THE MISOSYS QUARTERLY

Look at what is in this issue:

Volume VII.i **$10** **Winter92/93**

PRICE LIST for TMQ Subscribers - effective Jan 1, 1993

TRS-80 Software (Items on Closeout)

Product Nomenclature	Mod III	Mod 4	Price S&H
AFM: Auto File Manager data base	P-50-310	n/a	$10.00 D
BackRest for hard drives	P-12-244	P-12-244	$10.00
BASIC/S Compiler System	P-20-010	n/a	$10.00 B
BSORT / BSORT4	L-32-200	L-32-210	$5.00
CP/M (MM) Hard Disk Drivers		**H-MM-???**	**$10.00 B**
CON80Z / PRO-CON80Z.	M-30-033	M-31-033	$5.00
diskDISK / LS-diskDISK	L-35-211	L-35-212	$10.00
DoubleDuty		M-02-231	$25.00
DSM51 / DSM4	L-35-204	L-35-205	$10.005
DSMBLR / PRO-DUCE	M-30-053	M-31-053	$10.00
EDAS / PRO-CREATE	M-20-082	M-21-082	$10.00 D
EnhComp / PRO-EnhComp Diskette	M-20-072	M-21-072	$23.98
Filters: Combined I & II	L-32-053	n/a	$5.00 B
GO:Maintenance	n/a	M-33-100	$15.00 B
GO:System Enhancement	n/a	M-33-200	$15.00 B
GO:Utility	n/a	M-33-300	$15.00 B
Hardware Interface Kit	n/a	M-12-110	$5.00
HartFORTH/PRO-HartFORTH	M-20-071	M-21-071	$10.00 B
LDOS 5.3.1 Mod1 Upgrade kit	M-10-133	n/a	$20.00 B
LDOS 5.3.1 Mod3 Upgrade Kit	M-10-333	same	$20.00 B
LS-DOS 6.3.1 Upgrade Kit - M4	n/a	M-11-043	$20.00 B
LS-DOS 6.3.1 Upgrade kit - M2/12/16		M-11-002	$25.00 B
LED / LS-LED	L-30-020	L-30-021	$5.00
LS-Host/Term	n/a	L-35-281	$10.00
LS-UTILITY	n/a	L-32-150	$10.00
MC / PRO-MC	M-20-064	M-21-064	$79.95 D
Mister ED	n/a	M-51-028	$10.00 B
MRAS / PRO-MRAS	M-20-083	M-21-083	$30.00 D
PowerDot (Epson or Tandy)	P-32-21?	n/a	$5.00
PowerDraw	P-32-220	n/a	$5.00
PowerDriver Plus (Epson).	P-50-200	P-50-200	$5.00
PowerMail Plus	P-50-003	P-50-004	$15.00 D
PowerMail Plus TextMerge	P-50-100	P-50-100	$5.00
PowerScript	P-50-142	P-50-142	$10.00 B
PRO-WAM	n/a	M-51-025	$50.00 D
PRO-WAM Toolkit	n/a	M-51-225	$15.00 B
QuizMaster	L-51-500	n/a	$5.00
RATFOR-M4		M-21-073	$10.00 D
SuperUtilityPlus	P-32-132	P-32-104	$15.00 D
Supreme HD Driver (PowerSoft-RS)	P-12-113	P-12-113	$15.00
TBA / LS-TBA	L-21-010	L-21-011	$5.00 D
THE SOURCE 3-Volume Set	n/a	L-60-020	$10.00 D
Toolbox/Toolbelt	P-32-203	P-32-245	$10.00 B
UNREL-T80	same	M-30-054	$5.00
UTILITY-I	L-32-070	n/a	$5.00
XLR8er Software Interface Kit (M3 mode)		M-12-X10	$5.00 B

TRS-80 Software

DISK NOTES from TMQ (per issue)			$10.00
HDPACK: Disk De-fragger	**n/a**	**M-33-400**	**$29.95**
LB Data Manager-M4 (Ver 2.2)	n/a	M-50-510	$99.00 D
LDOS/LSDOS Reference Manual	M-40-060	M-40-060	$30.00 B
LDOS/LSDOS BASIC Reference Manual	M-40-061	M-40-061	$25.00 A
LDOS 5.3.1 Diskette - M1	M-10-110	n/a	$15.00
LDOS 5.3.1 Diskette - M3	M-10-130		$15.00
LS-DOS 6.3.1 Diskette - M4	n/a	M-11-243	$15.00
RSHARD - R/S HD driver	M-12-013	same	$15.00

TRS-80 Game Programs (Items on Closeout)

Cornsoft Group Game Disk: Bouncezoids, Crazy Painter, Frogger, Scarfman, Space Castle (M3)	M-55-GCA	$20.00
Kim Watt's Hits (M3)	P-55-GKW	$9.95
Lair of the Dragon (M3/M4)	M-55-021	$10.00
Lance Miklus' Hits (M3)	P-55-GLM	$15.00
Leo Cristopherson's (M3)	P-55-GLC	$10.00
The Gobbling Box (M3/M4)	M-55-020	$10.00

MSDOS Game Programs

Lair of the Dragon	M-86-021	$10.00

Hardware ("*" indicates Closeout)

*Power Supply, 40WT Astec AC8151	H-PS-A40	$40.00	D
*Power Supply, 68WT Astec AA12310	H-PS-A68	$50.00	D
*Floppy Disk Controller M3/M4	H-MM-FDC	$35.00	F
*Double Density Controller (DDC) M1	H-MM-DDC	$40.00	F
*RS232 Serial Card M3/M4	H-MM-SPC	$40.00	F
*RS232 Serial Card Kit M3/M4	H-MM-SPK	$45.00	F
*TeleTrends TT512P modem (M4P)	H-4P-512	$49.95	E
Floppy drives (5.25" 360K 1/2 ht)	H-FD-360	$75.00	D
Floppy drives (3.5" 720K 1/2 ht)	H-FD-720	$85.00	B
*Floppy Drive Case (2-1/2 ht drives)	H-FD-2SV	$30.00	F
MSCSI HD, 20Meg M3/M4	H-HD-020	$395.00	?
MSCSI HD, 40Meg M3/M4	H-HD-040	$495.00	?
MSCSI Hard Drive joystick port option	H-HD-JSO	$20.00	
MSCSI Hard Drive hardware clock option	H-HD-RTC	$20.00	
Aerocomp HD - 20 Meg M3/M4	H-MM-020	$350.00	?
Aerocomp HD - 40 Meg M3/M4	H-MM-040	$450.00	?
Hard drive: Seagate ST225 (20M)	R-HD-020	$200.00	G
Hard drive: Seagate ST251-1 (40M)	R-HD-040	$300.00	G
Hard drive: Seagate ST-351AX (IDE)	R-HD-I40	$195.00	G
*Cable: dual floppy extender	H-FD-2EX	$10.00	
Cable: 4Ft floppy (1 34EDC each end)	H-FD-C04	$12.50	
*Cable: 4Ft M3/M4 printer	H-RC-PM4	$20.00	
Cable: 4Ft Radio Shack hard drive	H-HD-CT4	$20.00	
Cable: 4Ft MISOSYS hard drive	H-HD-C04	$20.00	
Cable: 26-1069 internal floppy	H-FD-2NG	$20.00	
Cable: 26-1069A/26-1080 internal floppy	H-FD-2GA	$20.00	
Cable: 26-1080/A internal floppy	H-FD-24P	$20.00	
*Standby Power System: 200VA	R-PS-200	$150.00	?
*HD Controller: Adaptec 4010A	H-HD-CA4	$45.00	D
*HD Controller: Xebec S1421A	H-HD-CX2	$45.00	D
*HD Controller: WD1002S-SHD	H-HD-CW2	$45.00	D
T80 to SCSI host adaptor	H-HD-MHA	$75.00	D
ZOFAX 96/24 Fax/Modem (PC XT/AT)	R-Z1-FAX	$125.00	G
*Infochip Systems Expanz! (PC)	R-IC-EXP	$99.00	G
DJ10 Tape Backup (PC)	R-TD-D10	$199.00	G
DJ20 Tape Backup (PC)	R-TD-D20	$265.00	G
AB11 Tape Adaptor (PC)	R-TD-A11	$45.00	D
KE10 External tape adaptor/case (PC)	R-TD-K10	$110.00	F
Tadiran TL-5296 AT 6V lithium battery	R-PB-TL6	$19.95	B

MSDOS Software ("*" Indicates Closeout)

LB Data Manager 2.3	M-86-510	$99.00 D
DED-86 [Disk/Memory sector editor]	M-86-020	$29.95 D
*RATFOR-86	M-86-073	$10.00 D
*HartFORTH-86	M-86-071	$10.005 D
*SAID-86 [Text Editor]	M-86-040	$15.00
Super Utility PC	P-86-407	$29.95 B
TRSCROSS (transfer <> Mod III/4	P-86-212	$89.95 B
*FM-86 (File Manager)	L-86-050	$10.00
*Lair of the Dragon	M-86-021	$10.00

The Fine Print

Freight codes: A = $3.50; B = $4.00; C = $4.50; D = $5.00; E = $5.50; F = $6.00; G = $7.00; H = $12.00; ? = varies; All unmarked are $3.00 each; Canada/Mexico add $1 per order; Foreign use US rates times 3 for air shipment. Virginia residents add 4.5% sales tax. We accept MasterCard and VISA; Checks must be drawn on a US bank. COD's are cash, money order, or certified check; add $4 for COD.

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subscription rate information

Each issue of TMQ has information on MISOSYS products, programs and utilities, patches, significant messages from our CompuServe forum, and articles on programming. Not only that, TMQ will keep you up to date with information, news, and announcements concerning our entire product line and related machine environments. Subscription cost varies by rate zone as follows:

A = $25; United States via 3rd class bulk mail
B = $30; Canada, Mexico, via 1st Class
C = $32; Colombia, Venezuela, Central America via AO Air
D = $35; South America, Europe, & North Africa via AO Air
E = $40; Asia, Australia, Africa, Middle East via AO Air

TMQ Toolbox

The MISOSYS Quarterly is published using the following facilities:

The hardware used to produce the "camera ready" copy consists of an AST Premium/386 computer (20 MHz) with 9 Megabytes of RAM, a Seagate ST4096 80M HD, ST251 40M, Expanz! card; a CMS DJ10 tape backup, a NEC Multisync II monitor driven by a Video Seven VGA card, an AST TurboScan scanner (Microtek MS300), and a NEC LC-890 PostScript laser printer.

