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	1024 x 768 x 256

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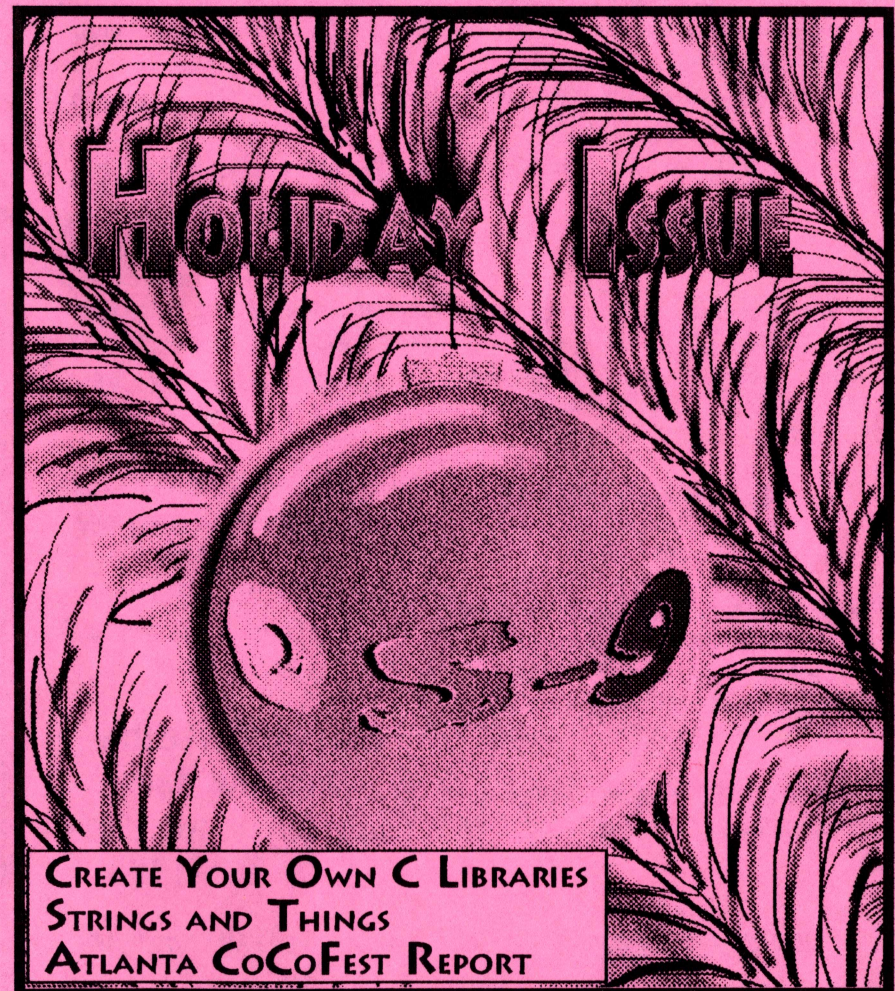
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(October 2-3, Atlanta, Georgia)

by Allen Huffman
of Sub-Etha Software

This makes my sixth Fest report and I still make no claims to have any thing correctly spelled or accurate.

It seems like I could replicate this opening paragraph by simply cutting and pasting key sentences from my previous 'Fest reports. After all, the same general things remain true:

- Support for our beloved computer system, the CoCo, continues years after it was discontinued by Radio Shack, even after the "last" publication of "The Rainbow".

- We are still seeing new products.

- We are still seeing new mini-publications.

- We are still seeing CoCoFests.

- And we, (at Sub-Etha), are still driving hundreds of miles to attend them...and the drives are not getting any shorter as the years go by.

But instead of stating the now hopefully obvious, which it seems I just did, I'll use a bit of this space to comment on this year overall.

This year, I went by car to Des Moines, Chicago, and now, Atlanta for all gatherings. I hate to repeat myself, but all of this "lack" of support sure is taking it's toll on my gas card bills. It has been a good year...for credit.

THE DRIVE

Terry Todd, Co-founding Sub-Etha partner, and I were going to try something different this time. We were going to try to

arrive early. With this in mind, we planned to leave on thursday afternoon instead of early friday morning. I had to work that morning and wait for my paycheck to hit the bank. At noon, I departed to load up the Honda for it's 750+ mile journey to Atlanta, Georgia.

Terry planned meet me at my apartment where his incredibly, well-packed, "chest" of computer gear and a small bag of clothes would be loaded into my car. This was the first time anything went to a 'Fest with me was so well packed. My gear, on the other hand, included "the box", which made up Sub-Etha Software, a box of all my CoCo equipment, monitor, case of disks, the PVC nightmare, a suitcase, laptop computer, camcorder, ice chest, and well...you get the idea. It could be done...No problem. And it wasn't. Really.

Sure, I couldn't see out the ba window, and sure, the car rode a bit lower to the ground, but hey, we had everything in it, (except for our friend Tim Johns, who was to find his own way to Atlanta if he wanted to attend). So, at about 1 pm, we headed out from Lufkin, Texas, on our all-day journey...needing to turn around only once to go back to the bank to pick up money for the trip.

There was nothing very eventful this time. After four such roadtrips along I-20, even all the "Bridge May Ice in Cold Weather" signs aren't worth noting. About the only thing that did catch our attention along the way was when we passed up a truck pulling a trailer which apparently contained:

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Colin McKay

I suppose, I should mention while I did see a number of diesels this time, none of them tried to make my sub-compact car more compact, (for which I was grateful). Also, there were no evil toll roads on I-20. Traffic did come to a halt in Louisiana for awhile for what I thought was a make-shift toll collection, but it turned out to be a mere mail-in "Monroe Metropolitan Area Transportation Study Travel Survey" about the roads and travel and stuff like that.

Anyway, at about 3am-ish early Friday morning, we arrived at the Holiday Inn, Northlake, where this year's event would once again be held. Their sign said, "WELCOME COCOFEST".

THE ARRIVAL

It was early, ... too early. The hotel's computer was "down" doing audits, so they had no record of our reservations. We were told they wouldn't appear until later in the day anyway. We just wanted a room. After some negotiations, we were able to get the clerk to tell us which rooms on the first floor were available. We had our choice of three rooms, and found one reasonably near the outside door and 'Fest area, ... a first for us. I guess it DOES make a difference when you gripe a bit, (We'll try that next year for Chicago so we don't end up lugging computer equipment three miles back and forth between show area and our room). Of course, if we hadn't griped, we would have ended up paying \$57.00 for a room we didn't have a key to and had only about six hours before checkout.

We loaded everything into the room and set up our systems to make the usual, last minute changes to our new software that would debut the next day. After everything was unpacked and plugged in, we received a phone call saying that someone else had that room reserved and that we might have to vacate the room later on

that day. We didn't take this well, especially after being told numerous times that there was "no way" to reserve a certain room in this hotel. It did all end up okay, and we later found out the person who had been scheduled to have our room was with the 'Fest and had requested two rooms side-by-side. Hopefully he's not upset at us for ruining his plans.

At about 6:30 am, Terry and I decided to get some sleep. After a few hours of snoozing, we were awoken by a 9:25 am phone call, and then Tim Johns was pounding at our door. Tim had managed to rent a car and made his way to the hotel. It was great to see him, but he refused to let us get back to sleep. Our day began earlier than we planned, (*Thanks a lot, Tim...*). At least breakfast at the IHOP was enjoyable ... even though I had to pay for Tim.

THE PRE-SHOW

Our main goal was to get rested up and be wide awake when people came dragging into the hotel, (tired like we usually are each year), and laugh at them. And, sure enough, later on that evening people did begin to arrive. The first person we saw was Al Dages. Since no one else was around, we helped him unload all of his gear. Maybe there are some advantages of not being early after all? With that done, it was time to "hang out" in the lobby.

At about 4:30 pm, I saw Fra Swygert, Boisy Pitre, and James Jones mulling around. Scott Griepentrog and Eddie Kuns had made it and had a nice story to tell about Eddie's MM/1 "dying" during the trip, (while Eddie was using a terminal to program on it in the dark by using an AC dimmer and an auto-light). I even noticed that Joel Hegberg, (*Sub-Etha OSK division*), and Carl Boll, (*who is a great guy*), from Chicago pull up, then drive off... to the airport. Knowing that

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position independent references to the function `foo_init()` and the variable "t" and "f". However, it is not possible to determine where the function `woof()` or the variable `global_var` will end up in the final program. If you examine the ".r" file you will find that the code referring to `woof()` and `global_var` is incomplete. There are markers in the code which are recognized by the linker.

At link time the correct address offsets are inserted in to code. This is a complex operation...you don't need to understand the details. However, doing a `rdump` of .r files will give you some insight into the methods used.

