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Q. I installed an Altos UPS onto my 2086-386 upgraded 386. The UPS immediately blew a fuse. I don't believe that the UPS is necessarily bad. Anything else that I should check?

A. On an upgraded 2086, the main power supply is not an auto switching supply. The voltage being fed into the computer from the UPS is 240V DC. Also, the hard disk modules' power supply may not be auto switching.

Q. I have a 2086-386, upgraded to a 16 mhz 386 CPU with (2) UK-190 hard disks. The price of the UK-190 is much higher than a UK-170 meg, and I don't need the extra 20 meg storage. Can I use the 170 instead of the 190 meg hard disk?

A. The UK-170 is an ESDI drive. The UK-190 uses the ST-506 interface. They have a different number of sectors per track as well as other major differences with the interface. Also, the backplane on your 2086 was probably an ST-506 backplane which also would not support ESDI.

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Q. Here I sit with (3) 190 meg hard disks in my 2086 and a 60 meg tape drive. This is driving me crazy with all the tapes I'm using. Is there an alternative to the 60 meg tape? Will the 150 meg tape drive for a 2000 work?

A. No. The 150 meg tape drive for a Series 2000 will not work. The 150 meg tape uses the SCSI interface, and this is not available for use on a 2086 (or 1086, 3086 or 3068, for that matter). A 150 meg tape drive is available (just recently) that will work. It will work on all models currently using the 60 meg tape, including the 686T and 986T, which is nice if you have multiple hard drives or a 190 meg disk.

Q. How many megabytes of memory can I install in my 886?

A. The 886 has 1 meg of memory on the CPU, but you can install 2 additional (1) meg boards for a total of 3 megabytes.

Q. My question on the Series 500 involves the 8 port Comm Bd. I understand the Series 500 is capable of running SCO XENIX, but I cannot make my 8 port board work. Any tricks?

A. No tricks. It just doesn't work. To utilize 8 ports under SCO, you must remove the Altos board and install a board that includes SCO drivers (if it's an intelligent board).

Q. My Series 1000 has started giving me "Out of C-List" messages on the console, and my system locks up. I reloaded the operating system, but this didn't help. What area of the hardware should I look at - the CPU?

A. If you have a modem attached to a Serial port, this is your problem. Disable all of the echoing and responses coming from the modem. Even go so far as to disable the port when not in use.

Q. I recently formatted my hard disk on my 986T with my SDX diagnostic disk. I had one question come up that I did not know the answer to: "Do you want CRC error checking instead of ECC?" I guessed and said "No." It appears to work okay. Was that the right answer?

A. Yes.

Q. I have a customer who wants to use a modem on his 1086. I believe that I have it wired correctly (I used the diagram in the 1086 operator's guide), but, when I have it connected, that port seems to attempt to login over and over even though I have not phoned into the modem. When I do call in, I can never get a login prompt.

A. First of all, I can tell from your description that you do have the port configured as a login port. Make sure it is the correct baud rate. Odds are that the modem you are using is Hayes compatible. You must disable all of the echo command functions of the modem. When you connect it to the Altos, the 1086 is issuing a login prompt, which the modem is echoing back, so the Altos is requesting a password, and so on forever.

Continued from page 1 . . .

I find certain resistance amongst some resellers to place the same value on their efforts as their clients are willing to place on them. When I examine the amounts that businesses will spend on an effort to computerize, many times unsuccessfully, and at what is at stake for the business, I am convinced that the only important issue is whether the system works when completed. It would seem important that we develop skills to sell systems at a high enough price that we can afford to stay with them until they are functioning. A personal preference is to identify the requirements to the client early in the game and insure that he understands the importance of what he is doing and why he is going to pay large amounts of money to achieve his goals.

Another conviction of mine is that add-on sales should be VERY profitable. One of the advantages of our systems is that they are expandable. Once they have a system up and working, why should we throw away the profits on add-on sales? The client surely would be aware of the variation on Parkinson's Law (data expands to fill all available space), so they should be prepped from day one that they will probably need more memory, more hard disk, and that if, they don't buy it up front, they will someday want a tape drive. Generally, they have saved money by waiting to buy (price curves, etc.); so, when they need the space, the speed, or the convenience, they should be ready to "belly up to the bar" with the big boys. Assuming, of course, that we have sold them somewhat near right in the first place.

In my experience, I have not met a reseller who can run a profitable business, provide a high level of support and do it while selling \$1,000 PC's. We need to understand why our equipment is superior, add the value that we are charging the client for, and make no concessions to anything that isn't a "real" computer. In sales, we call it a Believable Story (BS).

March, 1988

While sitting here gazing out the window at a beautiful spring day, the thought occurred to me that it is always nice on Maui. That thought sequence prompted me to go back to my recurring theme of maintaining profitability. During the past few weeks, we have been selling the remnants of an Altos distributor's inventory, and I felt that some of the buyers might have used a more profitable approach.

Whenever we get the opportunity to buy something at a savings, we go for it - but we rarely sell it at a savings. We quote our prospects off our highest likely costs (use Micro America's price book) because we sell the systems based upon other qualities other than low price. When we have the order in hand, we set out to fill it with the lowest cost goods possible.

This may seem on the surface to be a bit mercenary, but it accomplishes two missions. First, it improves our margins (which always seem too low on system sales), and, secondly, it protects our clients from being sold something that isn't the best choice for them just because I got a "deal" on it.

Our normal approach is to get the order, then locate the lowest cost hardware to fill the order, and then find the latest version software to complete the package. We are less concerned about hardware versions as they do not normally impact much on the performance of the system. We do like to start with the most recent software, because improvements do happen in the software arena.

During our liquidation, we wanted to be fair to everyone, so we advertised that we couldn't "hold" the hardware. This approach would fit our needs, because we would have a sale in-hand and then be looking for the hardware. I was surprised by some dealers who were trying to use the prices to close sales. The most obvious pitfall to this approach is the risk of someone buying the item(s) before your client says "Yes". How do you honor the "low" price if you can't get the special?

A secondary trap is getting into price concessions as a sales tool. I honestly feel that we lose more sales (at least of the ones we want to make) by being too low priced. How can we possibly deliver quality hardware and support for half the price of IBM. Obviously, we can't in the minds of some customers, because they still get Big Blue a part of the time.