Text is developed, edited, spell-checked, and draft formatted using Microsoft WINWORD Version 1.1; Submissions on paper and letters are scanned and converted to text using ReadRight optical character recognition software by OCR Systems. Final page composition is developed using PageMaker 4.0 by Aldus.

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TMQ Appearance

Just when you were ready to accept TMQ's appearance, here I've gone and changed it again. As subscription levels continue to shrink, and as I've gotten terribly dismayed at having to throw out all the extra copies of previous issues, I have moved total control of TMQ's publication in-house. TMQ is now being printed on our in-house copier. It is also being bound in our new GBC thermal binding machine. In this way, I can control the duplication of copies to exactly what is needed. There's no more waste of an excessive print run winding up in the landfill.

I also will no longer be making back issues of TMQ available; however, I will be making re-prints of articles available. There will soon be a complete index of TMQ content available. The index will list the number of pages included in each re-print; a standard fee per page will prevail. This index will be available in three forms:

- A bound printed copy - fee to be determined;
- An LB Database file set on floppy disk - fee to be determined;
- An LB Database file set available for download from our CompuServe Forum (as long as the forum remains available).

It is expected that the index covering TMQ Volumes I through VI will be available by late January 1993.

The Blurb

by Roy Soltoff

Points to Ponder

SBT Corp., a software-consulting firm, has coined a new term which should add headaches to work-place businesses as well as home-based businesses using computers. I'm referring to the *futz* factor. Futzing relates to the wasted time spent by computer users playing or tinkering with their computers. According to SBT, futzing includes striving for perfection, playing with fonts, re-doing projects, and most likely, getting into computer games on business time.

But as we waste more time on computers, the hardware continues to add features. For instance, Sejin-America and Home Row announced a new 101-key PC keyboard which incorporates Home Row's J-Mouse. This non-traditional mouse is fabricated with resistive pressure sensors located beneath the "J" key (hence it's name). By depressing the key and pushing it in any of the four directions, software converts the pressure changes to mouse movements.

Early versions of the J-Mouse are already being used on Everex and Leading Edge notebook computers.

Turning away from computers, here's something to cure the never-find-a-parking-spot parking blues. Mazda came up with a prototype one-passenger vehicle that folds into a suitcase; the suitcase is essentially the body of the vehicle. Power comes from a one-cylinder, 1.7 horsepower engine. Top speed is a scant 12 mph. However, options include such creature comforts as an AM/FM stereo cassette radio as well as a 3.3 inch TV. There's something to keep you occupied while you avoid being run over on the freeway. Then again, some of the roads here in the D.C. area run at less than 12 MPH during rush hour - an oxymoron if ever I saw one!

Talking about driving, there's been a lot of recent developments in the drive business - disk, that is. Toshiba introduced a 3.5" hard drive with 1.2 gigabytes of capacity. List priced at $2395, the MK-538FB includes a SCSI-2 controller and consumes only 10 watts.

IBM, on the other hand, which is struggling to stay at the top of the heap in the computer marketplace, introduced a 2 gigabyte 3.5" hard drive. It is also bundling two of these drives together into a 5.25" frame to offer 4 gigs of storage. That's known as the *Allicat* package.

Coming down in size, Aura's 1.8" 126 megabyte 19 ms drive should be in production soon. These drives use the PCMCIA-standard interface, an interface currently seeing a lot of action .

Seagate also has a new series of 1.8" drives with 40, 65, and 80 megabyte capacities. The 65 megger consumes only 1.3 watts in read/write mode, 0.13 watts in standby, and a scant 0.09 watts in sleep mode.

Now why aren't hard drives usable on the TRS-80 coming down in price? That's because very few manufacturers are building any more MFM drives - the ones typically used on the older machines. I attended a presentation by Seagate Technology recently and was amazed as to their projections on the shift in drive size.

Right now, their shipments of 3.5" hard drives exceed the shipment of 5.25" drives. And 2.5" drives will overtake the 3.5" ones in a few years.

Seagate has also discontinued many of the older drives. The only MFM drives still in production at Seagate are the ST225 (20MB), the ST251 (40MB), and ST4096 (80MB). All 3.5" MFM drives are discontinued. Even the SCSI-1 and early IDE drives are out of production. Kalok discontinued production of their 3.5" 20MB drive quite some time ago; I used to use those in my MHDT34 hard drive package. But it's more sensible these days to make larger capacity drives.

Of course the Seagate presentation was important to me for two items: (1) I got a look at the new ST351A/X IDE drive which has a combination 8-bit/16-bit jumper-selectable interface. I grabbed onto one of those recently and replaced the old Kalok in the family's 1000TL/2 with the snazzy 351A/X. Not only is there now twice the storage capacity, but the 351 is considerably faster and quieter than the Kalok 320. I'm now selling 351A/X drives (see announcement later on).

The second thing I found useful about the Seagate presentation was the ability to talk directly to a Seagate technician. Some of you who read between the lines may have noticed quite some time ago that I was working on a hard disk driver to use my host adaptor with SCSI drives. The MISOSYS host adaptor currently being sold was designed for the SASI/SCSI interface; but I use a supply of SCSI to MFM hard disk controllers (the Xebec S1421 and Adaptec 4010) to utilize MFM drives. I had purchased a Seagate ST157N SCSI-I drive to aid in developing a driver. Unfortunately, I could never get the driver to work the drive properly.

Last Spring, I poured on the time to fully understand why the driver would not work. My research disclosed that the driver was able to operate the drive perfectly using a sector size of 512 bytes. But that sector size is not useful for TRS-80 users. Phone calls to Seagate's technical support, followed up by letters detailing the problem, led to no response. Until I nailed that tech! Meeting eyeball to eyeball solved the problem.

It appears that the Seagate SCSI Interface Manual left out one vital piece of information. In the *Format Unit* command, there is a data bit (FMT DATA) which if set, indicates that a list of defective areas on the disk will be passed to the controller; a zero indicates that the data-out phase of the command will not occur and no defect data will be supplied to the drive.

Such a list was not normally used on TRS-80 hard drives, and modern smart drives (those with imbedded controllers) maintain their own lists internally. In fact, another bit in the Format Unit command tells the controller to use only the original manufacture's list (internal list). What the Interface Manual failed to disclose was the requirement to **set that bit if the sector size was being changed.** Even if the list was void, the bit had to be set! That's so the controller would be able to re-calculate the new sector numbers corresponding to the existing list.

What was happening in my driver was the controller generating a continuous error the first time it accessed what it thought was a bad sector.

Now that the problem was solved, I went back to my prototype SCSI driver, made the change to set the FMT DATA bit in the format command, and it performed flawlessly. Now there's just a little cleaning up to do with the error handling and the SCSI driver is complete.

The end result is that my SCSI driver can be used with my T80 to SCSI host adaptor and any Seagate SCSI drive. This eliminates the need for a separate hard disk controller. Putting a hard drive internal is now less of a problem. With modern hard drives using less power than the old floppy drives, converting a floppy slot to a hard drive use will be easier - no separate controller to worry about for power consumption, heat generation, cabling, and mounting. I'll soon be popping that ST157N into a 4P. The only drawback is that now the ST157N has been discontinued. That was a 3.5" drive. The smallest capacity 3.5" SCSI drive Seagate now makes is a 248 MB SCSI-2 drive (still should work). They do have an 84 MB ST296N 5.25" drive. So I'll be looking around for compatible drives. If you're still looking to add a hard drive internally, talk to me.

Floppy drives haven't been taking a back seat to capacity inroads. Iomega Corp, makers of the Bernoulli Box, have introduced a variant on the Floptical drive licensed from Insite Peripherals, Inc. This 20 megabyte floppy drive has a 65 ms average seek rate - about the same as the venerable Seagate ST-225 hard drive. Iomega's Io20S 3.5" drive is read/write compatible with 1.44 MB and 720K floppies.

Improvements in the standard 3.5" floppy drive are coming from Epson. Their SMD-1100 drives run on 3.3 volts, the next standard for computer powering of laptops and notebooks. Epson also announced an SMD-800 series of dual 3.5"-5.25" floppy drives which incorporate both mechanisms into the same 5.25" half-height housing; the same electrical mechanism is used for both devices. A similar drive, the FD505, is available from Teac.

Other hardware advances include Dallas Semiconductor's EcoRAM. This item is a 256-bit read/write serial memory device in a 3-pin transistor package. Address, data, and control lines are all multiplexed on a single pin. A varient on this device is their DS2400 Silicon Serial Number - which is a read-only form of the SRAM. The SSN contains a one-of-a-kind number which can be used to positively identify electronic equipment.

Is a step back in time considered regressive? Not if you happen to be old enough to be a vacuum-tube audiophile. Transistors have replaced the use of vacuum tubes in virtually all forms of electronic

equipment. However, true audio purists still prefer the sound of audio generated from vacuum tubes - there is a difference.

Eric Pritchard has now devised a *Tube Emulator* which he claims sounds like the real thing. Sample circuits were built up and presented to a group of professional musicians for ear evaluation. With that test successfully passed, Pritchard formed a company called *Deja Vu Audio* to market the Tube Emulator.

If your hearing needs improvement, how about your smelling? According to a brief article in *EBN*, Arrow Electronics is considering moving from their Melville New York headquarters to Dallas because of the discontent arising over an adjacent compost facility which has soured the local air quality.

One of the recent merchandising developments at Tandy is their requirement for bar coding products purchased for resale at their Computer City, Incredible Universe, and Radio Shack chains.