When you call the linker (r68 in OSK, rlink in Level II) you specify which modules are needed to create your program and which libraries to search for functions and variables which do not appear in your program modules.

So, back to creating a library: it's just a matter of writing some code, compiling it, and merging the files together. Well, almost.

There are two important things to keep in mind when creating a library. First, all references outside of a module must be forward. For example, if you have the modules `mod_1.c` and `mod_2.c` in your library and you merge them with the command:

```
merge mod_1.r mod_2.r >mylib.l
```

functions in `mod_1` can reference variables and functions in `mod_2`; however, the reverse is not true. A sneaky way to get around this is to tell the linker to include `mylib.l` twice. This is usually not needed and is most likely poor form.

Second, the linker will only include those functions which are actually needed. A library can contain hundreds of functions. If they were all included in each and every program you wrote you would soon run out of memory and storage on your

computer. But there is a limitation on what the linker can discard: the entire module which resolves the reference is included. For this reason, it makes sense to keep your modules as short as possible.

Getting to the Nitty Gritty

In the next issue we'll get into some nitty gritty programming...we'll create some additional library modules and even replace some of the standard ones with our own. In the meantime, keep those cards and letter coming to PO Box 355, Porthill, ID83853 or PO Box 57, Wynndel, BC, Canada V0B 2N0 or Compuserve 76510,2203.

-Bob van der Poel



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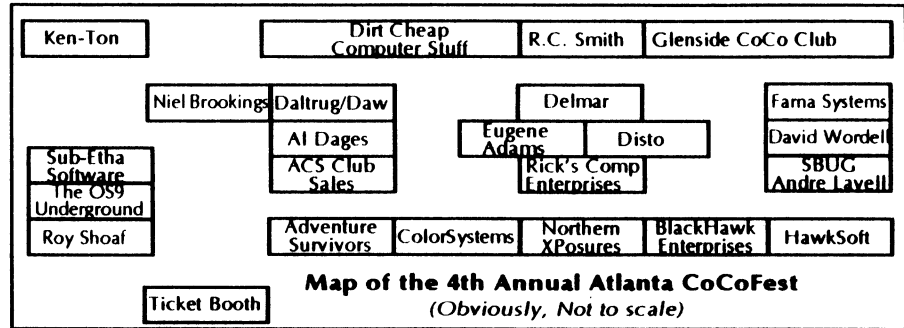
see page 15 for address

Tony would be at this show was a very positive sign of an interesting time. This would be his first 'Fest "down South". Things were falling into place.

Since we were so early, the show area was not even open for vendor setup yet. All we could do was go have some fun and food...so we did. A group of us headed across the street to the traditional

Gyro sandwich shop for, you guessed it, Gyros and sandwiches. Then it was back to the hotel, where people were continuing to arrive.

Later in the evening, the show area was opened for vendor setup. The location was the same as all previous Atlanta Fests, and it was setup as follows:



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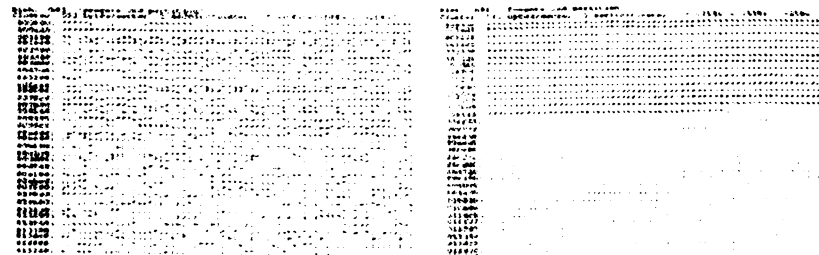
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Creating Your Own C Library

Part One

by Bob van der Poel

One of the more powerful and functional features of C is the ability to utilize functions for a library. This library can be one supplied by the writer of your compiler, created by you, or purchased as an additional package from the third-party source. However you acquire your library functions, they should (and usually do) share several common virtues:

- They are conveniently located in one easy to maintain and access place (The library modules are normally on your hard drive in /dd/lib. In addition, keep my library source code in /dd/lib/src.).
- They have been extensively debugged so you can be sure that they are reliable.
- The documentation for the functions is clear.

In the next few articles we will discuss how Microware has implemented libraries with the OSK 3.2 compiler and how and when you should create your own. There are some differences in syntax with the Level II compiler; however, most of the discussion will apply equally to it as well as Ultra C.

There is nothing magical about C libraries. They are just collections of functions and macros which can be included for use in your own programs. For the purposes of this article we will not include macros in our definition of "library", even though they technically do form part of the library.

In the Microware C implementations and in several other C compilers I know of), a library is simply a collection of object files which have been compiled, but not yet linked. These files normally have a .r extension. To turn a collection of object files into a library they are simply merged together. For example, if you have the following object files:

```
my_arc.r
my_tan.r
my_cos.r
```

you would merge them together with the following command:

```
merge my_arc.r my_tan.r my_cos.r >my_math.l
```

But before we get into the details...just what is an object file?

If you've been doing much programming at all in C or in assembler (using OSK or the RMA Level II assembler) you are familiar with the compile/link process.

After a C program has been translated (compiled) into assembly language, it is then passed through an assembler. Since C supports multiple modules, the assembly process is not completed until the modules are linked together. For example, assume you have the following module:

```
foo()
{
  int t;
  t=foo_init();
  for( ; t<10; t++) woof(t);
}
foo_init()
{
  int f;
  f=global_var * 123;
  return f/88;
}
```

When the assembler is finished with the module, it will have calculated

(HawkSoft cont) in the contest. Other MM/1 goodies of interest were his Sound editor and Digital Clock.

6) S-BUG
Andre Lavelle once again had gobs of goodies, including 85 meg SCSI Quantur drives, tons of cables, good ROM-paks, etc.

7) OS-9 User's Group
Carl Boll took memberships and handed out MODDs for the newly reformed group. Carl is now the president of the group.

8) FARNA System
Frank Swygert was another Georgian who showed up. He represented C. Dekker's fine OS-9 products, such as the easy-to-use CoCoTop, a graphical desktop file manager/utility, and a new audio sampler with graphics. Of course, subscriptions were taken for "The world of '68 Micros", and back issues, (both of them), were available. The most interesting offering would have to be "Tandy's Little Wonder", a very complete book on CoCo history including schematics, hacks, and lore. FARNA was also representing SpectroSystems' ADOS.

9) Glenside CoCo Club
A lot of free software was to be had with membership to this Chicago area club, (which sponsors the CoCoFest there each year). A supply of T-Shirts from the previous Chicago Fest were also available. Their "point of sale" system ran two terminals from the master CoCo. Glenside remains the national support group for CoCo users after going nation, three years back. Their CoCo123 Newsletter is a great source of information, and you get four great RSDos and OS-9 disks free when joining. Being a member also gives you SAMS Club access.

10) R.C. Smith
R.C. is always around with "gently-used" goodies.

11) Dirt Cheap Computer Stuff Company
Mark Griffith and Bill Dickhaus made the scene again. Mark was taking subscriptions for his "Metamorphosis" magazine (yes, that's the new name for "No Name") as well as selling 14.4 Class 2 external fax modems for \$139. and external CD-Rom drive for the MM/1

1) Adventure Survivors
Terry and I both renewed our subscriptions to their gaming newsletter. For six bucks a year, why not? (Hello there, L.E. Padgett!!! Did I spell it right? No wonder I can't remember his name...I don't know it! Just some initials I learned at this show.)

2) Color Systems
Zack Sessions showed off OS-9 games such as battleship and various card game paks for CoCo 3 and MM/1. WP Shell, (word processor oriented shell), and some MM/1 future products. The "I ♡ my CoCo" bumper stickers were also available

3) Northern XPosure
A collection of Canadian vendors where represented such as Gale Force Enterprises, Bob van der Poel Software, Vulcan Alumni Software, Radical Electronics, (circuit board CAD w/postscript output), Oblique Triad, Canaware, Hartsoft (?), Monarch Software, and Intelligent Algorithms.

Of special interest was Alan Dekok's latest creation: Smash! This was a breakout-type game with 30+ levels, (you can make your own), multiple balls, and HIGH SPEED action with sound. It ran smoothly under OS-9 and had to be... one seemed to be "in charge" here ☺. Alan did a great job with the Canadian map on the back with markers representing where all the companies were located. He mentioned wanting to bring a world map down to the show and let people put pins in where they were from. This seems like a good idea and I hope Colin brings a map with him to Chicago, (if they make it, eh?).