I guess it still comes down to establishing "value" by some yardstick other than cost price. We encourage using something more akin to what it will do for a business, and what we add to the package in terms of on-going support. If we really accomplish this sales job, I may wind up in a little cottage on the lee-ward side of Maui someday — enjoying a view out the window that is always pretty near to this spring day.

June, 1988

Darn, I didn't win the \$5 million dollar prize in the Iowa Lottery - I suppose it was because I didn't buy a ticket. We had all of our extra dollars tied up in computer parts, and it seems to me they are a better bet.

In a conversation with Jerry Carpenter, he made the comment that "if dealers knew how much money could be made in service, they might quit selling". Jerry may have a valid point as our experience with service revenue has been very positive. It seems that not everyone enjoys this area; so, I thought that a little time spent in discussion of this service potential might be useful.

Care and feeding of computers is a vital part of our business. We sell numerous systems where the only promise we make is that if it breaks, we will fix it. The user makes his own arrangements for software either with his CPA or with a vertical software marketer. We support it through the operating system and almost all have service contracts.

We price our contracts at 10% or retail (or 16% of cost), and we normally include all of the system components including cables. An average contract runs \$2,500, and they must be paid in advance. The use of the revenue for substantial portions of the year is an important facet of the program.

If you look at the worst possible system failure (the disk drive module) P1 cost is about \$1,800. There is no way that a hard disk is going to fail every year, so the contract is going to develop gross profit - the only question is how much. Our records indicate that exchange parts consume about 33% of the contract revenue.

You do have the overhead of technical people and their training and related costs, but once you reach an appropriate level of contracts per technician (probably about 25 to 40 systems), this cost becomes quite reasonable. Without allowing any benefit for the use of the funds, I think the service contracts produce double digit before tax profits, and we can use a lot of that.

Sometimes I get the impression dealers have difficulties dealing with service because it is a "problem" related business. That has never bothered us, because we are "problem solvers". We tell end users that they are going to have problems when they start out, but not to worry, we will be there when we are needed. We schedule preventative maintenance calls, so they see us regularly even if the machine doesn't break.

We find a way to make money even if the customer opts for time and material billing. The most important thing for an end user to understand is that a repair bill doesn't cover everything that could be wrong with the system. Just because we find a bad drive, doesn't mean that the controller isn't bad also. They pay us for whatever we do - period.

I suppose the key parts of our approach include a recognition that the system is a valuable part of the business it serves and that quality service is worth what it costs. We are going to be here when we are needed, and that doesn't make me feel at all guilty about the prices we charge.

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THE SOFTWARE EXCHANGE

July, 1987

Shell Programming (Part II of a Series)

Two features of shell programming which are frequently misunderstood are shell variables and the quoting of command line arguments. Shell variables will be discussed in the next issue. Quoting of command line arguments is outlined below.

A good working definition of quoting arguments is to prevent the usual interpretation of special characters by the shell.

For example, consider the following commands:

```
echo one two three
echo "one two three"
```

The first command has three arguments, the second consists of one argument containing embedded spaces. In neither case are the quotation marks passed to the program.

There are three methods of quoting command line arguments: the reverse slash (\), the apostrophe (') and the double quote ("). The reverse slash tells the shell to ignore the special meaning of the following character. The apostrophe indicates that the special meaning of all up to the following apostrophe will be ignored, allowing characters such as the dollar sign, asterik and brackets to be included in an argument. The double quote functions similarly, except that variable substitution is still allowed (i.e. the dollar sign still has its special meaning within double quotes). The entire string between apostrophes or double quotes is considered to be one argument.

Some examples would help to illustrate the usage of command quoting. Perhaps future issues will contain some.

Technology Strikes

The incompatibility between computer programming languages and most typesetting equipment has become painfully apparent. The **pick** program which appeared in the last issue of **Altogether** originally contained the output redirection character on line 4 and the input redirection character on line 10. If you can not determine the exact placement of the redirection characters on these lines, you would probably not use the program anyway.

Starting with this issue, programs and program fragments appearing in this column will no longer be typeset. We apologize for any inconvenience these typesetting problems have caused.

If the Software Exchange column in this issue contains any typesetting errors, the next installment will be hand written!

Reader Feedback

We have reproduced several letters from our readers. They are reproduced below in their entirety.

"Greetings:

While this is not a true program, maybe this will help others who wish to have some program or other task run in background and therefore not tie up the terminal. Since we do a great deal of work over a modem and do not have other workstations available to us, we have made an entry in /usr/lib/crontab of a script that executes a program which can be varied as needed. The last line in the program copies a null file to the program script to prevent it from being exe-

cuted again in the time frame we have determined to best fit our needs for a particular client.

Hope this idea might help others."

Joyce Ann Jaillite, Qualitech Computer Center, K.C.

Dear Sir (or Madam, "or whatever),

I apologize for not sending this earlier. I got bogged down in other projects, but if I had known that the field of competition was going to be so small, I would have made it a much bigger priority. Anyway, please enter this shell script in your next Software Exchange contest. It is being offered in the public domain, so print at will.

The program is designed to take care of the housekeeping details that arise after sending unwanted stuff to the print spooler, like a 900 page report or something. It will remove all of the files from the print spool, kill the daemon process, and take a lot of typing out of the user's hands. Full instructions are included with the shell script listing.

I really like the concept of ALTOGETHER, in particular the idea of an exchange forum for software developers. I intend to send in a few more goodies in the future, so I hope the column will continue to be available.

Jack H. Evans
Professional Computer Integrators

```
1  ::::::::::::::::::::::::::::::::::::::::::::
2  : Determine which directory contains the spooled files
3  ::::::::::::::::::::::::::::::::::::::::::::
4  if test -z "$1"
5  then
6      SPFILES="/usr/spool/lpd/*"
7  else
8      SPFILES="/usr/spool/lpd$1/*"
9  fi
10
11 ::::::::::::::::::::::::::::::::::::::::::::
12 : Find the process ID numbers of the spooler daemon
13 ::::::::::::::::::::::::::::::::::::::::::::
14 a='ps -e | grep lpd | cut -c0-7'
15
16 ::::::::::::::::::::::::::::::::::::::::::::
17 : Kill the spooler daemon(s), if they exist
18 ::::::::::::::::::::::::::::::::::::::::::::
19 if test `n $a`
20 then
21     kill -9 $a
22 fi
23
24
25 ::::::::::::::::::::::::::::::::::::::::::::
26 : Remove any files on the spool
27 ::::::::::::::::::::::::::::::::::::::::::::
28 rm -f $SPFILES
```

This shell script is designed to clean up the print spooler after sending an unwanted report. The first step is to physically turn off the printer, so that no more characters will be printed. After this, normally the files on the spool would have to be removed and the daemon process would have to be killed. By using this shell program, the entire process becomes very simple.