Speaking of Tandy, they just got some good press over their new Video Information System (VIS) multimedia player. The system includes a 25-MHz 386SX CPU, 2 MB memory, CDROM, SVGA graphics, stereo audio, and an infrared remote control. There's no keyboard as of yet as this thing hooks up to your TV set. The VIS includes Tandy's newly designed RAMDAC and VGA color-blending chips which make graphics look like broadcast video.

Now for a look at the horizon in memory storage, how's 50 gigabytes in a 5 cm cube sound? All that, and 10 ns access time to any location in the cube. Those figures are the promise of research by Robert Birge, of the Syracuse University Center for Molecular Electronics, in photoreactive protein harvested from bacterium - *halobacterium halobium*, to be exact.

Peter Rentzepis, of the University of California at Irvine, is also researching the use of organic molecules in three-dimensional memory. His goal is 100,000 gigabytes in a peanut-sized, transparent cube. Does this sound like Superman's crystal palace? Both of these systems employ laser-based optical reading and writing.

Speaking of lasers, in a previous issue of TMQ I mentioned a new blue-laser developed by Sony which was claimed to eventually triple the capacity of CD-based systems. One user asked me to comment on that. The increase in optical capacity is, in a way, no different than that which has occurred in the field of magnetics. The capacity of a recording medium is based in part on the size of the medium necessary to store one bit of information, and the ability of the read/write head to target an area of matching size. If, for instance, it took one square centimeter of area to record one bit, then a read/write head with a field area of two cm^2 would be incapable of resolving single bits. Tape recorders increased their storage density as tape mediums improved (finer particulate for the magnetic coating) and magnetic heads improved to reduce the distance between the tape and the head (allowing for smaller magnetic fields).

Optical recording with lasers takes the same approach. Recollect that the majority of lasers produce red light. Red, at the low end of the visible spectrum, has the longest wavelength of visible light, 610-750 nm. It is the actual length of the wave itself (or width if you prefer) which controls the area of medium being discerned. By using a laser light with a much smaller wavelength, the bit density can be increased. Blue has a wavelength of 450-500 nm. Thus the average areal density of blue is one half that of red. The problem was that blue lasers were very difficult to fabricate with sufficient intensity of light to be useful. Thus the advance had technological merit.

Another advance, though not a technological marvel, is the inclusion of a small CCD video camera as part of a pen-based electronic notebook being shown by Fujitsu. Not only does the unit have the capability of capturing handwritten input, it can also capture video images directly. Still black and white images are instantly captured and stored on its 2.5" hard drive.

Now a look at the result of software bundling. In the past, users of LDOS and/or LS-DOS have asked for the inclusion of all sorts of applications within the DOS. Recognize that the DOS already includes a keystroke multiplier, minimal text editor, and a communications program. In the MS-DOS world, the same kinds of requests have been made - in fact, users have complained that the DOS was a poor product because it did not contain functions such as Superkey (keystroke multiplication), a shell processor, and a compression utility.

When DR-DOS came out, it was lauded for including file compression which MS-DOS 5 did not subsequently include (DOS 5 does include a shell and DOSKEY, a keystroke multiplier). Well now that MS-DOS 6 is to include bundled data compression, the stock of Stac Electronics, a leading supplier of compression software, dropped 75% in value.

Compression software companies are not the only ones who took a hit. When MS-DOS 5 was released with a shell facility, how many users of SoftLogic Solutions SoftwareCarousel gave up on it? I know mine is sitting on the shelf never to be upgraded again. Even though its switching performance was faster since it used RAM in contrast to MS-DOS 5's disk-only task switcher, Carousel would have required an upgrade to the next version which would work with MS-DOS 5.

A DOS can't include everything, lest it put independent add-on vendors out of business.

Some things get bundled with a DOS, and applications, that a user does not want. I am referring to computer viruses. These buggers have gotten quite pervasive over the past year or two as the ranks of computer *crackers* have swelled, and the extent of possible damage has increased. To date, most of the cures have been either

preventative (i.e. don't use any software disk except from a reliable source), or post operative (by using one of the many anti-virus programs which have come on the market. It has even been alleged that many viruses already exist which are designed to infect the next version of MS-DOS (6.0).

Now comes a hardware solution to the problem. Since viruses are primarily passed unbeknownst to the user by attaching themselves to executable programs thence to the DOS, having a means of protecting against fraudulent disk writing to regions of the disk containing programs could very well guard against virus infection.

According to Robert McCarroll of Western Digital, there exists about 1000 known computer viruses and they are growing in numbers to the tune of 50 per month. That's what prompted WD to develop the WD7855LP/LV system controller chip which works with the 386SX system management interrupt (SMI). The SMI, which is a highest level interrupt, is activated by WD's controller on every disk write. Software in protected memory then checks to see if the write request is to an area of the disk previously protected by the user. If so, the operation is assumed to be a virus and the user - or a special virus-inoculation program - is notified.

And the other front for criminals - the software piracy front - has finally been attacked in Congress to provide bigger teeth on the punishment side. Commercial software piracy - where folks spring up and copy packages en masse for resale - has been elevated to a felony from a misdemeanor. It is said that this will now encourage federal prosecutors and other law enforcement agencies to pursue these cases of theft. The law defines commercial pirates as individuals who willfully copy software for commercial advantage or private financial gain. Prison terms of up to five years and fines of up to $250,000 can now be imposed on persons convicted of infringing at least ten copies of a copyrighted software program, or any combination of programs with a retail value greater than $2,500.

Trade-in Policy

The policy for trade-ins of an equivalent non-MISOSYS software product for a MISOSYS-published software product is to just send in an original *Table of Contents* page with the trade-in fee which is 50% of the price of our product. So for LB 2.3, trade in any other database product and you can purchase LB or LB-86 for $49.50 plus S&H. How's that for a deal? It doesn't matter for what system or operating environment your trade-in was designed for. This offer does not extend to products re-sold by MISOSYS or products on sale.

In this issue...

Last issue, I said that Volume seven would start our focus on the C language. I'll defer that an issue as many other articles were contributed or internally developed which I felt would have greater priority to *TMQ* readers. So look for the C coverage to begin next issue.

I did receive a big article covering an introduction to FORTH from Peter Knaggs; however, I need to do some work on it before publication in *TMQ*. I am still keeping open my offer for someone who wants to get involved with learning FORTH and writing about it in a series of articles - for either MS-DOS or TRS-80; MISOSYS will provide you with a free copy of either HartFORTH for the Model I/III or Model 4, or even HartFORTH-86.

From time to time I am told that there is not enough on BASIC in *TMQ*. Well, you'll find an amortization program in BASIC within this issue. Also, an algorithm for drawing lines with PC line-drawing characters is illustrated in a BASIC program.

For the assembly language buffs, Frank Slinkman provides another example of his expertise with a disk-quantity-optimized archival program for hard drive users. Along the theme of backing up hard drives, Scott Toenniessen provides techniques for using known tools in the hard drive backup process. Odds and ends fill out the issue.

TMQ Schedule

The MISOSYS Quarterly is mailed approximately every three months. Note that your mailing label usually has the expiration date of your subscription. For instance, those with "92/11" complete their subscription with this issue. The renewal fee to continue with another four issues is covered on page 1.

MISOSYS Forum

I sponsor a forum on CompuServe. You can reach some "experts" on TRS-80 and MS-DOS subjects by dialing in, then GO PCS49, or GO LDOS. This is probably the oldest forum still-surviving from the *MicroNet* days. If you want to see it continue, how about popping on for a chat or a question.

The forum contains many programs to download, as well as lively discussions which thread through the message system. You can direct a message to me at 70140,310. Post a message in private if you don't want it "broadcast".

I handle support via that facility. You can also submit an order either by a message

saved as PRIVATE, or via EMAIL. MSDOS users can even request an order for selected products be EMAILED as a ZIPed file for nearly instant service (manuals to be shipped separately).

DISK NOTES 7.1

Each issue of *The MISOSYS Quarterly* contains program listings, patch listings, and other references to files we have placed onto a disk. Where feasible, the text accompanying an article is also on DISK NOTES. DISK NOTES 7.1 corresponds to this issue of TMQ. The disk is formatted usually for TRS-80 LDOS/LS-DOS users at 40D1 (that's 40 tracks, double density, one sided). MS-DOS users can request a 5.25" 360K disk. If you want to obtain the fixes and the listings, you may conveniently purchase a copy of DISK NOTES priced at $10 **Plus S&H. The S&H charges are $2 for US, Canada, and Mexico, $3 elsewhere.**

DOS Manuals

Don't forget that with our "LDOS™ & LS-DOS™ BASIC Reference Manual", which covers the interpreter BASIC which is bundled with LDOS 5.3.1 (even the ROM BASIC portion), the interpreter BASIC which is bundled with LS-DOS 6.3.1, and both Model I/III-mode and Model 4-mode EnhComp compiler BASIC, you can purchase the disk version of EnhComp for $23.98 plus $1.50 S&H when purchased along with a BASIC Reference Manual, or the disk version by itself for $29.98 plus $3 S&H if purchased separately. If ordering the EnhComp disk, please note which version: Model I/III or Model 4!

MS-DOS Products

MISOSYS is a reseller of products purchased from Ingram Micro; thus, we have access to a huge array of MS-DOS products. So if you are looking for some hardware or software to go with your MS-DOS system, why not get in touch with us for a quote. Call, write, or FAX.

I still have some Tadiran TL-5296 6V lithium batteries usable in most AT-class machines. Don't wait for your battery to fail and lose your configuration data. A spare's shelf life will probably out last your machine.

Seagate ST351A/X IDE Drive

One of the hot new drives on the market for low-end systems is Seagate's new 42-Megabyte ST351A/X drive. This 28ms IDE drive features a MTBF of 150K hours. What I found very useful is the 351A/X is jumper selectable for either 8-bit (i.e. Tandy 1000TL/2) or true 16-bit bus systems. I replaced the Kaylok 320L and WDXT-GEN controller in my 1000TL/2 with this new 351A/X and the machine's response is now fantastic. Besides a souped-up performance, the new Seagate drive is absolutely quiet! I can't hear the thing.

So if you are looking to pop in a 40M IDE drive in your new low-end PC, consider this new Seagate. On hand now at only $195 + $7S&H (domestic U.S.)