4) Blackhawk Enterprises
Bill Wittman, (an IMS rep), was manning this booth representing IMS and showing off his new GCal graphical calendar for the MM/1, (also, deposits where being taken for the new memoryboards).

5) Hawksoft
Chris Hawks and his wife, Nancy, made their 20th 'Fest appearance at this show. His latest creation was GNOP, a pong(tm)-type game for the MM/1. You'd have to see it to believe it. The ball stays perfectly still while a small screen with paddle bounces around. Very bizarre, and it won him the \$1.00 Grand Prize

(Dirt Cheap - cont.)

for just \$199. Really "Dirt Cheap" Deals! Bill had his IX Offline readers for CIS and Delphi, and there was a gadget designer (*buttons, sliders, knobs, etc.*) for the MM/1, (by Paul Fitch), that helped create control screens for the MM/1. Also on display was Brian White's Speed Disk Optimizer for OSK. On the MM/1 it had a moving screen that looked like Norton's SD on the PCs.

12) Daltrug & Daw Training

David Wordell and Lee Veal, (from Texas), were there as well. David had his "Installing the 6309" and "Beginning OS-9" videotapes, (a great way to learn), and Lee had the Planet Engine OS-9 planetarium and also some Planet Engine jewelry in the shape of stars, the moon, Earth, etc. A CoCo 3 CAD package is in the works.

13) Al Dages

"Guaranteed" used CoCos, Cases, and drives galore. And peanuts. His goal was to "make everybody happy!". I think he succeeded!

14) ACS Club Sales

More hardware/software offerings from the host club of this event.

15) Delmar

Ed demonstrated the new G-Windows based System V, which had very high-speed VGA graphics. This system runs a 68020 at 25mhz or 33mhz and soars. Also shown briefly was G-Windows fax software, (under development), with a full screen viewer for incoming faxes. A MM/1 version is in the works, too. (Seeing that the G-Windows was a port done from that code). Unfortunately, those red foam rubber hammers made the show again ☹.

16) Eugene Adams

More good deals on good hardware.

17) Disto

Tony Distefano made his first 'Fest "down South" with 2 meg upgrade boards, Super Controller IIs, and 4-n-1 boards. Tony seemed very happy to be with us and we were all happy to have someone who has made such an impact with our history. Most of his Disto line was available in working and non-working form and he has made new runs of several items.

18. Rick's Computer Enterprises

Rick had his normal selection of disk magazines and goodies, as well as representing Sundog Systems' purchases!

19. Niel Brookings

Niel and Dave Halko showed off a "hyper-text" type utility which was currently geared for searching various full-text bibles on disk. The program would find, (on his MM/1 nearly 6000 occurrences of a word in a split second. When demonstrated reading off of a floppy, the program was almost as fast! Any type of text could be made searchable through his program and a CoCo OS-9 version coming up "real soon now". The system could be used to search encyclopedia text. Y might want to invest the \$20.00 for this program and show the author that we could use something like this!

20. Sub-Etha Software

Ah, now I get biased. This year I actually had new CoCo products! Imagine that. First was a graphics adventure of last year's Atlanta 'Fest with 60+ rooms with digitized 16-level images. Next was Towel, an OS-9 disk utility which runs under the new EthaWin interface with pull-down menus and mouse support all on a high-speed text screen. Mulemulator, we had Terry's RS-DOS based CoCo hooked to mine using his 4-pin serial port and we were able to run applications such as EthaDemo, MiniBanners, etc., over 1 serial cable with overlay windows, screen codes, etc., all intact. Joel Hegberg had Write-Right and EthaGUI for the MM/1 with a free "disktop" calculator, (on disk, of course), to give away. We also represented JW (UpTime back issues and subscriptions), and StrongWare, (GEMS, Soviet Bloc, MM/1 tools).

21. Fat Cat Publications

Fat Cat Publications, publisher of "The 'International' OS9 Underground Magazine, was represented by Scott Griepentrog. (Due to an unforeseen medical emergency, Steve Secord, assistant editor, was unable to attend). Subscriptions for a show special of \$16/ye. Back Issues were available as well.

The editor, Alan Sheltra (ZOG), was busily preparing the next issue at the time of the Fest, across the country in California, and could not attend (but wanted too!).

```
/*
stringstr - The "stringstr()" function prints 'n' chars
of 'str1' to the terminal. Eg. stringstr("-", 79);
*/
void stringstr(str, n)
char *str; int n;
{
    int i;
    i = 0;
    while(++i < n)
        printf("%s", str);
        printf("\n");
        return;
} /* End of stringstr.c */
```

```
/*
substr.c - Searches for the first occurrence of
array "b" in array "a" starting at position "n", and
returns the array position as an integer if successful,
or a negative one, (-1), on error. NOTE:
The "substr()" function does NOT alter the string.
*/
int substr(a, b, n)
char *a, *b; int n;
{
    int i, j, k;
    for(i = n; a[i] != '\0'; i++)
    {
        for(j = i, k = 0; b[k] != '\0' && a[j] == b[k]; j++, k++);
        if(b[k] == '\0')
            return(i);
    }
    return((-1));
} /* End of substr.c */
```

```
/*
dnstr - Converts array "s" to lowercase.
*/
void dnstr(s)
register unsigned char *s;
{
    while(*s != '\0')
        *s++ = tolower(*s);
    return;
} /* End of dnstr.c */
```

```
/*
upstr - Converts array "s" to uppercase
*/
void upstr(s)
register unsigned char *s;
{
    while(*s != '\0')
        *s++ = toupper(*s);
    return;
} /* End of upstr.c */
```



How to reach The OS9 Underground:

For subscription information, questions, call or write to:

Fat Cat Publications
4650 Cahuenga Blvd., Ste #7
Toluca Lake, CA 91602
(818) 761-4135 (voice)
(818) 365-0477 (fax)
(818) 769-1938 (BBS)
 or by email to:
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ZOGster@Delphi.com

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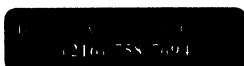
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22. Roy Shoaf

Roy had a table of various goodies he has collected including disk drives, cases, printers, etc., collected from various sources. I almost picked up a color plotter for five dollars!

23. Ken-Ton

Not listed in the 'Fest booklet. This was apparently a late entry. Joe Scinta showed up with the Ken-Ton SCSI hard drive interface and RGB-DOS. Folks, this is the BEST hard drive setup I have ever seen for the CoCo. You could link up to eight SCSI devices together using his \$89.00 interface. He also had a Midi equipped guitar out for awhile and it turns out he's quite a good guitarist. (He knows many Beatles songs, which is a "good thing"!). Joe wants to point out that they are still in business, and will continue to be so as long as people are interested in thier SCSI drive setup.

Sunday:

10:00 am

"OS9, etc."

by Allen Huffman
(I overslept and missed this one.)

11:00 am

"to be announced"

by Tony Podraza, (Glenside CoCo Club president)

1:00 pm

"How to move OS-9 from hackers to users"

by Mark Griffith

FOOD

On Sunday, ACS provided us with muffins and hot coffee! Ah, this is what makes these trips all worth it! Many had the breakfast bar in the hotel, and others went to local restaurants. There are many food places around the 'Fest area ranging from McDonald's to Red Lobster.

THE SEMINARS

Once again, I missed all the seminars. There just aren't enough hours in the day for all of this free information I guess.

Saturday:

11:00 am

"Putting a Disk Magazine Together"

by Rick Cooper

1:00 pm

"Tandy's Little Wonder"

by Frank Swygert/FARNA Systems

2:00 pm

"C Programming"

by Bob van der Poel

3:00 pm

"OS9, etc."

by Alan Dekok

4:00 pm

"C-Windows, OSK"

by Ed Gresick

6:00 pm

"OS-9 User's Group Meeting"

discussed later.

THE EVENINGS

The key to being popular at a "Fest" is to keep your door open. Terry suggested this last year and it has been working for us. At one point on Friday, we had about 20 people in our room including Boisy Pitre, James Jones, and Bob Van der Poel. Just about everyone stopped by as we gathered around computers, kicked back and discussed David Letterman, and even drank some of Paul Jerkatis's homebrew. There was something for everyone, and the information and friendship shared after-hours was amazing.

QUOTES

[Editor's Note: The following are some quotes from attendees about the Fest]

"It was a good show. We needed more people." - Ken Scales

"I thought the show was great."
- Frank Swygert

"Could have been bigger, but it was alright." - Alan Dekok

"Could have been bigger, but it was good." - Chris Hawks

"I loved it. I really enjoyed being an official vendor." - Niel Brookings

"It was all worth it during the first hour when I saw a ... roommate from 21 years ago from college. Aside from that, there was alot of interest going on. I think a lot of positive stuff came out of it."
- Tony Podroza

"It was great. Amazing. Absolutely Amazing." - Vaughn Cato

"The laser show was really cool!"
- Terry Todd

THE END

Watch for the upcoming CoCoFest Chronicles, a new book scheduled to be published by Fat Cat Publications which will contain revised versions of all my 'Fest reports including pictures and more recollections of past Fests.