The program is invoked as follows: While logged in as root, type

```
unspool <RETURN>
```

to clear the spool for the default printer. Printer one would be cleared by typing

```
unspool 1 <RETURN>
Select the option Print Letter from the Follow Up
```

and so on for additional printers.

Lines 1-9 sets a variable to be the names of the files in the appropriate spool directory. Note the use of the wild card '*' to name all files in the directory.

Lines 11-14 determine the process ID number(s) of any process running with the name 'lpd', which is the daemon controlling printing. This will also stop any other printers currently running (although it will not delete their files). If other printers are running, they should be allowed to finish printing before this program is run.

Lines 16-22 actually stop the programs found, if any. Lines 25-28 then remove the files from the spool, and the program terminates.

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586T	- 40, 80	2500+	2000+
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686T	- 50	3000+	2500+
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THE SOFTWARE EXCHANGE

October, 1988

Altos System V Print Spooling

One of the most useful changes encountered in moving from XENIX System III to Altos System V (or XENIX System V) is the new print spooler, lp. The new spooler introduces the concept of "interface files". Interface files are typically shell scripts (although executable binaries may also be used) through which all output to a specified printer is passed. Note that it is possible to have several names associated with a single physical device. The primary use of this feature is to select one of several available capabilities of the printer. For example: when using an Epson-compatible printer, you may wish to select between 10 and 12 characters per inch and between draft and correspondence quality printing. The number of options available increases greatly on LaserJet-compatible printers and is nearly infinite on Postscript-based output devices.

In the next issue of **Altogether** we will provide listings for interface files for several of the most popular printers. If you have implemented a nonstandard printer, send us your listing, and we will publish it. If you have a specialized printing application that you wish to have implemented, let us know, and we will consider implementing your application as an example of specialized interface files.

The Mythology of AdLANtes

The AdLANtes product looked reasonably good at the Altos service class in August. As part of the training, we ordered the AdLANtes product (which was to be delivered at the end of class). As of this time, we have not received the product. We have also been unable to find anyone at Altos who can tell us when it will be shipped. We have called Altos Education, Logistics and Operations. As a reseller, it is very difficult to sell a product which will be available at some unspecified time in the future.

Having seen AdLANtes in August, it seems possible that the product may indeed exist. Another possibility is that the two AdLANtes boards used for the class are the only two in existence. Or it is possible that the Altos training department has become extremely adept at the use of the two most common marketing tools used by vendors: smoke and mirrors. We will keep you apprised of the future events (if any).

We will present a comprehensive review of the product when (and if) we ever receive one.

Stay Tuned . . .

We just received an Altos 500 and will be presenting an overview in our next issue.

As always, we encourage readers to write in and let us know what your experience has been with Altos products. We particularly appreciate hearing about problems encountered and/or creative uses of standard software.

If you are submitting a shell script or C program for publication, we would appreciate receiving this in machine readable format (preferably Altos format).

Thank you for your support.

Whoops . . . Duke Goofed!

The following programs were submitted by one of our friends in the dealer community — but — the name got separated from the programs! Let us know who you are, and we'll give you full credit in the next issue . . .

Shell Program "Check"

This is a shell program "check" that we wrote to monitor a modem port on an Altos 986 for its usage.

After a minute of idle time, a message is sent to the port to notify the user. If they continue working, nothing will be done; if not their processes will be killed and the modem disconnected.

I used a C program to disconnect the modem, and I have included a copy of it also.

This program is set to monitor only port tty4 and could be modified to be more flexible on which port is monitored.

```
while true.
do
    x=`finscr | awk '( if($3 == "4") {
                                print 1
                                exit } )'^
    if test $x. -eq 1.
    then
        con=1
    else
        con=0
    fi
#
    echo "con = " $con
    if test $con -eq 1
    then
        c=`finscr | awk '(if($3 == "4" && $4 > 0 && NF == 6)
                                print $4
                                else
                                if($3 == "4" && $4 < 1 && NF == 6)
                                print 0
                                else
                                if($3 == "4" && NF == 5)
                                print 0)'^
        if test $c. -ne . -a $con -eq 1
        then
#
            echo "giving them one more minute"
            echo "\007" > /dev/tty4
            echo " <<< You have been idle for more than 1
                minute >>> " > /dev/t
            echo " <<< Please continue working, or we will
                disconnect the line
                sleep 60
            fi
#
            echo "starting to check "
            x=`finscr | awk '(if($3 == "4" && $4 > 1 && NF == 6)
                                print $4)'^
#
            echo "x = " $x
            if test $x. -ne .
            then
#
                echo "starting to kill process"
                rm -f /usr/osi/accu/TIME.BI
                if test $con = 1
                then
                    rm -f /usr/osi/accu/LOGIN.BI
                    echo "Disconnecting Your Modem --- You have
                        exhausted your idle time"
                fi
                y=`ps -t tty4 | awk '(if(NR != 1) print $1)'^
#
                echo "process to kill " $y
                for x in $y
                do
                    if test $x -ne $$
                    then
                        kill -9 $x &
                    fi
                done
                y=`ps -elf | awk '( if($13 == "4") {
                                print $4
                                exit } )'^
                kill -9 $y
                mset /dev/tty4
                (sleep 2);hansup /dev/tty4
                echo "all done killing process"
            fi
#
            echo "going back to sleep"
            sleep 60
done
```

To Disconnect the Modem

```
#include <stdio.h>
#include <signal.h>
#include <fcntl.h>
#include <sys/types.h>
#include <sys/ioctl.h>
#include <termio.h>

#define SAME 0
char *setup = "M1 F1 DT";
struct termio term;
int baudrate;
char buffer[80];
int alrmint();

main(argc,argv)
```

Continued on page 7 . . .