Power Supplies

MISOSYS has a limited supply of replacement power supplies for Model III or 4 computers. The Astec AC8151-01 40-watt supply provides +5V @ 2.5A, +12V@2.0A, and -12V@0.1A. It's size is 6.25"x4"x1.75"; mounting holes are 3.125"x4.75". The Astec AC12310 68-watt supply provides +5V @ 7.3A, +12V@2.5A, and -12V@0.1A. It's size is 7.69"x4.125"x2"; mounting holes are 3.75"x7.25". This supply is a direct replacement for the Tandy Model 4 power supply (Tandy's was based on the Astec design). The 40 watt supply is $40 and the 68 watt supply is $50. Surface S&H for either is $5. Currently in stock are seven of the 68-watt supplies and nine of the 40 watt supplies. When these are gone, we will not be obtaining more.

Address Change

The United States Postal Service has seen fit to change the ZIP code of our Post Office Box (mailing address) effective July 1, 1992. The new ZIP is 20167. Please update your records; I don't want to lose any of your orders.

FAX Number

If you want to reach us by fax, try 703-450-4213.

LB Printing Hint

Here's a hint for LB 2.3.0 users looking for a way to remove blank lines from mailing labels. If you have received any recent mailings from us, you would be able to see the effect.

At MISOSYS, our general format for mailing labels is:

First-Name Last-Name
Company-Name
Street
City, State ZIP
Country

Most of our database records do not have a company-name entry; thus, our labels would have previously been printed with a blank line between the name row and the street row. But now there is an alternative.

With the inclusion of the *Suppress Blank Lines* feature of the Print parameters, you can eliminate the rows which have nothing printed on them. This can only be useful for one-across labels, however. Also, on mailing labels, make sure you set your print parameters for 6-line forms and set the *1-Rec* parameter in the defining of the screen. That's to ensure that all six lines of a typical 6-line mailing label will be used for each record (you do not want your printed image riding up the labels).

Closeouts

After evaluating the past few years sales of MISOSYS TRS-80 software products, the time has come to cease the manufacture of selected program packages. This issue includes a list of products which will no longer be available from MISOSYS after the Spring of 1993. In case anyone still wants to acquire some of these products, I am making this announcement to TMQ readers first. I will subsequently publicize this list to any takers. In order to make it easy, the price list in this issue reflects those products under clearance at prices reduced approximately 80% from normal. Available quantities of some products may be limited. Note that no warranties, returns, or support will be offered on these items.

Hardware Clearance

Over the years, MISOSYS has accumulated TRS-80 hardware and related equipment in excess of current needs. The following items are now classified as surplus and are available for sale to the first takers (shipping charges are additional):

- Tandy 2000 e/w color monitor, floor stand $150
- TRS-80 Model II (Video needs tweaking) $50
- TRS-80 Model III (working) $35
- TRS-80 Model III (video bad) $20
- Model 4, 128K (non-gate) $75
- TRS-80 4P (working) $75
- MAX-80 $75
- Amdek Video-300 Monitor $40
- BMC Monitor (for MAX or M1) $25
- (3) 5 Meg Radio Shack HD $75
- 10 Meg Radio Shack HD $100
- 12 Meg Secondary (bad drive) $50
- DW-II Daisywheel $50
- Printer III (no printhead) $25
- Radio Shack Modem II $15
- Lobo dual floppy drive box with two 80T1 drives $25
- CTR-41 Cassette (new, in box) $5
- CTR-80 Cassette (new, in box) $5

Binders

I was recently cleaning out the warehouse and came across a box of LSI 1" binders. These are the beige colored D-ring binders which were used with some LSI products years ago. First come first served at three for $10 + $5S&H (continental U.S. only). Note some imperfect.

I also found, tucked away in the back room, a large box of old MISOSYS-imprinted 0.75" dark blue three-ring binders, and a handful of 1" MISOSYS binders. Both are imprinted with our old Alexandria address. The 1" binders are bundled three to a box, and the 0.75" are four to a box. $10 per box + $5S&H.

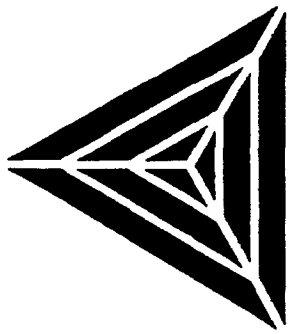
And for the nostalgia buffs, I found a box of old Galactic Software Inventory Manager User manuals still in the Yellow three-ring binders. There's probably about 8-10 binders. Again, I can pack three to a box.

If you want a quantity of these binders, let me know. I can find a larger box to package them and save on shipping charges.

Passages

I close this *Blurb* with a sad note. Chuck Tesler recently informed me that Ron Malo, a former employee of Prosoft, passed away this past August. Ron was a key member of the early PC community, as well as the radio-controlled model airplane community. Those of you familiar with Prosoft's Alwrite word processor should well remember Ron.

Letters to MISOSYS



LB 2.3.0 EDIT-FIND Bug

The following information was sent directly to LB 2.3.0 users. In case I missed someone, here's the scoop.

It appears that there was a bug introduced at the recompilation of the LB8 module when version 2.3.0 was created. This bug renders the EDIT-FIND command inoperative when a FIND is performed on a database without an index file attached, or if one with a single key field is attached. This bug was located and supposedly corrected on the LB/OV8 file dated November 19, 1992. Unfortunately, after testing a hand patched module, a patch was applied to the master disk. The patch had the last "F" line mis-typed as a "D" line. Unfortunately, the PATCH command not only does not apply the corresponding D-line, it does not flag this as an error. As a result, the FIND command with the patch applied would most likely crash LB.

If you have a TRS-80 Model 4 version of LB with a file date earlier than 11/19/92 for the LB/OV8 file (disk 1), then please apply the following patch entitled LB8230A/FIX; the patch as listed here is correct. If your LB/OV8 is dated 11/19/92, then please apply LB8230B/FIX.

```
. LB8230A/FIX - Patch to
LB/OV8 of release 2.3.0
. Patch corrects bug in
unsorted find command
. Apply via PATCH LB/OV8
LB8230A
D1E,03=CD F7 70
F1E,03=22 CA 70
D46,58="Data not found "
F46,58="Search data not"
D46,67=00 22 CA 70 22 D4
70 C9
F46,67=20 66 6F 75 6E 64
20 00
. Eop
. LB8230B/FIX - Patch to
LB/OV8 of release 2.3.0
. Patch corrects bug in
LB230A/FIX
. Apply via PATCH LB/OV8
LB8230B
D46,67=00 22 CA 70 22 D4
70 C9
F46,67=20 66 6F 75 6E 64
20 00
. Eop
```

If you have an MS-DOS version of LB86 V2.3.0, the LB.EXE module was corrected on the file dated 11/19/92.

LB Printer codes

Fm MISOSYS, Inc: Release 2.3 of LB added an automatic print definition report generator. This print autogen module references a PRINTER DEFINITION file of printer codes to automatically construct a report definition for narrow and wide table reports, form reports, and 11 address label reports plus Rolodex and 3x5 card. The file uses the following control codes:

- codes to place printer in cpi's 10, 12, 14, 15, and 17, where applicable;
- codes to enable/disable bold, where applicable;
- codes to enable/disable underline, where applicable;
- codes to enable/disable italic, where applicable.

The following codes have been submitted by our users since the release of the PRINTER.DEF file.

Fm David Huelsmann: The following ASCII codes are for an Epson L-1000 Action Printer.

10 cpi = 27 80
12 cpi = 27 77
15 cpi = 27 103
17 cpi = 15 (actually does about 60% of size of print already in: Will give 17 cpi if in 10 cpi to start with. Will not work with 15 cpi.
Emphasized select = 27 69
Emphasized cancel = 27 70
Double strike select = 27 71
Double strike cancel = 27 72
Underline toggle = 27 45
Italic select = 27 52
Italic cancel = 27 53
Initialize printer = 27 64

Fm Jim Potsch: Roy, codes for a DWP 220 printer: (Decimal)

12 pitch (10 cpi) select = 27 14
10 pitch (12 cpi) select = 27 15
Start underline = 14
End inderline = 15
Reverse Line feed = 27 10
proportional select = 27 17
bold on = 27 31
bold off = 27 32
start CR only = 27 21
end CR only = 27 22

PRO-EnhComp Use

Fm CCG: Dear Sir, I am having a problem in using the subject compiler. I would like to know how to convert what I do with the BASIC Compiler I now use to be able to use the subject Compiler. For example, I now key in BASIC - then NEW - then AUTO and I am able to then type in my program. How do I achieve the results using the subject Compiler?

If I type in BC I get the message — missing parameters. When I type in S I have to key in the line numbers. Also when I key in <break> nothing happens. I can get some of the samples in the manual to work using S but I always have to key in line numbers. When I tried the example on page 254 I get 0 compilation errors but nothing happens. When I try the sample on page 86 there are no compilation errors but the computer hangs up.

I am probably overlooking some small detail but would appreciate any help you can give me in this matter.

Fm MISOSYS, Inc: To begin with, Enhcomp programs do not have to have a BASIC line number on every line (see page 34). Only lines which are the target of GOTO's or GOSUB's, etc., require either a number or a label. If you are starting a program from scratch, then the easiest way is to invoke the S/CMD supervisor. It automatically loads the CED editor. From there (either CED invoked from S or directly from DOS), you can simply type "I", for input. Enhcomp won't automatically insert BASIC line numbers because most lines will not need that number. <BREAK> will cease the input mode. That is essentially the same as interpreter BASIC's AUTO command.

The sample program on page 86 will absolutely lock up your computer since you are using the Model 4 version and that program is noted to be for Model I or III (not the 4). The program as written pokes machine language code into memory - code which is Model I/III specific. What you see on page 254 is not a complete program but simply a user command - a program fragment, so to speak. It's sort of like a defined function in interpreter BASIC. If you wrote a BASIC program which consisted of nothing but a DEFFN, it wouldn't do anything, either!

