcomputer. The FP-950 Controller Module controls up to 4 two-sided Floppy Drives, eight heads.

It uses State-of-the-Art technology to handle either Single or Double Density formats. It can control 35,40 or 77 tracks/side, as well as overlapped seek capability and independent motor control.

The new Advance Operating System (ADOS) uses a new concept on the file structure, allocating files dynamically which results in quick deletion and compression of files.

ADOS allows manipulation of input/output files in: Buffered Sector or Block Transfer Modes up to 63KBytes. Files can be read/write from Editor, Monitor, Assembler or Basic, besides the normal commands for manipulation of files. Module FP-950 $475, Single sided driver with power supply and case $375, and Double sided driver with power supply and case $460.


Compas Microsystems 224 S.E. 16th Street Ames, Iowa 50010

Compas Microsystems announces the CSB1 and CSB1D. The CSB1 adheres to the Rockwell System 65 bus and provides 2K static RAM, sockets for up to 32K EPROM/ROM, 50 input/output lines and 10 buffered output lines.

CSB1D is a development oriented model of the CSB1. The difference between the two boards is that the CSB1D has been modified to disable the on-board 6502 processor. This allows the CSB1D to be plugged into the Rockwell expansion motherboard (A65-009) for the Aim 65.

The CSB1D appears like an expansion board to the Aim 65.

Once the project software (and hardware) is developed, the software may be programmed into EPROM/ROM and installed in a standard CSB1. If desired, the CSB1D may be easily modified back to the standard CSB1 configuration. Contact Mike Corder at 515-232-8187.

THE TARGET

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