Continued from page 6...

```

int areq;
char *arev[];
{
    FILE *fdr,*fdw;
    int fd,i;
    if((fd=open(arev[1],O_RDWR|O_NDELAY)) < 0) {
        fprintf(stderr,"dial: Can't Open device %s
                for reading. \n",arev[1]);
        exit(-1);
    }
    baudrate = B1200;
    /*
     * Set line for no echo and specific speed
     */
    ioctl(fd, TCGETA, &term);
    term.c_cflag &= ~CBAUD;
    term.c_cflag |= CLOCAL|HUPCL;baudrate;
    term.c_lflag &= ~ECHO;
    term.c_cc[VMIN] = 1;
    term.c_cc[VTIME] = 0;
    ioctl(fd, TCSETA, &term);
    fcntl(fd, F_SETFL, fcntl(fd, F_GETFL, 0) & ~O_NDELAY);
    if(((fdr=fopen(arev[1],"r")) == (char *) NULL)) {
        fprintf(stderr, "dial: Can't open device: %s for
                reading. \n", arev[1]);
        exit(-1);
    }
    if ((fdw=fopen(arev[1],"w")) == (char *) NULL) {
        fprintf(stderr, "dial: Can't open device: %s for
                writing. \n", arev[1]);
        exit(-1);
    }
    /*
     * Setup for timeout in 10 seconds if no response
     */
    signal(SIGALRM, alrmint);
    alarm(0);
    fprintf(fdw,"+++");
    fflush(fdw);
    system("sleep 5");
    fprintf(fdw,"ATH\r");
}
/*
 * turn off CLOCAL now, since we want modem interrupts to work
 * setup alarm. (Longer timeout period for longer number);
*/
alarm((4*strlen(arev[2]))+5);
again:
    exit(0);
}
alrmint()
{
    exit(-1);
}

```

November, 1988

Update on AdLANtes

We've just received AdLANtes from one of our distributors (we're still waiting for the fine folks at Altos to call us and let us know when the product will be available). We do not yet have the system assembled and running, so the review will be postponed until next month. Apparently, distributors now are stocking the complete AdLANtes product. We have been informed that the Series 2000 server board will NOT work with currently available TCU's in a multidrop configuration. This capability will require an updated ROM in the TCU - to be available from Altos at some (unspecified) future date.

Series 500: First Impressions

The Altos Series 500 seems to be a thoroughly competent and price competitive piece of hardware. There were no major problems getting it up and running under either Altos System V or SCO XENIX. Altos is currently including Altos System V at no extra charge with each 500 purchased, which gives it a definite price advantage over other systems for which a generic UNIX (e.g. SCO or Microport) must be purchased.

It would be nice to see Altos follow the lead of SCO and provide a support for a wider range of peripherals (particularly hard disks, controllers, and intelligent serial

cards). The current limitation of 8 users under Altos V can also be a severe handicap when competing with SCO systems running 16 or 24 users. Even customers who do not currently need that many users like to see that there is an upgrade path available for them. No one likes to buy a "dead end" piece of hardware.

System V Print Spooling

Altos System V print spooling allows a single printer to be configured under several different names, each with different attributes. The example given below demonstrates a possible setup for an Epson LQ printer. By using different destination names, the user can select a draft or letter quality output, number of lines on an 11 inch page, and the style of printing (standard, compressed or expanded). There are no restrictions on the names to be used for the printers, but it is usually best to use names which reflect either the print attributes used, or the ultimate purpose for which the printer is intended.

For the example, we use the following format for printer names:

Character 1:	"d" if printer is used in draft mode "h" if printer is used in high-quality mode
Characters 2-3:	"66" for 66 lines per page "88" for 88 lines per page
Characters 4-last:	"std" for standard print "comp" for compressed print "exp" for expanded print

Thus, there are twelve logical names associated with the one physical device.

For example, the command

```
lp -dh88comp/etc/passwd
```

would print the password file at 8 lines per inch, in high-quality, compressed print.

To set up the required files for this configuration, the following steps should be followed:

1. Set up each printer using the "lpinit" program (you must specify the port to which the printer is attached, the printer model, and whether or not this is to be the default printer.)

You should generally choose a printer model which is as close as possible to the one desired, and then make any necessary modifications. For this example, we use the model "dumb" (no special printer attributes).

2. Modify the interface files. These reside in directory /usr/spool/lp/interface. Generally, you will only need to modify the initialization data. The contents of the twelve interface files used in the example are shown below.

It should be noted that there are no restrictions on the manipulations which can be performed in the interface file. Possible applications would be converting numeric data to a graph, multi-column print, etc.

Let me know what applications you develop using interface files. Those of general application will be published in this column.

```

d66comp
# Epson LQ printer interface file (d66comp);
# Draft mode, 66 lines per page, compressed mode
#
printer='baucname 50'
request=51
name=52
title=53
copies=54
options=55
shift; shift; shift; shift; shift
shly Ixon IxoLL 0<61
# send the file(s) to the standard out. Copies: 1 time
while [ "$copies" -gt 0 ]
do

```

Continued on page 8...

Continued from page 7...

```

        for file
        do
            echo -n "\033@033\062\033x0\033\017"
            cat "$file" 2>&1
            echo "\f\c"
        done
        copien="expr $copies - 1"
    done
    exit 0
}

d66exp

# Epson LQ printer interface program (d66exp);
# Draft mode, 66 lines per page, expanded
#
printer='basename $0'
request=$1
name=$2
title=$3
copies=$4
options=$5
shift; shift; shift; shift; shift
stty ixon ixoff 0<&1

# send the file(s) to the standard out $copies times
while [ "$copies" -gt 0 ]
do
    for file
    do
        echo -n "\033@033\062\033x0\033\017"
        cat "$file" 2>&1
        echo "\f\c"
    done
    copien="expr $copies - 1"
done
exit 0
}

d66std

# Epson LQ printer interface program (d66std);
# Draft mode, 66 lines per page, standard print
#
printer='basename $0'
request=$1
name=$2
title=$3
copies=$4
options=$5
shift; shift; shift; shift; shift
stty ixon ixoff 0<&1

# send the file(s) to the standard out $copies times
while [ "$copies" -gt 0 ]
do
    for file
    do
        echo -n "\033@033\062\033x0"
        cat "$file" 2>&1
        echo "\f\c"
    done
    copien="expr $copies - 1"
done
exit 0
}