OR IS IT?

A graphical adventure/simulation based on the 1992 Atlanta CoCoFest including over 60 locations with digitized images is available from Sub-Etha Software.

The game requires 490K of disk space for full installation (but you may run it on less if you leave out some pictures) and comes on a 360K floppy in "ar" compressed format. If interested, send \$9.95 + \$2.50 S&H to: Sub-Etha Software
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-Allen Huffman



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```

/*
strstr - Writes the value of numeric argument "b"
as an ASCII string. The argument may be any
numeric type. The function will write an integer
to array "a" when there is no fractional value
other than zero. Otherwise it writes a float value.
*/
void strstr(a, b)
char *a;
double b;
{
    if((b - (int)b == 0)
        sprintf(a, "%d", (int)b);
    else
        sprintf(a, "%f", b);
} /* End of strstr.c */
    
```

```

/*
swapstr - Exchanges the contents of two strings.
Since pointers cannot be treated exactly the
same as variables, I've found it is better to use
this function rather than a macro.
*/
void swapstr(a, b)
char *a, *b;
{
    char temp[256];
    strcpy(temp, a);
    strcpy(a, b);
    strcpy(b, temp);
} /* End of swapstr.c */
    
```

```

/*
cntrstr - The "cntrstr()" function centers the array
"str2" at the terminal screen center. Terminal width
is defined by variable "col". The left-hand side of
array "str1" is padded with ASCII char $20.
*/
void cntrstr(str1, str2, col)
char *str1, *str2;
int col;
{
    int length, padding, i;
    char *p = str2;
    while(*p != '\0')
        p++;
    length = (p - str2);
    padding = (((col - length) / 2) - 1);
    i = 0;
    while(i++ < padding)
        *str1++ = ' ';
    while(*str2 != '\0')
        *str1++ = *str2++;
    *str1 = '\0';
} /* End of cntrstr.c */
    
```

```

/*
fillstr - Centers the array "str2" at the terminal
screen center and pads both the lefthand and
righthand sides of array "str1" with ASCII char
$20. Terminal width is defined by variable "col".
*/
void fillstr(str1, str2, col)
char *str1,
*str2; int col;
{
    int length, padding, i, fill;
    char *p = str2;
    while(*p != '\0') /* do some pointer math */
        p++;
    length = (p - str2); /* get string length */
    padding = (((col - length) / 2) - 1); /* find center position */
    fill = (col - (padding + length));
    /* find right hand fill */
    i = 0;
    while(i++ < padding) /* pad left hand side */
        *str1++ = ' ';
    while(*str2 != '\0')
        /* insert string */
        *str1++ = *str2++;
    i = 0;
    while(i++ < fill) /* fill rest of line */
        *str1++ = ' ';
    *str1 = '\0'; /* terminate string */
} /* End of fillstr.c */
    
```



```

/*
instr - Places, or Inserts, array "b" into array "a",
at the "start" position with the number of characters
defined by "count" or up to the array length
of character array "b".
*/
void instr(a, b, start, count)
char *a, *b; int start, count;
{
    int x;
    x = strlen(a) - 1;
    count += start;
    -start;
    while(start <= count && start <= x && *b != '\0')
        *(a + start++) = *b++;
} /* End of instr.c */
    
```

While this could be duplicated using "strcat()", using the "sprintf()" function, eliminates the second call to "strcat()" necessary in the earlier example.

```
main()
{
    char a[15];
    char *b[] = "Merry ";
    char *c[] = "Chris";
    char *d[] = "mas";
    sprintf( a, "%s%s%s", b, c, d);
    printf("%s\n", a);
}
```

The "sprintf()" function writes its output to the char array named as it's first argument. This is followed by the format control string. The "sprintf()" function uses the same format controls as "printf()". The "sprintf()" function also provides an easy method to incorporate numeric values into the string by automatically converting them to their ASCII character equivalents:

```
main()
{
    int x; char a[9];
    sprintf( a, "%d %d %d", 23, 55, 16 );
    printf("%s\n", a);
}
```

This example would produce the character string "23 55 16". The function combines the effects of "strcpy()" and "strcat()" in a single function call and allows multiple arguments. It is similar to the "STR\$<>" in BASIC.

While the standard set of string functions available in C seems small, many specialized string functions can be built using these as building blocks and are limited only by the programmers imagination.

In closing, I'd like to share with you several string manipulation functions from my programming toolkit that duplicate BASIC functions, a few of which have no C equivalent. There are many more emulations possible and I'll leave those to your own creative ideas.

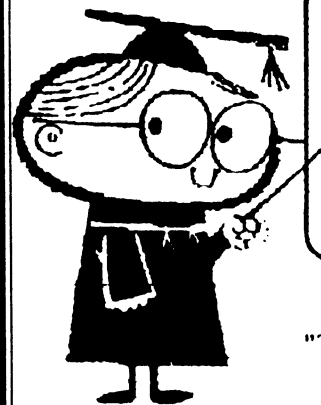
```
/*
midstr - Extracts the portion of string "b" defined
by the variable "start" character position and
character count up to length of array "b" and
copies the substring to string array "a".
*/
void midstr(a ,b, start, count)
char *a, *b; int start, count;
{
    --start; count += start;
    while(start <= count && start <= strlen(b))
        *a++ = *(b + start++);
    *a = '\0';
} /* End of midstr.c */
```

```
/*
leftstr - Copies the leftmost characters in array
"b" to array "a", up to a total of "n" characters.
If the string "b" is less than "n" characters, the
entire string is copied.
*/
void leftstr(a ,b ,n)
char *a, *b; int n;
{
    int i;
    i = 0;
    while(i++ < n)
        *a++ = *b++;
    *a = '\0';
} /* End of leftstr.c */
```

```
/*
rightstr - Copies the rightmost "n" characters in
array "b" to array "a". If the array "b" is less than
"n" characters, the 'rightmost' portion of the
string is copied.
*/
void rightstr(a, b, n)
char *a, *b;
int n;
{
    int i;
    n = (n > strlen(b)) ? strlen(b) : n; i = strlen(b) - n;
    while(i < strlen(b))
        *a++ = *(b + i++);
    *a = '\0';
} /* End of rightstr.c */
```

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A Stack

The Great Communicator!

Understand the concept of parameter passing, you must first understand what a stack is and how it works. Basically a stack is an area in memory that holds data in a certain sequence. Data structures can be defined in two ways and what sets these two structures apart is the manner in which the data placed on the stack is accessed.

Data Stack Structure:

A Data Stack structure is when the first data to be placed on the stack is the last to come off, which brings us to the term FILO, (First In, Last Out).

Queue Data Structure:

A Queue Stack structure is accessed exactly the opposite from the Stack structure. The data that is placed in the queue comes out first, which brings us to the term FIFO, (First In First Out).

An analogy to the two types of would be this:

A stack is similar to you placing disks on top of each other to store them. When you want a disk to use, you take it from the top of the stack. A queue is similar to a gum ball machine. When the machine is filled, the first gumballs that enter the machine exit the machine when a coin is inserted.

When used in computers, data is used, whether it is a string type or numeric type, the data can be either placed, (or "pushed"), on to the stack, and taken, (or "popped"), from the stack. The reason you need, (or don't need), to know this

information is that it better prepares you for parameter passing, and when you don't get the results you expected, going back to this preliminary definition will help you to see your mistakes, (if there are any).

The only type of data structure used in parameter passing is the standard FILO stack. The FIFO queue is used in print spoolers and applications that require many processes to share the same printer or terminal. The rest of this column deals with a stack or FILO.

When you use a variable like "x" in a program, the "x" represents a pointer, or offset to an address to an area in memory known as the stack. The stack contains the locally declared contents of the variables. When you use an assignment statement like, "x = 5", you are telling BASIC09 to store a "5" at the address defined by the "x" pointer.

When you "pass" a variable from one program to another, what really happens is that the variable, (or its address), is pushed onto the stack, and then control is transferred to the called program. The called program then references the stack and either sees your data, or a pointer to where your data exists. If your data is placed on the stack, your variable is passed by value. If the address of where your variable exists is pushed on the stack, your variable is passed by reference.

Because most data types are quite long, (like strings), it is not efficient to pass a variable by value because it is copied each time the value is passed. Rather, passing by reference, is the preferred method.

Now that you are familiar with parameter passing, I would like to elaborate on the basics. You know that the system keeps track of which variables are being "passed" by way of a stack, which can store data on a FILO, (First In Last Out),

contents of string array, "b" are copied to the remaining sequential bytes up to and including the terminating NUL of string array "b". String array "a" is then equal to "Merry Chris". The second call copies the contents of string array "c" to the end of the previously concatenated contents of string array "a" in the same manner.

The "strlen()" function in C is the equivalent to the "LEN" function in BASIC. As in BASIC, the C function returns the integer number of "printable characters" in a string, however, the terminating NUL byte is not counted.