Look at the short program on page 255 - it should work. So should the one on page 163 if you make sure that you either have a drive ":4" or change the OPEN to reference a valid drive.

Incidentally, your reference to your existing BASIC appears to be referencing the BASIC *Interpreter* provided with the DOS, not a compiler. There is a major difference in the two. Interpreters need to look at each source statement each time a statement is reached and convert the logic to interface with machine language functions. Compilers do that once and convert the source program to machine language.

HDPACK Queries

Fm JFS: Since I use my HDDE utility to create extra directories for my 40MB drive, DIRCHECK, of course, reports many "granules allocated but not used". This is due to the fact that the GAT must record all space used on all directories.

Will this prevent HDPACK from working properly, or will it just avoid using the granules DIRCHECK thinks are improperly allocated (as I would think it should)?

Fm MISOSYS, Inc: Any granule showing up in the GAT as allocated but unused by a directory entry will be locked in place and both unused and unmoved. Your presentation with HDDE would appear no different than any other "bad" granule locked out by a hard drive formatter as unusable - but the only way such a formatter can lock it out is to either allocate it in the GAT, or construct a file entry allocating it. You should be safe.

And kudos...

Fm AM: I wanted to drop you a line, but have been very busy, and finally have gotten a break here at the shop to compliment you, and thank you for producing and writing such an excellent piece of

software. I'm referring to HDPACK, I hadn't realized how "flakey" a hard-drive can get after using it even for a week. I knew reading and writing to the hard-media will fragment a file after several access's, and now I can really appreciate on a weekly basis, to optimize it and know all will be 'smooth' on a regular basis. Fantastic, and a job well done!

I used DISKOPT, by D. Goben, and since then have stuck it in the back of the disk box. I've run into inconsistencies with it, and seems a clash every now and then would occur, I didn't like it after I found out that it caused some files to "grow". I noticed a 19.5K/HR file would turn-out to be 24K when I finished optimizing, I don't know what happens, but it must me re-sizing the granules or something.

At any rate, I have one comment on your HDPACK also. I am using LS-DOS 6.3.1, and have created a JCL file to optimize my hard drive; it's very simple:

```
HDPACK :0
HDPACK :1
HDPACK :2
HDPACK :3
```

One thing I noticed is now that I've cleared partition 1, (for a blank dummy drive), with no files on it, when the JCL file gets to the "empty" partition, HDPACK hangs up the system and I have to re-boot. Is this the JCL doing this or HDPACK? Do you have a fix it if so? Please drop me a line if you can Roy. Thank You and have a nice Christmas out east there. I'll be watching for your next new piece of software!

Fm MISOSYS, Inc: Well it turns out that the problem you refer to is due to HDPACK trying to clean up after the last file was restructured. Of course, with an empty directory, there is no *last* file (HDPACK doesn't test for that. The HDPACK3/FIX will correct for that event.

```
. HDPACK3/FIX - 12/15/92
  - Patch to HDPACK
. Corrects hang on at-
  tempt to pack a disk
  with no files
. Apply via, PATCH
  HDPACK HDPACK3
D06,C9=33
F06,C9=32
D08,C3=AD 2C
F08,C3=D6 26
D08,D9=2A 5A 27 7C B5 C8
  C3 D6 26
F08,D9=24 24 24 24 24 24
  24 24 24
. Eop
```

LDOS Version?

Fm MB: What is the latest version of LDOS for a Model I? I'm currently on 5.1.4. I've seen references to 5.3 (?) but that also seems to be mainly for a Model III.

By the way, is it at all possible to load the RDUBL driver in LOW memory somewhere? My word processor ignores the memory flag and grabs it all (COPYART), so I have been running it with SD all these years. It *almost* worked with TRSDOS 2.7/8, with just a bit of general unreliability, so it must be possible to do something. Ideas?

Fm MISOSYS, Inc: Latest version of LDOS for the Model I is 5.3.1 (that was a relatively recent upgrade). You cannot run the double-density driver in low memory as there is not enough space available. Why not dig into COPYART to fix it to honor HIGH$?

OPREG bit-3 Confusion

Fm MISOSYS, Inc: There appears to be some confusion concerning the software handling of reverse video in the Model 4 DOS. The TRS-80 Model 4 is not capable of reverse video of the 256-character set - only the lower 128 characters can be displayed in reverse. The Model 4 uses character bit-8 to indicate a character should be displayed in reverse video. Once reverse video is activated in hardware, any character stored in the video RAM which has bit-7 set (values 128-255) is displayed in reverse. Characters with values of 0-127 are displayed in normal video. Bit-3 of the OPREG (78H) designates hardware reverse video. Therefore, when you activate reverse video with CHR$(16), the video driver enables the hardware by setting bit-3, and "turns-on" the driver's bit-8 setting routine. Any character sent to *DO from then on will have bit-8 set by the driver - even if it is a character already with a value above 127; the hardware will display it as an ASCII character in reverse video since the hardware is enabled. The DOS manual documents CHR$(17) as "Set high bit routine off". That's exactly what it does. Once the driver receives a CHR$(17), it ceases further setting of bit-7 for each character subsequently sent. But since the hardware is still reverse video active, any reversed characters *still* on the screen are left in reverse video.

Now, when you want to stop displaying characters in reverse, you send CHR$(17). However, since the previous characters (in reverse) still appear on the screen, resetting bit-3 of OPREG will display those characters as their 8-bit component. Now what were ASCII characters in reverse, will automatically appear as special or alternate characters. That's not what you want. So CHR$(17) does not reset the hardware; it only turns off the driver's bit-8 setting routine so subsequent

- and the second one was too long to fit on a single line - until I left off the second scr17.

After reading your write-up of PRO-NTO/PROWAM, I can see why you are not familiar with the Tandy programs of SuperScripsit or Deskmate. Now if I switched to PROWAM instead of using Deskmate:

What would I need to go along with the plain Jane PROWAM to duplicate Tandys Deskmate? (I have SU4 and Doubleduty.) Does PROWAM2 include MisterEd? Is the Text Editor useful as a simple word processor as is Deskmate? Would it accept ASCII files without modification? (Deskmate only requires the filename to have the extension /DOC for it to be listed on the menu.) I have many thousands of words stored in ASCII Deskmate files. Would it allow transfer of ASCII files from one disk to another from within the word processor program? Would it allow importing an ASCII file to the file under work, from another file on that disk or on another active disk? Will it allow a specified paragraph to be exported to another file on the same or a different disk, and have it automatically appended to that file?

Will I have to have 128K on my Model 4 to run it? (one of my 4's does the others don't.) Easy enough to fix.

How to obtain PRCTL? How much? (As on p.35 VI.iv). Same for CTL255?

And on other subjects: Why can't LDOS 5.3 do a CAT? It does a DIR in alphabetical form and it does a four column DIR, un-alpha when asked for DIR under SuperScripsit (Mad3), so the routine must be there somewhere - perhaps only in the SS? It sometimes makes for easier printouts to be taped to the disks. The DIR :0(P) Printout is longer than the CAT :0(Prt).

Fm MISOSYS, Inc: The format I use to publish patches in TMQ is as a /FIX file. This means that you should type the lines into a file, save it under the name specified, and apply it to the program as specified. You really only need to type in the "D" and "F" lines, however, if you care to preserve the file for future reference, it is a good idea to type in the comment lines as well - or obtain the corresponding DISK NOTES to save you the typing. For instance, that patch should have been typed in and saved under the name "SCR17/FIX". Then it would be applied by the command printed on patch line 4.

I think you missed the point of all the information I printed in the previous issue concerning PRO-WAM. DESKMATE and PRO-WAM are two completely different types of packages. DESKMATE attempts to be an operating environment with easily-invoked applications: i.e. word processor, spreadsheet, communications, etc. This is somewhat similar to the T/MAKER product which was sold for many years - and still should be available - by T/Maker Company (now T/Research, I believe). The problem with DESKMATE is that there is not sufficient memory in the TRS-80 to implement fully-functional applications.

PRO-WAM, on the other hand, is similar to Borland's SIDEKICK - which is a memory-resident pop-up windowing application program. None of the applications in SIDEKICK - nor in PRO-WAM - pretend to be fully-functional applications. Their claim to fame is their ability to be available for use when you are running another application. This gives your computer the task-switching capability. I thought that message was quite clear.

Therefore, it makes no sense whatsoever to compare the applications in PRO-WAM - or the package as an entirety - with the DESKMATE application. However, that aside, I can make some comments to increase your awareness of PRO-WAM's applications.

MisterEd is a program package separate from PRO-WAM. From time to time MISOSYS has bundled the two together for a promotion. This combination was available and advertised at a special price in the last issue of TMQ.

As far as TED is concerned, the PRO-WAM article said that, "the LS-DOS 6.3 TED/CMD editor was derived from TED/APP". Since you have TED/CMD with your LS-DOS, you know exactly what its capabilities are. TED/APP omits the print command since the application is extremely tightly written and has no memory available for additional commands. Thus, TED/APP accepts ASCII files (in fact only ASCII files), uses a default extension of "/TXT", allows transfer of files because being a PRO-WAM application, you can pop up the PRO-WAM library executive to perform DOS library commands, And just as TED/CMD operates, TED/APP allows files to be concatenated.

PRCTL as well as CTL255 are both part of the Wammies Application Disk. The price for this disk was published on page 5 of the TMQ you referenced (see the PRO-WAM Special in column three). The disk was (and is) $10 + $2 S&H.

Now, why can't LDOS 5.3 do a CAT? Well it can! The CAT command is simply an automatic invocation of DIR with the (A=N) parameter. Fortunately for LS-DOS, the command interpreter overlay (SYS1/SYS) has room sufficient for a larger command table. It's overlay region extends from 1E00H to 23FFH - a full 1.5K. In LDOS, the overlay region extends from 4E00H to 51FFH - only 1K. Thus DOS overlays in release 6 have more memory space available to code functionality in the overlays.

If you have access to a Programmer's Manual, you will note that the DOS includes a service call named @DODIR. This is available under both LDOS and LS-DOS. It's function is to perform a mini-directory either to the display or a user buffer. That's what Superscripsit is using to display the directory.