```

February, 1989

Use of Multiple File System Under UNIX or XENIX

Some of the most frequently heard questions about UNIX concern the use of multiple file systems (multiple physical volumes, usually hard disks). The UNIX file system provides a method of handling multiple file systems which is integrated with the standard file system. UNIX does not provide any means of making multiple physical volumes appear to the user as a single logical volume. This restriction has two significant consequences: no single file may be larger than the physical volume on which it resides, and some additional system administration effort is necessary to determine on which physical volume files are to be placed. The user (or system administrator) always determines the placement of files. **WHEN A VOLUME IS FULL, ANY OPERATION WHICH ATTEMPTS TO EXPAND OR CREATE A FILE WILL FAIL.**

The Mechanics of Multiple File Systems

Additional file system volumes are created using the **layout** and **mkfs** utilities. Because these commands are somewhat cryptic and subject to significant changes between operating system releases, Altos provides a shell script **add.hd** which automates the process. This script performs the following functions:

1. Prepare the disk for use (checking for bad blocks, etc.)

2. Create an empty file system on the volume. During this process, the user may be asked for the number of inodes to allocate on the device. The number of inodes represents the maximum number of files which can be stored on the volume. In the vast majority of cases, the default value is adequate.
3. Mount the file system. Mounting a file system means establishing a one-to-one relationship between the device file for the device on which the file system resides and an existing directory in the root file system. This relation is dynamic - it may be broken and re-established as required by the operation of the system. In most cases, the volume will be mounted during the process of going to multiuser operation, and will remain intact until the machine is shut down.
4. Modify the procedures which are executed when going multiuser so that the additional physical volume is mounted when the system goes multiuser. By default, the first add-on volume is mounted as **/usr2** and the second add-on volume as **/usr3**. This is only a convention. Additional volumes can be mounted on any desired directory. The directories **/**, **/bin**, **/etc**, **/lib**, **/tmp**, and **/usr/bin** are used during the startup procedures before any volumes are mounted; therefore, these directories should never be used to mount points for additional file systems.

Use of Additional File Systems

There are three common methods for placing directories and files on an add-on volume: configuring the applications programs to look to the appropriate directory names (e.g. **/usr2/dirname/datafile**), creating user directories on the add-on volume (when specifying the home directory for a new user, select **/usr2/smith** rather than **/usr/smith**), and using the symbolic link facility. Symbolic links allow the operating system to create an alias for a name on the add-on volume. This method essentially fools the applications programs into believing that a file or directory is on the root volume when it really is on the add-on volume.

Using Symbolic Links

Symbolic links are created using the **-s** option of the **ln** command. For example, if a program's data files are to be placed on an add-on drive, and the program requires the data to exist in the directory **/usr/screwball**, the following command will create the necessary symbolic link:

```
ln -s /usr2/progdata/screwball /usr/screwball
```

Functionally, this command tells the operating system that any reference to the name **/usr2/screwball** should be interpreted as a reference to the name **/usr2/progdata/screwball**. This interpretation is completely transparent to any program referencing this name. Symbolic links are created as permanent parts of the file system and are preserved over shutdowns and startups.

Moving existing directories from the root file system to an add-on file system consists of three steps:

1. Create a new directory on the add-on drive.
2. Move files to the add-on drive.
3. Delete the directory from the root drive, and create a reference to the add-on drive.

For example, to move the directory from: **/usr/jones** to **/usr2/jones**, the following steps could be used.

1. **mkdir /usr2/jones**
2. **cd /usr/jones**
3. **tar cf - .profile * | (cd /usr2/jones; tar xvf -)**

Continued on page 10...

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Altos to Link UNIX Terminals, DOS Stations

by Will McClatchy

September, 1987

SAN JOSE, CA - Altos Computer Systems revealed plans last week to introduce a family of software and hardware products to connect multiuser UNIX terminals with networked MS-DOS workstations.

The products, whose names Altos officials declined to reveal, will allow the 80386-based Altos Series 2000 to serve as a DOS network server in addition to its present ability to control multiple terminals running under both DOS and the UNIX environment. With the new products, the Series 2000 multiuser machine will have the capability to link users with network gateways running under communications protocols such as SNA (Systems Network Architecture) or X.25, according to Russ Aldrich, director of systems software at the company.

To complement the Series 2000's new capabilities, Altos will also introduce in the first quarter of next year an 80286-based workstation, said Jeff Bork, vice president of product-marketing planning at Altos. The as-yet-un-named machine will be demonstrated this November at Comdex/Fall in Las Vegas, Mr. Bork said. A diskless version of the machine booting from the server, as well as a floppy drive version will be offered, he said.

Altos recently announced an agreement to merge the XENIX and UNIX operating environments in a joint development effort with Microsoft Corp. of Redmond, Wash., and Locus Computing Corp. of Santa Monica, Calif., as well as an intent to offer the ability to run DOS and software written for DOS, as a task under UNIX.

Mr. Bork added that Altos, a major supplier of XENIX-based multiuser supermicrocomputer systems, will join Microsoft in several weeks to specify in greater detail the merging of XENIX and UNIX.

The heart of the hardware connections in the new Altos system will be a Series 2000 add-in board, said Russ Aldrich, director of systems software at the company. "This board is the future of all our communications products," Mr. Aldrich said.

Available in Early '88

Likely to be priced between \$350 and \$450 and available in the first quarter of 1988, the board connects between 32 and 64 dumb terminals running AT&T's new UNIX System V version 5.3 and DOS, two wide-area communications ports supporting separate protocols such as SNA or X.25, and an Ethernet port for thick or thin coaxial cables.

Altos officials said the firm will bundle the operating system and networking software with the hardware upon its release.

A typical configuration might be a Series 2000 computer supporting 30 to 40 users performing a variety of tasks with a range of machines, according to Mr. Aldrich. Such a system might act as a server for a standard NetBIOS network connecting a dozen or more PC's.

In addition, the Series 2000 will allow users to transparently access files on two other local area networks with a standard gateway connection. Mr. Aldrich claimed that files may be transferred between the operating systems with ease. "You no longer have a kludgey connection," he said.

Software Exchange continued from page 8 . . .

4. `cd /usr2/jones`

5. Use a text editor to change the entry for **jones** in **etc/passwd** to specify **/usr2/jones** as the home directory.

When moving programs and data files rather than user directories, only the last step differs. If possible, it is best to specify the actual pathname to programs. For example, if programs reference **/usr/database**, move the directory to **/usr2** and change the program to reference **/usr2/database**. If this is not possible, create a symbolic link as follows:

```
In -s /usr2/database /usr/database
```

This allows programs to reference file names in the root directory to access files on the add-on drive. The **"-L"** option of the **ls** command will display symbolic link information.