```
10 A$ = "Happy Holidays"
20 X = LEN(A$) 30 PRINT X
```

The C equivalent is:

```
main()
{
  int x; char a[15];
  strcpy( a, "Happy Holidays");
  x = strlen(a);
  printf("The length of %s is %d bytes.\n", a, x);
}
```

The integer value of 14 is displayed by both examples. In the C example, the string array "a" is declared to be 15 characters to allow room for the terminating NUL byte. It is good practice to always add one extra byte to the length of character arrays in C to make room for the terminating NUL byte, or you may overwrite an address the system is already using and probably crash it.

The "strcmp()" function compares two string values and returns an integer value to indicate whether or not the strings match. In BASIC, numeric operators "=", "<>", "<=", ">=", are as used to compare two strings:

```
10 A$ = "Reindeer"
20 B$ = "Reindeer"
30 IF A$ = B$ PRINT "MATCH" THEN END
40 PRINT "NO MATCH"
```

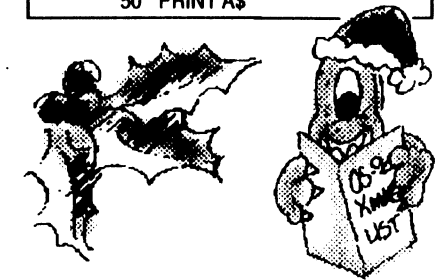
In C, the equivalent program would be:

```
main()
{
  int x;
  char a[] = "Reindeer";
  char b[] = "Reindeer";
  x = strcmp( a, b);
  if(x == 0) printf("MATCH\n");
  else
    printf("NO MATCH\n");
}
```

The function compares successive array bytes from the two strings until it finds two bytes that are not equal in ASCII value. If all bytes are equal in value, a zero is returned. If the differing byte from string array "a" is greater than the byte from string array "b", the function returns a positive number, otherwise the function returns a negative number. While it is usually only necessary to know only if the strings match, the byte to byte comparison could be useful in a sorting program. The BASIC version would require additional tests to return the same information.

Besides the "printf()" function, C also has a version that writes a formatted output to a string pointer or character array instead of the monitor. Consider an earlier example:

```
10 A$ = "Merry "
20 B$ = "Chris"
30 C$ = "mas"
40 A$ = A$ + B$ + C$
50 PRINT A$
```



value stored at the pointer location is the address of the first character of string "a". The "strcpy()" function locates the first byte in the string, via the pointer, and copies it to the first location reserved for character array "a", and then copies the second byte and so forth until the NUL byte is copied. This terminate: "strcpy()" function.

Other Functions

One string operation that BASIC allows, is adding strings together in a mathematical way, or in effect, string concatenation. The C language has the "strcat()" function to emulate this, although not exactly in the mathematical way BASIC performs, the effect is the same:

```
10 A$ = "Merry "
20 B$ = "Chris"
30 C$ = "tmas"
40 A$ = A$ + B$ + C$
50 PRINT A$
```

The C version could be:

```
main()
{
    char *a[] = "Merry ";
    char *b[] = "Chris";
    char *c[] = "tmas";
    strcat( a, b );
    strcat( a, c );
    printf("%s\n", a);
}
```

It is necessary to call "strcat()" twice in this example. After the first call, the terminating NUL of string array "a", located. Memory allocation is checked to insure enough sequential bytes are available for the operation. In the case where there is not enough memory available, a new memory block is located and the contents of array "a" are copied to the new location and the old memory block is released back to the system. The pointer to string "a" is decremented by one to point to the memory location just before the array "a" terminating NUL, and the

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basis. In fact, every programming language utilizes the stack in one way or another. You also know that the values themselves are not passed, rather, the addresses or "pointers" to the area in the stack where the variables are stored, are passed.

You know that variables passed by their location in memory is known as being passed by reference and that this is the default for BASIC09. What most BASIC09 programmers don't realize is that you can pass a variable by value by adding a null argument to the variable being passed. A null argument would be a zero, (0), if it is a number being passed, or a empty string, "", if it is a string being passed.

For example:

```
PROCEDURE one
DIM x:INTEGER
x = 14
RUN two(x+0)
PRINT x
END

PROCEDURE two
PARAM y:INTEGER
y = 2
END
```

In procedure one, the value of "x", (in this case 14), would be placed on the stack, then it will start procedure "two".

Passing by value is great when you want to manipulate variables in the called procedure without returning the manipulated variables back to the calling procedure. The PRINT in procedure one would have resulted in a 14 being printed regardless of what procedure two did to the original value.

Okay, so much for review. Now we jump into the more interesting stuff, passing more than one data type, or passing complex data types.

Suppose you wanted to pass t procedure two the variables x, y, z, a\$, b\$ and c\$. How would you do it?

Take a look at the following programs:

```
PROCEDURE one
DIM x:INTEGER
DIM y:REAL
DIM z:BOOLEAN
DIM a$:STRING[20]
DIM b$:STRING[30]
DIM c$:STRING[1]
x:=123
y:=1.2345
z:=FALSE
a$="Is it a nice day "
b$="In Sunny California?"
RUN two (x,y+.0,z,a$,b$+"",c$)
PRINT "Here is x: ";x
PRINT "Here is y: ";y
PRINT "Z is ";z
PRINT a$;b$
INPUT "Would you agree? (y or n)",c$
PRINT "The response to the yes/no was: ";c$
PRINT "End Job."
END

PROCEDURE two
PARAM a:INTEGER
PARAM b:REAL
PARAM c:BOOLEAN
PARAM d$:STRING[20]
PARAM e$:STRING[30]
PARAM f$:STRING[1]
a:=5
b:=1.414
c:=TRUE
d$="Is it a terrible day "
e$="In Chicago, Illinois."
END
```

What do you think the output will be when you run procedure one? What does the (+.0) and (+ "") do in the above procedure one example? How would the output differ if those arguments were taken out? Why did I use different variables in

procedure two than in procedure one? Can I do that? All of these questions can be answered.

The output should read:

```
Here is x: 5
Here is y: 1.2345
Z is TRUE
Is it a terrible day in Sunny California?
Would you agree? (y or n)? [enter anything you want here]
The response to yes/no was: [whatever you entered before]
```

The (+.0) and the (+") are ways to tell BASIC09 that the variable is to be passed by VALUE, so procedure one passes to procedure two, the address of "x", (1.2345), the address of "z", the address of "a\$", ("in Sunny California?"), and the address of "c\$". Since the address of "x" is passed, any modifications to that memory area will effect "x" in procedure one.

The "PARAM a:INTEGER" in procedure two tells BASIC09 to create a variable named "a", but in the same address that is passed to it, (which happens to be the address of variable "x" from procedure one). Since "1.2345" is passed without the address of variable "y", procedure two cannot overwrite what is in the "y" variable's space, so the "PARAM b:REAL" in procedure two creates a new data variable space and stores "1.2345" there.

The address of "z" is passed to procedure two and its state is changed from FALSE, (initialized in procedure one), to TRUE, (set in procedure two),. The same thing is happening with the strings. The address of "a\$" is sent to procedure two and procedure two creates a variable "d\$" with the same address as "a\$" in procedure one. Any assignments made to "d\$" in procedure two will cause procedure one's "a\$" to reflect the change.

However, "b\$" in procedure one it gets passed by value, since the null variable, "", is added to it. It is passed by value because once the, +", is postfixed, the expression, b\$+ "", is looked at as a constant since its value, b\$+ "", can not be changed. Therefore the entire string, "in Sunny California", is passed to "e\$" in procedure two, thus "e\$" is allocated separate memory for that variable and changes made to it are not passed back, causing the line "Is it a terrible day in Sunny California?", to be printed out.

You also need to notice that t passed variable names and the receiving variable names need not be the same. As a matter of fact, when a RUN is issued in a BASIC09 procedure, the variables of the called procedure are completely independent except for the passed variables.

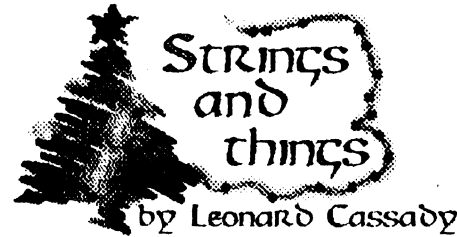
For instance, if you wrote a program called procedure one, and it used a variable called "total sales" and a procedure two used a variable called "total sales", and they were not passed, they are two independent variables and one will not affect the other.

In other words, all variables are LOCAL to their own procedure and ONLY their own procedure. This is called GLOBAL/LOCAL variables. A global variable is one that is accessible to all the procedures in the program, or the variable may be accessed globally. Unfortunately, BASIC09 does not support global variable types. A local variable is only accessible from within the SCOPE of its own procedure.

So much for value and referen passing. In next month's article, I u introduce you to complex data types. I will show you how to make a sim phonebook program utilizing these variables.

Until then...

-Eric Levinson



String Manipulation

One of the advantages of the C language is that it allows the programmer to build specialized functions not built into the language.

The standard functions such "printf", "strcpy", "strlen", and so forth, were built using the C language primitives. The standard function set comprises the minimum tool set the language developers felt were needed. As a programmer, you'll find the need to develop still others functions.

The standard function set includes a small set of portable functions that perform only the most common of string manipulations. Each function works with a sequence of characters that is terminated by a NULL byte, "\0". Actually, C treats all character strings as 'an array of char' which are, by default, internally treated as integer types. If we assume the memory location for the character string "Merry Christmas" to be \$100, the sequence would be stored as:

address	Binary	Hex	Decimal	ASCII
\$100	01001101	4D	77	"M"
\$101	01100101	65	101	"e"
\$102	01110010	72	114	"r"
\$103	01110010	72	114	"r"
\$104	01111001	79	121	"y"
\$105	00100000	20	32	..
\$106	01000011	43	67	"C"
\$107	01101000	68	104	"h"
\$108	01110010	72	114	"r"
\$109	01101001	69	105	"i"
\$10A	01110011	73	115	"s"
\$10B	01110100	74	116	"t"
\$10C	01101101	6D	109	"m"
\$10D	01100001	61	97	"a"
\$10E	01110011	73	115	"s"
\$10F	00000000	00	0	"\0"

Building Blocks

The "strcpy()" function in C is th equivalent of the assignment operator "=", in BASIC. The following BASiC program:

```
10 A$ = "Happy Holidays" 20 PRINT A$
```

requires the "strcpy()" function when translated to C:

```
main()
{ char a[15];
  strcpy( a , "Happy Holidays" );
  printf("%s\n", a); }
```

The char array, "a", is declared to be fifteen sequential bytes and storage is set aside somewhere in memory. The fifteenth byte is automatically set as a NULL byte by the compiler to signal the end of the string, however. Storage must b allocated for the terminating NUL byte, so we declare string "a" the be fifteen bytes in length. The string is now located somewhere in memory and a pointer to the first character in the string is automatically assigned. The "pointer to char" is also placed somewhere in memory and th

NEW DISCOVERIES (CONT)

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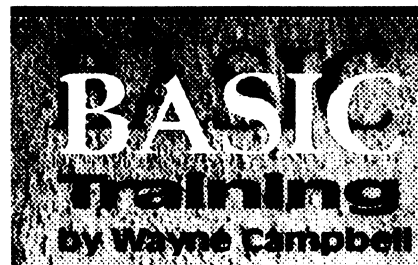
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ItoH (Integer to Hex)

[Editor's note: Wayne Campbell will host this month's BASIC Training. Jim Vestal will return next month.]

For a long time, I've wished I had a function that would return the hex value of an INTEGER value passed to it. Since I started learning C, I decided to write a sub-routine that would let me have such a function, using the itoh() function of C. Then I found out that C doesn't HAVE an itoh() function, neither in the standard library, nor in the Kreider library!

"Well", I surmised, "I guess I'll have to figure it out for myself!" And that's just what I did, and in the language that I'm best with, Basic09! The function is called ItoH. It is simple and straight-forward. There are a couple of notes, however.

Because of the way that parameters are passed by Shell+, there is a PARAM statement that looks for a 6-character string. I found that trying to pass an integer value only worked for positive values between 0 and 32767, as long as it was enclosed in parentheses, "()". Anything greater, or in a negative range, reported a runtime error. I don't use the stock shell anymore, so I don't know how it would deal with the parameter.

I also noticed in Basic09's execution mode, that passing an INTEGER worked, as long as it was in the range of 0 to 32767, or (-32767) to (-1), but it floated 32768, or (-32768), and returned a wrong answer. It WOULD, however, accept (32767

+ 1) or (-32767 - 1) as a parameter and return the correct answer. Doing this from Shell+, however, resulted in an error.

If using it in another procedure, and passing an INTEGER type variable to it, it will accept the variable assigned the value of (-32768), and return the correct answer. (If you assign an INTEGER variable the value (32768), or (-32768), Basic09 floats the value, (displayed as (-32768.), and then fixes the value to an INTEGER).

Run as is from Shell+, ItoH will allow you to use the ranges 0 to 32767, 32768 to 65535, and (-32768) to (-1), as parameters without any parentheses.

I've included, in the source, a PARAM statement that looks for an INTEGER for use in calling ItoH from another procedure.

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To use it, you must take the following steps:

1) Remark or delete the STRING PARAMETER statement:

```
E: *
E: PARAM ival:STRING[6]
E:c/P/( * P
E: ( * PARAM ival:STRING[6]
```

2) Un-remark the INTEGER PARAMETER statement:

```
E:
E: ( * PARAM value:INTEGER
E:c/I/ ( * //
E: PARAM value:INTEGER
```

3) Delete the reference in the DIMENSION statement for the INTEGER variables to the variable 'value':

```
E:s/value
E: DIM index,bit,bit_result,hex_index,
hex_result,value:INTEGER
E:c/,value//
E: DIM index,bit,bit_result,hex_index,
hex_result:INTEGER
```

4) Remark or delete the instruction statement:

```
E:s/value:=
E: value:=FIX(VAL(ival))
E:c/N/( * v
E: ( * value:=FIX(VAL(ival))
```

If you wish to return the string to the calling procedure instead of just printing it, you must take the following steps:

1) Change the DIMENSION statement to the STRING hex to a PARAMETER statement:

```
E: *
E:s/hex:
E: DIM hex:STRING[5]
E:c/DIM/PARAM
E: PARAM hex:STRING[5]
```

2) Remark or delete the PRINT statement:

```
E:s/NT hex
E: PRINT hex
E:c/P/( * P
E: ( * PRINT hex
```

NOTE: You don't HAVE to include the hex symbol, (\$), in the string. If you

wish, you can change the string length to four, (4), and remark or delete the line that adds the hex symbol, (\$), to the string:

```
E: *
E:s/hex:
E: DIM hex:STRING[5]
E:c/5/4
E: DIM hex:STRING[4]
E:s/"$ "
E: hex:="$"+hex
E:c/h/( * h
E: ( * hex:="$"+hex
```

Here's the code:

```
PROCEDURE ItoH
0000 PARAM ival:STRING[6]
000C ( * PARAM value:INTEGER
0022 DIM index,bit,bit_result
,hex_index,hex_result,value
:INTEGER
003D DIM hex_bit:STRING[1]
0049 DIM hex:STRING[5]
0055 ON ERROR GOTO 1
005B value:=FIX(VAL(ival))
0065 hex:=""
006C bit:=1 \ ( * this is the mask
integer for landing the value
00A4 hex_result:=0 \ ( * this is the
value for finding the hex value
(0-15)
00E0 FOR index:=1 TO 15
00F0 bit_result:=LAND(bit,value) \ ( *
check each bit in the value
011A hex_result:=hex_result
+bit_result \ ( * add the result
0137 bit:=bit*2 \ ( * set the mask for
the next bit
0162 ( * is it a complete nybble, or
the 15th bit?
018E IF index=4 OR index=8 OR index
=12 OR index=15 THEN
01AF RESTORE
01B1 ( * get the result down to
between 0 and 15
01DB IF hex_result>4095 THEN
01E8 hex_result:=hex_result/4096
01F4 ENDIF
```

NEW DISCOVERIES

BY JIM VESTAL

WE INTRODUCE THIS NEW COLUMN, THIS MONTH ENTITLED *NEW DISCOVERIES*. IT WILL CONTAIN A BRIEF OVERVIEW OF NEW PRODUCTS, HARDWARE, SOFTWARE (BOTH COMMERCIAL AND SHAREWARE/PUBLIC DOMAIN). IF YOU ARE A VENDOR OR A SOFTWARE AUTHOR AND WOULD LIKE TO SUBMIT A LIST OF NEW PRODUCTS PLEASE SEND A GENERAL DESCRIPTION TO JIM VESTAL C/O THIS MAGAZINE OR VIA INTERNET EMAIL: LOS9UNDER@AOL.COM, DISCOVER@NARNIA.CITRUS.SAC.CA.US OR ZOGSTER@DELPHI.COM

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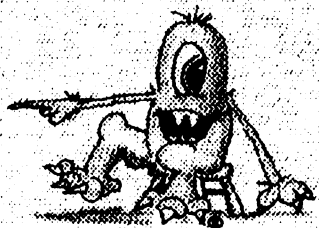
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Under Under It All



(Editor's Column)

by Alan Sholtz (200)

The Polls Are In...

We've received quite a number of responses to our poll, regarding our question of changing the format of the Underground. Proposed, was changing the size of the Underground to 8 1/2" x 11" from it's present size. The responses were overwhelming in favor of keeping the format (and price), just the way it is.

Many of you said you like the smaller size of the Underground, for various reasons. Most, due to cost, some because it fits in your mailbox easier, and a couple because you have a placed them in a binder of that size!

Another question was: *How do you rate the overall quality of the Underground, on a 1 to 10 scale?* Well, we averaged out the responses and it came out to an eight-point-two. Not too shabby!

As Editor, I listen to all complaints and criticisms I get and see what I can do correct them. I think we've done a pretty fair job of that to date. One of the big complaints, (and I totally agree!), is the use of screens or graphics behind a program listing. I promise, I won't do that any more! ☺

New Discoveries...

Our new "What's New" column is compiled by Jim Vestal and will attempt to let you know what new software and hardware products are

available. Both Commercial Shareware or Public Domain material will be covered here.

Any vendor is welcome to send us information or a press release of their product for inclusion in this new column. (Vendors are also welcome to send software/hardware for review) See page 15 for mailing/email address.

The Return of the MM/1

David M. Graham, president of BlackHawk Enterprises, Inc. has just announced that his company has reached an agreement with Interactive Media Systems, Inc., to produce the MM/1 computer and certain MM/1 products (both hardware and software). This is great news for both new prospective buyers and current MM/1 owners alike. Plans are to return the MM/1 to production in early 1994

Sincerely wish David (and BlackHawk) the best of luck on this project.

The 12th Issue

The Underground turns 1 year old next month and with 12 issues under our belt, we're ready to tackle the next 12! I want to thank you all for your support and wish you all the Best for the Holiday Season! See you next month.

01F6	IF hex_result>255 THEN	02D2	(* add it to the string
0202	hex_result:=hex_result/256	02E9	hex:=hex_bit+hex
020E	ENDIF	02F5	hex_result:=0
0210	IF hex_result>15 THEN	02FC	ENDIF
021C	hex_result:=hex_result/16	02FE	NEXT index
0227	ENDIF	0309	(* if the first 2 characters are
0229	(* if the 15th bit, check the		0, remove them
	sign bit	0338	IF LEFT\$(hex,2)="00" THEN
024F	IF index=15 THEN	0349	hex:=RIGHT\$(hex,2)
025B	bit:=-32768.	0354	ENDIF
0267	bit_result:=LAND(bit,value)	0356	(* add the \$ symbol
0273	IF bit_result<>0 THEN	0369	hex:="\$"+hex
027F	hex_result:=hex_result+8	0375	(* print the string
028A	ENDIF	0388	PRINT hex
028C	ENDIF	038D	END
028E	(* read the hex value of the	038F	(* error trap
	nybble	039C	1 PRINT "ERROR #"; ERR
02B1	FOR hex_index:=0 TO	03AC	END "Aborted"
	hex_result	03B7	(* hex value data
02C2	READ hex_bit	03C8	DATA "0","1","2","3","4","5","6"
02C7	NEXT hex_index		,"7","8","9","A","B","C","D","E"
			,"F"



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Writing a Device Driver Part V

By Boisy G. Pitre

[SRC Listing continued from last month]

Figure 3

```

nam ADDrv
ttl RM68030D A/D Driver
.....
* RM68030D1 Analog/Digital Driver
* Written by Boisy G. Pitre

* Edition History
* # date Comments by
* 01 93/05/31 Genesis BGP
* 93/06/02 Added GetStt/PutStt support for
  playing sound BGP

* The following I$GetStt and I$SetStt calls, allow for
* playback/recording variable amounts of data:
SS_Record equ 150 Record function code
SS_Play equ 151 Playback function code

LoopConst equ 110 PIO Loop constant

Edition equ 01 current Edition number
Typ_Lang set (Drvrc<8)+Objc
Attr_Rev set ((ReEnt+SupStat)<<8)+0
psect RMADDrv,Typ_Lang,Attr_Rev,
Edition,0,ADEnt

use defstle

* A/D port offsets
VOut0 equ 0 Left channel output
VOut1 equ 1 Right channel output
Vin0 equ 0 Left channel input
Vin1 equ 1 Right channel input

* Static Storage
vsect
ds.b 1
endsect

.....

* Entry jump table
ADEnt dc.w Init
dc.w Read
dc.w Write
dc.w GetStat
dc.w PutStat
dc.w TrmNat
dc.w 0 Exception handler entry (0=none)
    
```

```

ttl Device routines
.....
* Init
* Initialize A/D Port

* Passed: (a1) = device descriptor address
* (a2) = static storage address
* (a4) = process descriptor ptr
* (a6) = system global data ptr

* Returns: nothing

* Error Return: (cc) = carry set
d1.w = error code

* Destroys: (may destroy d0-d7, a0-a5)

* This routine does the following:
* - clears port to eliminate line noise present
* when the computer is started.

Init:
move.l V_PORT(a2),a0
clr.b (a0) clear the port
clr.w d1
InitExit rts
.....

* Read: Return one byte of input from the A/D port

* Passed: (a1) = Path Descriptor
* (a2) = Static Storage address
* (a4) = current process descriptor
* (a6) = system global ptr

* Returns: (d0.b) = input char

* Error Return: (cc) = carry set
d1.w = error code

* Destroys: a0

Read:
movea.v V_PORT(a2),a0 move address into a0
move.b (a0),d0 read byte into d0
clr.w d1 return SUCCESS
rts
.....

* Write
* Output one character to the A/D port

* Passed: (a1) = Path Descriptor
* (a2) = Static Storage address
* (a4) = current process descriptor ptr
* (a6) = system global data ptr
d0.b = char to write