Finally, on the subject of CAT, issue I.iii

@PUTs to *DO won't have bit-8 set.

The only way to ensure that no characters remain on the screen which were displayed in reverse is via a CLEAR-SCREEN, i.e. HOME (28) followed by Erase to end of display (E2EOD = 31). It works that way by design!

LS-DOS 6.3.1 on 6000HD

Fm DY: I'm curious about the Model 2/12/16 version of LS-DOS 6.3.1. Will it work on a 6000HD? And what about the Hard Drive? Is it usable under 6.3.1 via your RSHARD drivers or some other way? How Model 4 compatible is it?

Fm MISOSYS, Inc: Yes, and No/Yes. The LS-DOS 6.3.1 which is for the Model II will run on the 6000HD (I have one right next to me). A driver is available for the II/12/16/6000 HD but it is TRSHD2/DCT and TRSFORM2/CMD. The seems to not work on some Model 12 computers; however, the problem has never been isolated.

Converting a Database to Clipper

Fm RD: The task that I have to perform is to move a single database file (written in TRSDOS BASIC) onto a MS-DOS format and finally into a DBASE DBF (Clipper) file structure. Any other hints you may have would be gratefully received.

Fm MISOSYS, Inc: Okay, one thing is our TRSCROSS file conversion utility for MS-DOS. It reads TRS80 Model III and 4 files directly on your PC.

If your Model 4 database in BASIC is using a fixed record length file (i.e. fielded records), then an additional solution is to use the LBCONV database conversion utility which is bundled with our LB86 Data Manager. It can convert a fixed record length fielded file to LB format - then LB format can be converted (using LBCONV again) to dBASE-III format. LB86 is $99 + S&H. A bit much for just the LBCONV utility. You may find a PC-NATGUG member in the UK with a copy of LB86 who may be able to do that conversion once the file(s) is/are moved to MS-DOS.

PRO-WAM Use

Fm JPJ: PRO-WAM was received and installed. I use five Model 4's, only two with hard disks. Due to lack of floppy space, I made a PRO-WAM application disk that can then be removed (since / APL's are in bank memory for that application). I first used a /JCL file to install PRO-WAM and copy the proper WAMx/APL to WAM0/APL (/APL number on the command line would be helpful). But I had trouble remembering the defaults. So I created PROWAMx/CMD files from the original PROWAM/CMD, but with the proper defaults for each application (x now runs from 1 to 5). I then used FED/APL to change WAM0/APL to WAMx/APL on each PROWAMx/CMD file (Record 19). A /JCL (copy attached) installs the proper application, then I can remove the disk and insert the data disk. I thought that others may want to try this.

```
.INITPW/jcl for PRO-WAM (on
Pro-Wam applications disk) 09/
21/92
.All use <ctrl> P, except
LeScript (per LS manual, p. C-
2)
.Use 'PROWAM (R)' to remove any
version (will need this disk)
.Note PRO-WAM applications disk
can be removed, except for F3
(universal)
.
.Enter 1 for Original, 2 for
LeScript, 3 for Mr. Ed Editing
       4 for Telecom, 5 for
Assembly
//KEYIN
//1
PROWAM
.This is application NUMBER 1,
but uses WAM0/apl
.There are no Help nor PW
function cards, so use  Manual
//EXIT
//2
PROWAM2 (A=170)
.This is application NUMBER 2,
and uses WAM2/apl
.Card 2 gives Help, 9 gives PW
functions for ALL applications
.Remove PROWAM disk and insert
data disk WHEN PROMPTED
//PAUSE (Hit Enter)
DO INIT2
//EXIT
//3
PROWAM3
.This is application NUMBER 3,
and uses WAM3/apl
.Card 3 gives Help, 9 gives PW
functions for ALL applications
.Can de-activate and re-
activate by 'PROWAM3' (is on
LS-DOS disk)
.
//EXIT
//4
.PROWAM4 will be installed by
INIT4/jcl, if wanted
DO INIT4
//EXIT
//5
PROWAM5
.This is application NUMBER 5,
and uses WAM5/APL
.Card 5 gives Help, 9 gives PW
functions for ALL applications
//PAUSE (Hit Enter)
DO INIT5
//EXIT
```

Fm RJS: Thanks for the patches to Superscripsit which you published in Volume VI.iv page 9. They worked fine - after a little experimenting. I forgot that patches needed parentheses around them

of *The MISOSYS Quarterly* published a short article on extracting the DIR library module from LDOS' SYS6/SYS module, patching it for "A=N", and naming the resulting file CAT/CMD. It's also a simple matter for a modest programmer to code a CAT for LDOS which uses the @DODIR service call. In fact, based on my discussion of the Superscripsit patch to SCR17/CTL which was in the last issue, most of the code is right there. All you need to add is a parsing of the command line to get the drive number to CAT. TRSTimes of Nov/Dec 1991 had such a program.

International Keyboards

Fm LR: I purchased the French version of LS-DOS 6.3.1 some time ago, your Invoice 92-10404 dated 05/08/92. So far I have been unable to find the letter M, which makes it rather difficult to type in commands such as MEMORY, SYSTEM, etc! Typing an upper case "M" gives me a question mark, the lower case "m" gives me a comma.

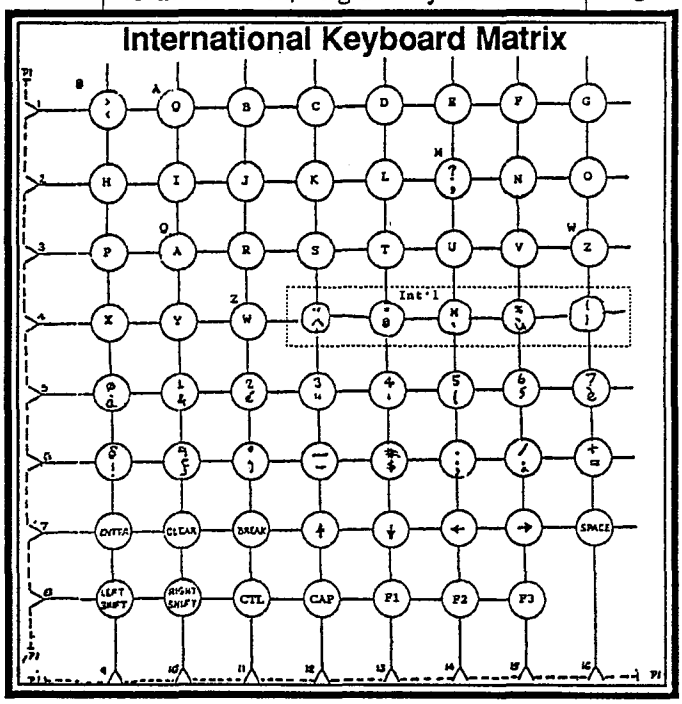
I've tried all possible combination of keys with no success, although did manage to get a lower case "m" on my printer using CONTROL; but that doesn't give me an "m" on the screen.

At three score years and ten my old brain isn't what it used to be, can you help me out?

Fm MISOSYS, Inc: The international versions of LS-DOS, specifically the French/Belgium (6.3.1F) and Deutsch (6.3.1D) versions, require the use of a TRS-80 equipped with the respective keyboard. The international DOS versions are not *conversant* in the foreign language; each merely addresses the specific keyboard and video. The printer driver is also specific. Everything else about the DOS (except for the day-month-year sequence of date entry) is identical to the domestic variety DOS.

In your case, you cannot enter the letter "M" because your keyboard does not have that key! Neither can you enter the following characters: {, }, %, *, @, ^, ", and ù.

The sketch shows a keyboard matrix for the French/Belgium keyboard. The area in a dotted box reflects the keys which are only in place on the international keyboards. The Deutsch keyboard would have those keys installed with slightly different keycaps. In your case, "M" is one of those keys. Note also that if you compare the keycaps with the English keyboard, you will note that there are differences from the regular key positions as well. I have placed the English alphabetic keys which are different from the international keyboards just outside of the keycap image; there are also differences in some of the special keys which I have not illustrated. You may as well resort to using the *English* version of LS-DOS unless you can locate a French/Belgium keyboard.



Model 100 Transfer

Fm RJS: I wrote to you some time ago asking for a program to allow two way communication between the Model 100 and the Model III. You sent me a back issue of a *MISOSYS Quarterly* which included a program by Mark Reed. It was an unassembled (I think) program, so I wrote him for a copy on disk. It runs fine, but it only allows for M100 -> M3, and not for M3 -> M100.

I have done a number of experiments trying to reliably and effectively transfer files from the M100 -> M4. I tried using Radio Shack's program REMOTE DISK, but it left the files in a configuration that I haven't been able to open on the Model 4 afterwards. I tried a direct RS232 transfer, but found that difficult and never reliable. I tried a RS232 through DESKMATE, - fast, but unreliable. Then I saw a note in DESKMATE indicating that it was necessary to slow down the rate in order to transfer long files. Thanks! Inspection of some of the long files showed large sections missing from the center of them, and I never knew it!

If I have to slow down, I might as well use TAPE100. It may be slow, but it is absolutely reliable. I very soon became weary of M100 -> tape -> M4. Besides, the tape would get dents on it from the parked capstan and cause drop-outs.

So I tried to use a little pocket radio as an amplifier to allow direct M100 -> M4 transfer. It chugs along at about 1500 BAUD, if the manual can be trusted. That is a lot better than the MODEM speed of 300. It is very quick to set up and it works super reliable, and it works just as well M4 -> M100. Naturally, it won't work for the 4P.

For anyone interested, few though there may be, the equipment is simple for anyone handy with a soldering iron. Just take a little battery powered, pocket radio and add a mini-jack to the input of the audio section. (Find the volume control. Ignore the two leads to the power switch. See which of the other three leads goes to ground. It will be the one on the "bottom" end of the potentiometer. Open the other end and insert the jack. If it is done correctly, the radio should still work as a radio and also work as a little utility amplifier. Test it using a cheap crystal type microphone or crystal type earphone.)