So You Want to Be a Salesman . . .

March, 1989

One of the neat things about editorial license is that you can write about anything you want. (It's possible that no one will read it - but you still get to write it.) This time I think pricing or value added is the topic. A question that pops up every now and then is, "What is the list on that?" or "What should that sell for?" Recently, while working on product documentation and the best way of doing the work, I arrived at some conclusions that may be useful in answering these questions.

If we take one of our products, a storage module, for example, we can attempt to define the value that is added by the dealer. Some treat it as a "quick and dirty" sale and wind up at a pretty low margin. Done right, it isn't very quick, but it can be much more profitable.

The proper steps to install the module start with knowing the condition of the system when you begin the process. It takes about twenty minutes to run the system confidence tests, but, if there is a problem uncovered, they can't blame your technician.

Next you should know the condition of the file system on the drive(s). Both dump and tar will sometimes gloss over problems that can be very serious. Running **fsck** only takes a couple of minutes per drive, but it is excellent insurance against being blamed for a pre-existing "gliche".

Not too many technicians take the time to do this, but the next logical step is a system backup. This should be a tar format backup of the entire file system. There are occasions when a new module either creates a problem or uncovers an existing one when installed. Better safe than sorry.

The actual physical installation is quick and dirty and most technicians can waltz through it with little trouble. When completed, one then has to contend with putting the additional file space to use. This is definitely not automatic and may require a software technician to properly complete. As a rule, any backup scripts must also be updated to include the new information in the backup process. If they don't have a consistent backup process, this is definitely a good time to teach them.

What we have outlined here may take a couple of hours to accomplish, but it has raised the product to a much more professional level. The system and its data have been certified as being correct. The "state of the system" has been saved, and the new product has been integrated. Best of all, the key operator has been re-indoctrinated in the backup procedure, and you probably won't be back the next day working out problems.

Putting a price tag on professionalism isn't easy, but if you let the user know up front that this is the value you add (and then add it), price may turn out to be less important than you thought.

More from Dr. Albert . . .

Q. Can I transfer Data Files from my SCO XENIX machine to my Series 2000?

A. The easiest way is with tape. Use tar with a blocking size of 20, and the Series 2000 can read these tapes. (I'm referring to 60 meg Streamers - i.e., Archive, Wangtek, etc.) The floppy drives are also compatible; they are both 1.2 meg. And you can also cable them together and transfer with UUCP which is very slow.

Q. Recently I had a problem restoring from a hard disk failure, which gave me doubts about the reliability of the "archive" ("dump.hd") tape produced on an Altos 1086/2086. The problem ran as follows:

- Customer machine locked up during normal operation.
- Reboot failed with error message: "error on dev hd(0/2) block=5176 cmd=002C status=0040".
- Booting from SDX diskette, I scanned the hard disk for bad sectors. Two were found; one was on the bad sector table, one was not. Unlisted sector was added to the list, disk rescanned for double-check, bad sector list showed both sectors.
- Reboot failed with error message: "error on dev hd(0/2) block=5176 cmd=0003 status=0080".
- Attempted to restore from archive. Archive showed "error writing to block 5168", but completed restoration.
- On booting from hard disk, however, a number of errors

displayed after the kernel and comm board loaded, such as "cannot open/usr" and "cannot access/etc/dicodes". System failed to boot and run.

- Altos technical support:
The first person I spoke with (who identified himself as a "supervisor") said:
"The archive should work fine. The only reason it might not have restored properly is if you didn't really add the new bad sector to the table; because the program reads the bad sector list before it starts to restore. It is restoring logical sectors, not physical sectors."
I was then transferred to a normal tech rep, who said:
"Restoring from an archive after adding new bad sectors to a disk drive is usually safe, but if the bad sector is in a critical place, the resulting restoration may not work. That's why I always make two kinds of backups: an "archive" and a "tar" backup. This is true for both XENIX 3.3 and 3.4."

My question: Is this really true? Is an archive tape unreliable if new bad sectors have been added? Is the user notified anywhere of this in Altos documentation?

In the meantime, I am making "two kinds of backups".

- A.** I do believe that your restore would have gone as planned if, after sparing out the bad sector, you would re-install XENIX onto the hard disk before attempting the restore. This is to let XENIX spare out the new bad sector. Use dump.hd whenever programs are added or changed, but use tar to backup data daily. When using XENIX 3.4, a capital 'V' option will do a byte by byte verify. However, it does slow you down by a factor of 2 to 3 times.

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More from Dr. Albert . . .

Q. Will the Series 1000 tape format be compatible with the Series 2000 and 286 Altos tar format?

A. A Series 1000 will read Series 2000 and 286 Altos tar format, but not write compatible tapes. File transfer both directions is only possible on floppy disks.

Q. I just received my first Series 1000. The one I ordered was 4 megabytes of memory which I found was shipped on expansion cards instead of on the main CPU. Wouldn't it be better and easier to ship these with the memory on the main board and leave the expansion slots open?

A. This was a marketing decision by Altos to let the dealers have more flexibility when selling a machine. Sell only as much memory as necessary. The Series 1000 can still be expanded to 24 megabytes, which is all the system can support currently. At some future date it will be able to use 28 meg.

Q. On an old Altos 580 running the Oasis operating system, I have a three user system. They are all doing word processing. It has recently become extremely slow. Is there anything I can check?

A. I had to call Dr. Albert in Tibet and interrupt the yak round-up (at least that's where he told me that he was going!) for an answer to this one. Your disk directory is over full. The Oasis operating system defaults to 1000 directory entries. You must backup, reformat with a size of 2000, and recover your disks.

Q. Which computer is faster - the Altos 586 or the Altos 886? I know that the 586 runs at 10 mhz and the 886 at 7.5 mhz.

A. They are close in performance with the 886 being the faster. The other advantages are the ability to add up to 2 additional megabytes of memory to avoid swapping and the ability to use a math co-processor.

Q. I recently installed a Series 2000. I am networking this system to a 1086. These systems are quite a distance apart - about 3500 feet - and I can't get them to connect up. Any insight?

A. The worknet that Altos uses is RS422. You cannot exceed 1500 feet without a repeater, or two, in your case. Dealer cost per repeater is about \$500 each.