* Returns: nothing

* Error Return: (cc) = carry set
    
```

The OS9 Underground BBS Listing

Country/ State or Province	BBS Name	Sysop	City	Phone	Max Baud	D-P-S	Hours	Network
Canada, Alberta	Photo Net	Horst Rossmann	Edmonton	(403) 425-6249	2400	8-N-1	24 hrs	STG
Canada, Alberta	So. Alberta Bulletin	Dieter Rossmann	Lethbridge	(403) 329-6438	9600	8-N-1	24 hrs	STG
Canada, N.W. Terr.	Snow Palace	Bob Pennington	Yellowknife	(403) 920-4798	2400	8-N-1	24 hrs	STG
Canada, B.C.	Izini	Wes Gale	Surrey	(604) 589-1660	2400	8-N-1	6p-8a	Fido/STG
Canada, Quebec	The ProSysop	Daniel Cordeau	Montreal	(514) 425-2276	14.4K	8-N-1	24 hrs	Fido
USA, Arizona	Class of 68's	Greg Forseth	Phoenix	(602) 516-9786	14.4K	8-N-1	24 hrs	(Mixed)
USA, Arizona	Coco Bug	Dick Reed	Phoenix	(602) 996-8828	2400	8-N-1	24 hrs	Local
USA, California	Adir Naval	Dean Leiber	Tarzana	(818) 345-2965	2400	8-N-1	8p-8a PST (Thu-Sat)	STG
USA, California	Andromeda	Tom Guzman	Orange	(714) 545-5156	2400	8-N-1	24 hrs	RCIS
USA, California	Narnia	Jim Vestal	Marysville	(916) 743-4264	2400	8-N-1	12a-8a	STG
USA, California	Night Gallery	John Powers	El Monte	(818) 448-8529	2400	8-N-1	24 hrs	STG/Usenet
USA, California	Zog's Cavern	Alan Sheltra	Toluca Lake	(818) 769-1938	9600	8-N-1	24 hrs	Usenet
USA, Florida	Applied OS9	Paul Fitch	Wintersprings	(407) 327-6346	2400	8-N-1	24 hrs	Fido
USA, Florida	Nobody's Home	Scott Proctor	Ocala	(904) 245-6585	2400	8-N-1	24 hrs	STG
USA, Illinois	Glenside Cocorama	Dave Barnes	Lake Villa	(708) 587-9837	9600	8-N-1	24 hrs	(Local)
USA, Illinois	Glenside Cup-of-Coco	Tony Podraza	Carpentersville	(708) 428-0436	2400	8-N-1	24 hrs	FIDO
USA, Minnesota	TCv3	Paul Jerkatis	Chicago	(612) 646-6593	14.4K	8-N-1	24 hrs.	Usenet
USA, New Jersey	RCIS HQ	Bob Brose	Twin Cities	(201) 967-1061	14.4K	8-N-1	24 hrs	Internet
USA, Oklahoma	The Kingdom	Steve Rottinger	New Milford	(405) 233-3866	14.4K	8-N-1	24 hrs	RCIS/Usenet
USA, Pennsylvania	The Astral Plane	Mike Guzzi	Waverly	(717) 586-2771	9600	8-N-1	24 hrs	Earthnet/WWW
Australia	OZ-OS9	Rod Holden	Brisbane	+61 7 2009870	2400	8-N-1	24 hrs	Fido
Netherlands, GD	* (Name unknown)	Peter Turehars	Leende	+31 4906 2883	2400	8-N-1	8p-10:30p AEST	Fido
	*Interested people contact: Peter Turehars@mail:ospeter@stack.urf:ue.nl			Phone: +31 4906 1971				STG V4



Background Graphics

Dear Editor,
Please reduce the number of "Background Graphics" in your magazine. It makes reading the articles and programs much more difficult.

-Paul M. Fitch, Jr.
Winter Springs, FL

Paul, I couldn't agree with you more. Everytime I have tried to use screens or background graphics behind a program listing, it looks fine on the original, but looks terrible after it gets to the press. As you can see, I have stayed away from using them behind program listings (and articles) starting with last month's issue.

Attaboys...

Dear Editor,
I just recieved issue number 11, yesterday (11/1/93). Nice looking issue!

-Howard Luckey
Park Forest, IL

Dear Editor,
Alan, long time no talk. Glad to see the Publication is getting better with every issue! Keep it up!

-Terry K. Laraway
Bremerton, WA

Dear Editor,
Your magazine is looking great! Keep up the good work!!!

-Ray Watts
Niantic, CT

Dear Editor,
BTW the Underground looks GREAT! My only regret when I get it is that I have to wait for the next issue to get more... Can't we get them daily??? ☺

-Carl Boll
[Email via Delphi]

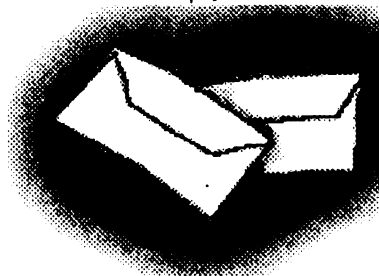
Doesn't Want Higher Pricing...

[In response to poll regarding higher price for larger format]
I want to support as many CoCo/OS9 vendors/magazines as I can. If prices go up, I will have to make a choice as to which information source to drop. I'd rather spend that money on subscribing to a 4th magazine.

-Malcolm Cleveland
Lansing, MI

Malcolm, one of the main reasons for the poll was to see what the readership wanted. While not all the poll results are yet in, the vast majority I have recieved, want me to stay with the smaller (and more economical) size the magazine is at now. I am listening to all of you!

FOR INFORMATION ON HOW TO REACH THE EDITOR, SEE PAGE 15. USE OUR EMAIL ADDRESSES AND GET IT THERE FASTER!



```

*      d1.w = error code
Write:
  movea V_PORT(a2),a0 move address into a0
  move.b d0,(a0) write byte into port
  clr.w d1 return SUCCESS
  rts
.....
* GetStat: get device status
* Passed: (a1) = Path Descriptor
          (a2) = Static Storage address
          (a4) = process descriptor
          (a5) = caller's register stack ptr
          (a6) = system global data ptr
          d0.w = status call function code
* Returns: varies with function code
* Error Return: (cc) = carry set
              d1.w = error code
* SS_Record parameters:
  * a0.l = Pointer to buffer
  * d0.w = Path number (unused)
  * d1.w = Function code
  * d2.l = Buffer size
  * d3.w = Sampling delay
GetStat:
  cmpi.w #SS_Record,d0 is it the record option?
  bne.s Unknown no, exit w/ error
  move.l R$d3(a5),d2 move sample rate into d2.l
  divu.w #LoopConst,d2 divide by loop constant
  and.l #$FFFF,d2 throw away upper 16 bits
  movea R$a0(a5),a0 move caller's a0 (buff ptr) into a0
  movea V_PORT(a2),a3 move base A/D address into a3
  RecLoop move.b VOut0(a3),(a0)+ move byte into
          (a0) and increment
          move.w d2,d1 move computed driver delay into d1
  RecDelay sub.l w #1,d1 subtract 1 from delay value
  bne.s RecDelay
  sub.l #1,R$d2(a5)
  bhs.s RecLoop subtract 1 from buffer size
  clr.w d1 return SUCCESS
  rts return to caller
Unknown: move.w #E$UnkSvc,d1 Unknown service
          code
  ori.b #Carry,ccr return Carry set
  GetSta99: rts
.....
* PutStat: set device status
* Passed: (a1) = Path Descriptor
          (a2) = Static Storage address
          (a4) = process descriptor
          (a5) = caller's register stack ptr
          (a6) = system global data ptr
          d0.w = status call function code

```

```

* Returns: varies with function code
* Error Return: (cc) = carry set
              d1.w = error code
* SS_Play parameters:
  * a0.l = Pointer to buffer
  * d0.w = Path number (unused)
  * d1.w = Function code
  * d2.l = Buffer size
  * d3.w = Sample rate
PutStat:
  cmpi.w #SS_Play,d0 is it the play option?
  bne.s PutStat10 no, check next possibility
  move.l R$d3(a5),d2 move sample rate into d2.l
  divu.w #LoopConst,d2 divide by loop constant
  and.l #$FFFF,d2 throw away upper 16 bits
  movea R$a0(a5),a0 move buffer ptr into a0
  movea V_PORT(a2),a3 move base A/D address into a3
  PlayLoop move.b (a0)+,VOut0(a3) move byte into chan-
          nel 0
          move.b (a0)+,VOut1(a3) move byte into channel 1
          move.w d2,d1 move computed driver delay into d1
  PlayDelay sub.l w #1,d1 subtract 1 from d1
  bne.s PlayDelay loop if not zero
  sub.l #2,R$d2(a5) subtract 2 from buffer size
  bpl.s PlayLoop branch if buffer > -1
  PutStatOK clr.w d1 return SUCCESS
  PutSta99: rts
* Dummy functions to appease the kernel
PutStat10 cmpi.w #SS_Open,d0 check for Open
          beq.s PutStatOK
          cmpi.w #SS_Release,d0 check for Release
          beq.s PutStatOK
          cmpi.w #SS_Close,d0 check for Close
          beq.s PutStatOK
          bra.s Unknown
.....
* TrmNat: Terminate A/D processing
* Passed: (a1) = device descriptor pointer
          (a2) = static storage
          (a4) = current process descriptor ptr
          (a6) = system global data ptr
* Returns: none
* Error Return: (cc) = carry set
              d1.w = error code
TrmNat: clr.w d1 return SUCCESS
          rts
          ends

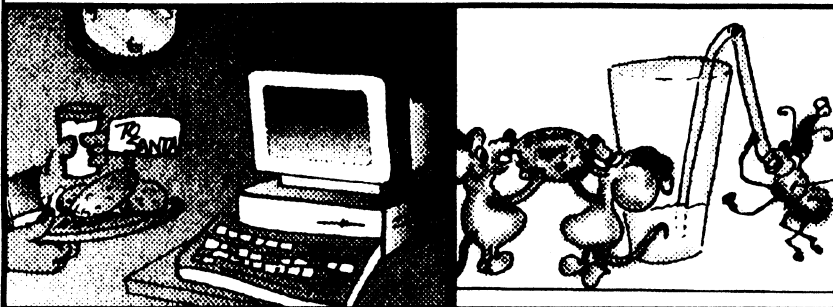
```



-Boisy Pitre

Shell Game

by Alan Sheltra



'Twas the night before Christmas, and all through Smedley's flat, not a creature was stirring, 'cept the roaches and rats.'

Next Month...
Our Anniversary Issue!

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The "International" OS9 Underground® Magazine

Volume 1, Issue 12

The "International" OS9 Underground® Magazine

Dedicated to OS-9/OSK Users Everywhere

Volume 1, Issue 12
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