Now make up two cables using mini-plugs and DIN plugs for input and output. Label them IN and OUT according to the TECH manuals. (Watch those DIN plugs the numbering is not smooth. Enough to say, the ground is the one opposite the locating tab and the IN is the pin next to it on one side and the OUT is the next pin to it on the other side. Just make up a cable using ground and one of the adjacent pins going to a mini-jack and another cable using the other adjacent pin going to it's mini-jack.)

Set the volume control to about moderate loud from the speaker. (annoyingly loud.) Plug the input cable into the output of the radio, call up TAPE100 and watch for the symbols. Reverse the cables to the computers and the plugs in the amplifier for transfer in the other direction. That's all there is to it, and it works every time - and transfers reliably.

I tried to get Mark Reed to modify his program Load100/CMD to work both directions, but he has trouble with his CASS port and begged off. I suspect his problem is with the tape system, not with the CASS port. Every time I have tried to use tape, I have eventually had trouble. The direct "cable, amplifier, cable" method works super. If we could get a program for the Model III that would work both ways in LDOS and also one in TRSDOS, then we would be able to use the M100 to transfer anything to anything in the TRS80 realm. Besides allowing students and researchers to have a super-low budget tool for notes and full word processing. The inexpensive Model 100 does great for portable work, but the Model III or Model 4 does much better managing files on disk and exchanging files with others by disk. (The Model IIIs are very cheap, now, and still run quite reliably, and thanks to you, Roy, they still run efficiently. Roy, if you decide to distribute on an annual basis, I'm interested.)

Thanks again for helping to keep us going for as long as you have. I try to do as little program development as I can. It interferes with my other writing and life is too short to do all the things that I want to do, as it is.

Inside TMQ

IBM PC Line Drawing

by Roy Soltoff

During the development of version 2.3 of the LB Database Manager, I wanted to provide the operator with the capability of drawing lines and boxes in the view screen. To do this, two hurdles had to be overcome. The first hurdle was a means to support a 256-byte character set; this was related to the internal design of LB which I'll touch on briefly here. The second hurdle was the development of an algorithm for easily drawing lines and boxes.

LB was originally developed jointly for the TRS-80 and MS-DOS operating environments and released back in 1985 by Logical Systems. The beginning stages of planning and development were probably done in 1983. LSI originally was working on developing an MS-DOS-only relational database system which internally was called "Big Brother" (BB). That proposed product was noted in their *LSI Journal* of April 1984. BB was being developed to LSI specifications by an out-of-house development team. Unfortunately, the team fumbled the ball and could not produce even a portion of the specs.

LSI scaled back the specifications to a flat-file database manager and brought the efforts in-house. My supposition is that the term "Little Brother" stemmed from the junior-sized version of the larger effort. They also ported the package under development to the TRS-80 Model 4 environment. Since the design goal was to achieve identical operating characteristics across both MS-DOS and TRS-80 environments, certain compromises had to be made.

The PC video environment allows character attributes, such as reverse video and blinking, to be distributed on a character-by-character basis throughout the entire video screen. The PC uses two eight-bit memory cells for each video display character position; one stores the character value while the other stores the attributes. The TRS-80 Model 4 video hardware uses a single eight-bit memory cell per character position to store only a character value. Also, it does not inherently support blinking video; where used, that must be achieved through continuous software updating of the screen by displaying blank strings alternately with the characters to be blinking. Reverse video is available on a character-by-character basis; however, reverse video is designated by activating the eighth bit of a character value (i.e. by adding 128 to the value) along with a bit change in a CPU port to *activate* reverse video hardware. Since the eighth bit is used to distribute reverse video on a character basis, this then restricts reverse video to the lower 128 characters; graphics and special characters cannot be used simultaneously with reverse video.

The LB Data Manager view screen - as does the entire presentation of LB's screens - uses reverse video for highlighting. Reverse video can also be used by an LB user to highlight the view screen when it is created or modified. Since box and line drawing characters have character values above 127D, they would be unusable on a TRS-80. In the quest to make both versions equivalent, my supposition is that LSI either LSI did not consider the use of line drawing characters or decided it could not implement their use.

The LB view screen is created by a user by means of a drawing technique using cursor movement keys and character entry. Fields may be placed on the screen anywhere - the choice is entirely at the discretion of the user. The screen image is saved in a data file using two character arrays. The *screen* array is for storing the actual screen characters (note that a string of periods is actually stored in the screen array for each position of a field). The eighth bit of the screen array cell is used to designate that cell position is to be displayed in reverse video if the bit is set. The *attribute* array contains field numbers in any array cell where the corresponding screen position is a field. LB supports a maximum of 64 fields numbered 0-63. To differentiate field 0 from a non-field position, each field number has a mask value of 128 added to it. This scheme uses bits 0-6 to store a field number with the high-order bit (bit-7) set to indicate a field.

On the surface, it would appear that the view screen storage arrays provided no further room for adding any other attribute, or of expanding the displayable character set to include line drawing characters for the PC. That was the first challenge to overcome; I did not want to alter the screen array which would require a conversion procedure to upgrade existing screen files and an inability to be downward compatible.

In solving the problem, I realized that even though the attribute array used all eight bits, they were used only when a field cell was specified. Since line drawing has to be restricted from passing through a field displayed on the screen, fields and line drawing were mutually exclusive functions. If I limited line drawing bit uses to bits 0-6 and keep bit-7 RESET, then the attribute array could share its use with both field specifications and line drawing specifications. Also, since the TRS-80 could not simultaneously display graphical line drawing characters along with reverse video - which was always present - I had to either not support line drawing on the TRS-80 or convert

```
      option base 0
      defint a-z
      dim video(79,24),_
          val2chr(16),_
          chr2val(11,2)
      DATA 32,205,205,205,186,201,187,
203,186,200,188,202,186,204,185,206
      DATA 185,14,186,12,187,6,188,10,200,
9,201,5,202,11,203,7,204,13,205,3,206,15
      DEF FNatbval(rowval,colval,codeval)
      fval = 0
      j = video(colval,rowval)
      if j <> 32 then
         for i = 0 to 10
            if (j = chr2val(i,0)) then
               fval = chr2val(i,1)
            end if
         next
      end if
      FNatbval = fval and codeval
      END DEF
      cls
      PRINT "Use <F10> to exit, <F2> to toggle, <ENTER> to
   begin";
start:  a$=inkey$
      if a$ = "" goto start
      cls
      for i = 0 to 15
         read val2chr(i)
      next
      if val2chr(15) <> 206 then stop
      for i = 0 to 10
         read chr2val(i,0)
         read chr2val(i,1)
      next
      if chr2val(10,1) <> 15 then stop
      locate 1,1,1
      row = 0
      col = 0
      drawmode = 1
      for j = 0 to 24
         for i = 0 to 79
            video(i,j) = 32
         next
      next
      ON KEY(2) GOSUB TOGGLE
      ON KEY(10) GOSUB ENDPROG
      on key(11) GOSUB 111
      on key(12) GOSUB 112
      on key(13) GOSUB 113
      on key(14) GOSUB 114
      KEY(10) ON
      key(11) on:key(12) on: key(13) on: key(14) on
      key(2) on
100      goto 100          'loop forever until valid keys
111      gosub 150 ' up
      gosub 211
      gosub 300
      RETURN
112      gosub 150 ' left
      gosub 212
      gosub 300
      RETURN
113      gosub 150 ' right
```

line drawing symbols to some form of ASCII character counterpart. The latter method was chosen. One additional point was to keep the view screen file identical across implementations for ease of porting data file sets across implementations. This was done by storing the IBM PC line draw graphic character and having the TRS-80 version perform the code conversion during the screen display.

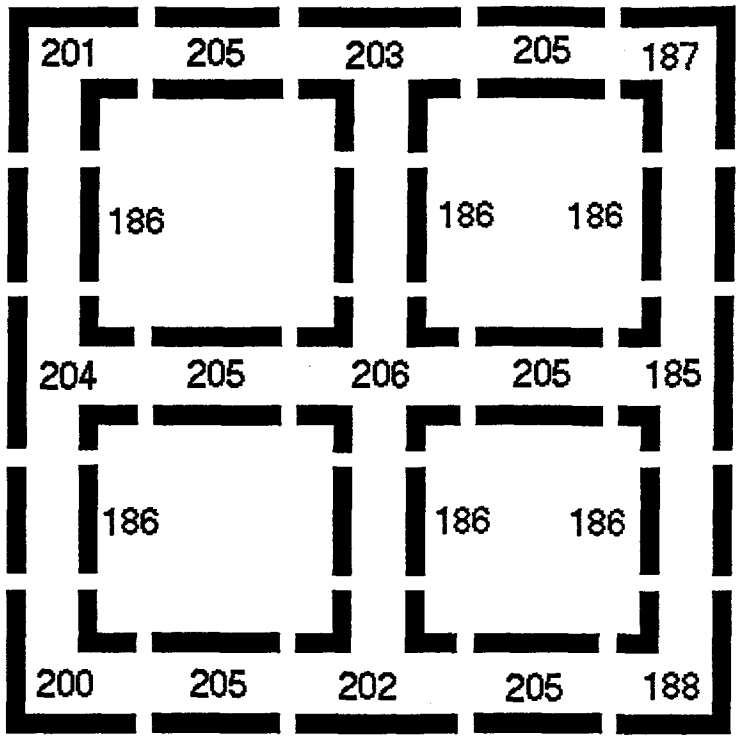
The technique used to differentiate reverse video character codes from graphic codes is to use bit-2 of the attribute array SET with bit-7 RESET to designate that the corresponding screen array position is to be used as is. The screen cell can store a graphics character with bit-7 SET. Additionally, reverse video of line drawing characters is designated by setting bit-3 of the corresponding attribute cell.

Now it certainly would have been simpler and more straightforward to revise the screen arrays' use to store strictly character values using all 256 values and simultaneously revise the attribute array use to designate either fields or reverse video attributes; however, to do that would have again created a problem in backward compatibility as well as requiring a screen conversion utility to upgrade from a previous version. I chose to keep the upward and downward compatibility. Besides, since the view screen background consists simply of static strings, the additional time required for array processing is unnoticeable compared to the time to open, read, and process the view screen file. With that first challenge out of the way, I moved to the second challenge - what algorithm could be developed to use in forming line connections?