Q. When I boot my Series 1000 from the root floppy disk, it always gives me a bad read error, but continues on to boot. Is my floppy or drive bad?

A. Neither. The floppy is written in high density, and the Series 1000 is trying to load the standard Altos format. When it can't read standard format, it will report an error, but then try the high speed in order to boot.

Q. I am trying to check the voltage out of my power supply, and I have disconnected all of the cables to insure that I do not damage my computer. I get no voltage out, yet if I connect up the hard disk drive, it spins up. Do I need this hooked up for a good ground or what?

A. The power supply used is a switching power supply. Until a switching power supply has excessive current draw or at least a minimum current draw, it does not put out any voltage. You must check the supply output under load. In a case where you suspect bad power supply, you may have to replace the unit as your best test.

Q. When reading the dump.hd script on my 1086, I notice it backs up /dev/rhd0b. Shouldn't it back up /dev/rhd0a to get the entire disk?

A. No. /dev/rhd0a would back up the drive configuration and bad sector information. If your hard disk developed a bad sector or if the drive had to be replaced, you would not want bad sectors to be restored onto the drive from the backup. Of if you replaced the drive with a drive with different heads and cylinders, it would not work.

Q. I received my first Altos 500 with a 70 Mb hard disk. I noticed it was using a Priam V160A. Isn't that a 40 Mb hard disk?

A. Yes. I contacted Priam and was informed by tech support that it is an MFM drive and not an RLL. They said that some people were using it with RLL encoding to get 70 Mb - at their own risk! I suggest that frequent backups be made when using that drive.

Q. I have a new 5407XST. I am installing my Altos System V, ver. 5.3 XASO and the root disk locks when booting from the floppy. I've replaced the floppy and also used the same root disk to boot on other Series 500's. Do I need a new Mother Board?

A. No, you need ver. 5.3 ASI, API or higher operating system. Western Digital changed the floppy controller chip, requiring Altos to update the operating system.

Q. I installed the Altos UPS to my 3068, and, when I power on the computer, it blows the fuse on the UPS. I have the 340 watt power supply, and the computer works when plugged into the wall. Is my UPS bad?

A. Not necessarily. The UPS outputs 240V DC. The 340 watt Power Supply autoswitches to 240V, but the hard drive modules may not. If you do not have supplies manufactured by Brown, you can make them work by rejumping the Power Supplies to 220/240V.

Q. Can I install a 380 meg ESDI hard disk on my 3086? It has ESDI with a 170 meg hard disk as my main drive.

A. Yes. A 380 meg hard disk can be installed as a second or third drive only. It does require XENIX 3.4bs5 upgrade. This also applies to 1086's and 2086's.

Altos in the News

SAN JOSE, CA., FEBRUARY 9, 1988. Altos Computer Systems today announced the Advanced Local Area Network Telecommunications System (AdLANtes), a family of hardware and software communications products that integrates UNIX-based multiuser systems and Microsoft MS-DOS based personal computers in a flexible network incorporating a variety of industry-standard communications capabilities.

The AdLANtes products provide combined Wide Area Networking (WAN) Local Area Networking (LAN), terminal communications and multiple concurrent Wide Area Network sessions between the UNIX-based Altos host system and DOS based PC, PC compatible or UNIX-based terminal applications.

The Altos AdLANtes products allow UNIX-based Altos multiuser host machines to become true DOS resource servers. IBM PC's, PC compatibles or terminals on the AdLANtes network can use Altos host-based files and directories, printers, disks and modems which are available to the network as local DOS resources.

The Altos AdLANtes Product Family

At the heart of the product family is the **Advanced Communications Processor Attachment (ACPA)**. This single board, intelligent communications/network processor subsystem provides WAN, ethernet LAN and Altos Multidrop terminal connectivity capabilities on the Altos multiuser system executing the Altos System V (UNIX V.3 compatible) operating system. ACPA supports the Multidrop interface with up to 64 locally attached asynchronous devices via a single cable link. Also, there are two on-board synchronous ports that allow up to two wide area network protocols to function simultaneously. The ethernet subsystem has its own local Random Access Memory for buffering and protocol storage, and both the standard 15-pin interface and BNC "Cheapernet" connection.

The **ACPA/PC** is a semi-intelligent communications subsystem that provides a Cheapernet ethernet connection. The ACPA/PC uses the international Standards Organization (ISO) protocol stack as its networking protocols. The ACPA/PC subsystem resides in one 8-bit or 8/16 bit PC card slot within IBM PC XT's, AT's or PC compatibles running DOS 3.3 or higher.

The **Altos AdLANtes/DOS Server** is Altos host-based software which allows DOS-based PC's and compatibles to view, copy, create, modify, execute, rename and move any UNIX host files and share those files with other DOS or UNIX machines on the AdLANtes network. DOS users share a disk on the Altos host as though it is "locally" attached. Altos System V users may also manage DOS files as though they were created by the Altos System V operating system.

Altos AdLANtes/Remote File Sharing (RFS) Software allows other UNIX hosts connected to the Altos AdLANtes network equipped with ACPA and running RFS to share files, directories and peripheral devices.

Altos Wide Area Networking Developers Kit is software that allows development of customized network programs using the Altos ACPA network engine. The package includes a loadable STREAMS driver based on UNIX V.3 specifications and Transport Level Interface (TLI) libraries for applications development and documentation creation.

The **Altos AdLANtes Network Protocol Services** are software modules that are downloaded to the ACPA subsystem by the operating system and are responsible for transmitting/receiving the network packets across the ethernet media.

Greater UNIX Connectivity

"The Altos AdLANtes products raise the level of UNIX connectivity. The system provides a low-cost, easy to install, easy to use solution that integrates existing personal workstations with powerful UNIX-based multiuser systems, providing truly flexible information services," said Russ Aldrich, Altos director of systems marketing.

"Our strategy has been to unite the environment of PC's, personal workstations, terminals and synchronous data communications into a single, modular product family while incorporating industry standard technology and providing ease of access to UNIX and DOS applications," continued Mr. Aldrich.

All network users are provided with centralized resources available through the Altos host system. Large capacity disk drives, high-speed printers, modems and plotters can be used to archive entire AdLANtes workstation file systems.

A single network host can be configured to provide centralized network administration for all other hosts on the network. Or, individual mini-networks can be configured with their own hosts, eliminating the need for logging into each host to both allow and restrict resource access on a host by host and/or user by user basis. This provides a high degree of flexibility and freedom to set up each host's view of the network.

"The AdLANtes product family will satisfy the needs of Altos resellers in all distribution channels," said Sam Spadafora, Altos senior vice president of sales and marketing. Because of its flexibility, distributors, value-added resellers, OEMs and systems integrators can provide their customers with a complete, cost effective network solution. AdLANtes links the power of UNIX-based multiuser systems with the personal productivity applications of DOS-based PC's and compatibles in almost any business environment. These products move Altos into a new era of providing our customers with host communications and comprehensive networking solutions.

Pricing and Availability

The Altos Advanced Communications Processor Attachment (ACPA) is priced at less than \$2500; ACPA/PC is priced at less than \$500; AdLANtes/RFS and AdLANtes/DOS are priced at \$800; AdLANtes/PC is priced at less than \$250. All of these products will be available in May, 1988.

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- 11 - Group tag option makes restoring or archiving files for a "group" id possible
- 12 - Restore SCO in 20 minutes with lone-tar CRASH RECOVERY SYSTEM
- 13 - Maintains log files of all archives, restores, verifications, etc.
- 14 - Non-destructive restore option prevents clobbering existing files
- 15 - Archives device files (/dev), empty directories, named pipes, etc.
- 16 - Vol # checking on restore prevents restoring out of sequence
- 17 - Can except file name to archive or restore through a pipe (!)
- 18 - 33% faster to verify & restore than any other utilities
- 19 - Dual sequential device backup with automatic switching
- 20 - Will notify you if file changes size during backup
- 21 - Supports Inclusion & Exclusion file lists
- 22 - Master & Incremental Backup capability
- 23 - Hardware/Software system independent
- 24 - Large Blocking for increased speed
- 25 - True Data Verification mode
- 26 - Data compression mode

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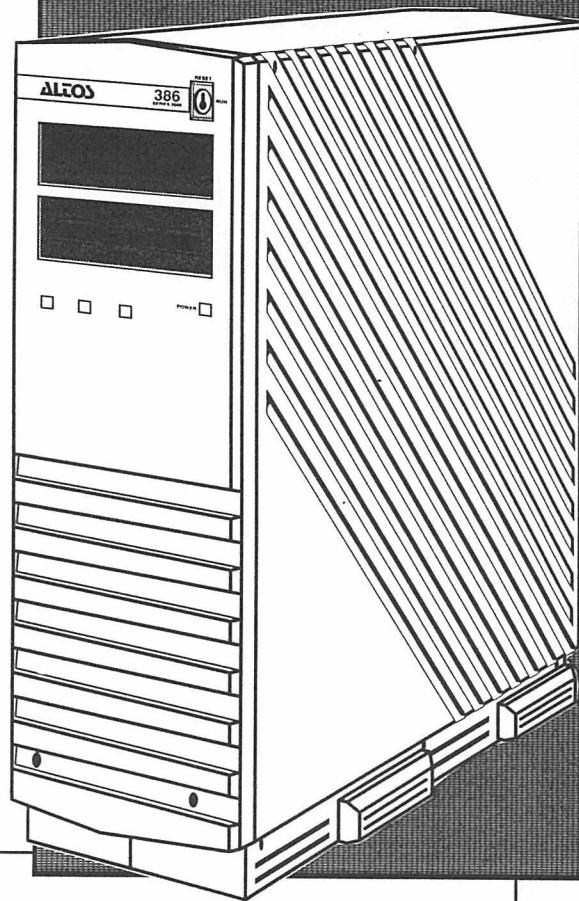
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LETTERS TO THE EDITOR

August, 1989

January, 1989

Dear Altogether,

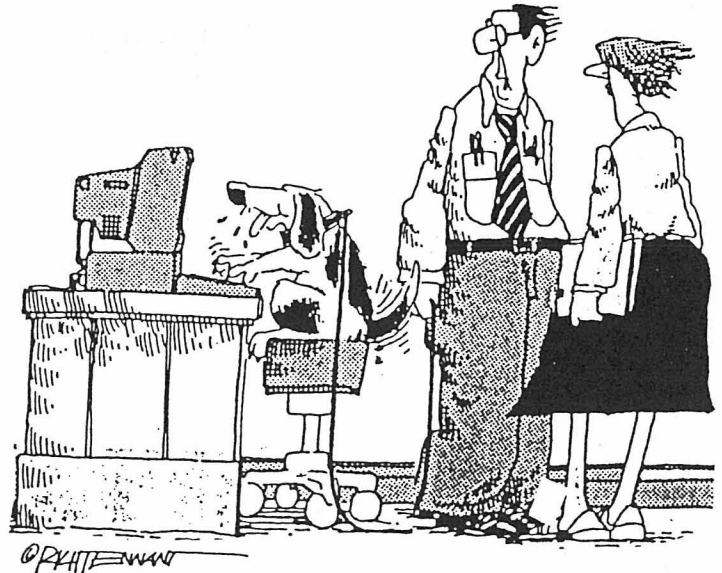
Thanks for all the good tips in the Altogether News. I thought it most interesting to learn that the "70" Mb drive for the Series 500 is really a 40 Mb Priam MFM unit force fed with RLL encoding (sort of like granny used to do to the Christmas goose).

Users of the Series 500 who keep only two or three generations (or fewer) of tape backups may discover to their horror that some data and programs have suffered "dropout" or other errors and that all their backups are corrupt. The solution is to make daily backups Monday thru Friday. Each Monday, take Friday's tape home and replace it with a fresh Friday tape. Keep taking the Friday tapes home until there are four of them. Then, take the oldest Friday tape back to work the next Monday.

If **crontab** is running an after-hours auto-backup of some sort, the User should be sure the backup did not abort due to a Hard Drive error. Since the Series 500 is a relatively new machine, we can expect that there will be more than the usual number of UNIX upgrade releases. For this reason, I recommend to Users that only **tar** backups be made; never any tape of "image" backup (i.e., any type of backup from which an individual file or a specific sub-directory cannot be extracted). Even with **tar**, the User must avoid backing up any "system" utilities (especially /unix and /bin★) which would tend to "undo" the upgrade if the entire backup tape were later to be restored.

Thanks again!

Daniel R. Martin, Data Base Management Services



"Naaaah - he's not that smart. He won't back up his hard disk, forgets to consistently name his files, and drools all over the keyboard."

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