The PC supports what could be called two sets of line drawing characters - including junctions where lines intersect: one set is made up of single lines; the other is made up of dual lines. There also exists a set of joining characters which establish the junction points where single lines meet dual lines. In the implementation of line drawing in LB, I chose to support only the dual-line line drawing characters. This, of

```
      gosub 213
      gosub 300
      RETURN
114      gosub 150 ' down
      gosub 214
      gosub 300
      RETURN
' <F2>
TOGGLE:
      drawmode = drawmode XOR 1
      if drawmode = 1 then locate ,,,7,7 else locate ,,,0,7
      RETURN

ENDPROG:
      cls:END:RETURN

150      code = 0
      x = col
      y = row
      if drawmode = 0 then return
      if row > 0 then
         if FNatbval(row-1,col,4)<>0 then code = code or 8
      end if
      if col > 0 then
         if FNatbval(row,col-1,1)<>0 then code = code or 2
      end if
      if row < 23 then
         if FNatbval(row+1,col,8)<>0 then code = code or 4
      end if
      if col < 79 then
         if FNatbval(row,col+1,2)<>0 then code = code or 1
      end if
      return

211 'up arrow
         if row = 0 then return
         if drawmode <> 0 then code = code or 8   'top vert
         row = row - 1
         return
212 'left arrow
         if col = 0 then return
         if drawmode <> 0 then code = code or 2  'left horz
         col = col - 1
         return

213 'right arrow
         if col = 79 then return
         if drawmode <> 0 then code = code or 1  'right horz
         col = col + 1
         return

214 'down arrow
         if row = 23 then return
         if drawmode <> 0 then code = code or 4   'bot vert
         row = row + 1

300      video(x,y) = val2chr(code)
      print chr$(val2chr(code));
      locate row+1,col+1
      return
```

Figure I



course, made the job easier. But it took some time to discover an simple algorithm which would calculate the proper joining character where an intersection occurred.

Microsoft WORD provides a line drawing mode in which you can simply move the cursor around the screen and a line would be drawn in its trail. This is not unlike many of the block graphics programs TRS-80 users have seen in the past, except that WORD's line drawing used the PC line drawing characters. Figure I displays a facsimile of these dual-line PC characters along with their values, in decimal. I was always fascinated how WORD always displayed the correct joining character when the cursor was moved through an existing line (which created a cross juncture) or when the cursor was moved at right angles (perpendicular to) a line (which created a T-intersection). When I first sat down to consider a technique, it was quite a puzzle.

My first attack was to explore the character values themselves in hexadecimal, octal, and binary. For instance, an examination of the Z80 operation codes in octal will reveal a great deal about their underlying operation as groups of codes. But that didn't provide any insight in the case of line drawing characters.

I next attempted to study the codes from a state diagram. Such a diagram reflects the change in state of a component to a given output caused by specific inputs. But the state changes were utterly complex. I naturally assumed there had to be an easier way.

I then stumbled onto the idea of decomposing each line draw character into subcomponents. A close inspection of every character in Table I will reveal that each character is composed of, at most, four pairs of components: a top vertical; a bottom vertical; a left horizontal; and a right horizontal. I could thus create a table of component values which would then represent equivalent characters. Value selection was arbitrary. I chose to use binary values of 8, 4, 2, and 1 to represent the top vertical (TV), bottom vertical (BV), left horizontal (LH), and right horizontal (RH) components respectively. For instance, a plain horizontal line has both an LH and RH component; a top left corner has both an RH and BV component; and a left-facing T-junction has three components: TV, BV, and LH. With the line drawing characters converted to a table of subcomponent values, it is quite easy to perform a simple lookup of the character value to a given code.

The next piece needed to put together the line drawing algorithm was a method to create a code value as the cursor was moved about the screen. Careful thought produced the following idea. The cursor is always moved by means of an ARROW key which denoted the direction of movement. Thus, if the direction of movement is UP, the current character cell should add a top vertical component. Similarly, if the direction of movement is RIGHT, the cell should add a right horizontal component. It is easy to see then, that moving DOWN adds a bottom vertical component and moving LEFT adds a left horizontal component. But what should these components be added to? The current cell value? No, it turns out.

You need to examine the adjacent cells for components closest to the cell in question. As an example, let's consider moving UP. A cell value is built then, by adding 2 (LH code) if the cell immediately left has an RH component, plus a 1 (RH code) if the cell immediately right has an LH component, plus a 4 (BV code) if the cell immediately below has a TV component, plus an 8 (TV code) if the cell immediately above has a BV component. If the cell immediately left, for instance, has no RH component, then you know there is no line coming from the left.

As it turns out, there is also no problem with checking for and including a component value from the adjacent cell in the direction of movement. This is because

the component value will always be added because the direction of movement requires the corresponding component value. However, considering that adjacent cell allows us to consider all four adjacent cells as a common function prior to any function needed to be executed for a specific direction.

I chose to use the screen borders as an enclosing surface; thus, if the cursor is currently positioned at the border, the cursor cannot be moved into the border to wrap around to the opposite side of the screen. Neither does the imaginary cell on the other side of the border add any component.

Another question to consider is the simultaneous display of line drawing and ASCII characters. I chose to implement in LB the priority use of line drawing. This means that a line being drawn through a character string will replace any ASCII characters with line drawing characters. Also, ASCII characters provide no line drawing components. This is the same concept in TRS-80 block graphics when displaying both graphics characters and ASCII text characters on the same screen.

The completed algorithm simply examines the four cells adjacent to the current one, temporarily accumulating the proper codes for the four adjacent components if they are present: BV for above; LH for right; TV for below; and RH for left. It does this by sequentially searching a character to code conversion table using each of the four adjacent cells in turn. Any character not in the table provides a zero result. The algorithm then adds the proper component based on the direction of movement. By constructing a code to character conversion table with all possible sixteen binary values, the line draw character can be extracted simply by using the code as an index value. Actually, the table has seventeen values since a zero value should imply no component (i.e. display a SPACE). Note that since initial movement would accumulate no components from adjacent cells, it is important to have codes of only a single component produce a character of two components. For example, an initial movement to the right from a blank screen accumulates only an RH component. But no character has that kind of appearance; the proper character is a horizontal line. So a code of 1, as does a code of 2, is translated to a character value of 205 just as a code of 3 which has both an LH and RH component. Table II presents the code to character translation.

Table II
Code to Character

TV	BV	LH	RH	Character
0	0	0	0	32
0	0	0	1	205
0	0	1	0	205
0	0	1	1	205
0	1	0	0	186
0	1	0	1	201
0	1	1	0	187
0	1	1	1	203
1	0	0	0	186
1	0	0	1	200
1	0	1	0	188
1	0	1	1	202
1	1	0	0	186
1	1	0	1	204
1	1	1	0	185
1	1	1	1	206

Table III shows the character to code translation.

Table III
Character to Code

185	1110
186	1100
187	0110
188	1010
200	1001
201	0101
202	1011
203	0111
204	1101
205	0011
206	1111

Since this algorithm was developed specifically for the PC line drawing characters, I chose to illustrate its use in an MS-DOS program. The line draw program is written using Microsoft Quick BASIC.

Of all the Microsoft MS-DOS BASICs, none provides a way to read extended key codes through the INKEY$ function; thus, a program somewhat compatible across TRS-80 and MS-DOS is an impossibility to program. MS-DOS BASIC supposedly allows you to sense (trap) any key code through use of the ON KEY GOSUB statement. The linedraw program uses that facility. On the other hand, I could not get it to work correctly using *user* KEY values (15-20). The program illustrates the algorithm using <F2> to toggle between draw mode and erase mode, and <F10> to terminate.

The program first dimensions an array used to store the screen character, and two additional arrays for the conversion tables. A multi-line function, ABTVAL, is defined which is used to obtain the subcomponent, if any, of an adjacent cell. The conversion tables are then filled with the values read from DATA statements.

The LOCATE statement positions the cursor to the northwest corner and turns on the cursor. The program allows for both drawing and erasing the line, functions which are toggled with an <F2> key depression; drawmode is initially turned on. Note, by the way, that LOCATE uses screen position values which are 1-based (i.e. col 1, 2, ..., 80) whereas the program uses a zero-based value for its ROW and COL variables; the cursor re-positioning statement makes the adjustment by adding one to the row and col values.

The video array is next initialized to SPACE characters to match the clearing of the actual screen.

The ON KEY(2) statement sets up BASIC's trapping of <F2> for toggling draw/erase modes. The ON KEY(10) traps the <F10> key for use as an exit from the linedraw program. The KEY(n) statements activate trapping of the cursor movement keys. A drawback of this key utilization is

that QB traps only the cursor characters on the keypad - not on an auxiliary cursor pad as found on 101-key keyboards.

The ON KEY statements will invoke the subroutines only when the corresponding key is pressed. The line numbered 100 will be continuously executed until a trapped key action is detected. <F2> stops this program.

Each of the four direction movement actions call subroutine 150 first. This is the part of the algorithm which examines the four adjacent cells and accumulates a temporary code value based on the adjacent cells participating components. Each direction of movement code block then adds the proper component and calculates the new cursor position - all based on a valid movement. Finally, they each call a common subroutine to index the correct character for the cell and display the character. The cursor position is then updated.

Note that the direction movement DOWN introduces a spurious repetition of the character from which the cursor was just moved - at least it does on my system. This does not appear to be a bug in the program. For some reason, moving down seems to draw two characters.

The same concept can be applied to single-line line drawing characters. In fact, it should be possible to handle a misture of both single- and dual-line characters and junctures by using encoding bits of 4-8 and larger conversion tables.

I explored adapting the algorithm to the TRS-80 Model 4 environment; however, a few snags reveal themselves. A close examination of the PC line drawing character set will reveal that true T-junctures exist as character values both in the vertical and horizontal directions. In the TRS-80, line drawing must use graphics characters which are fabricated in a 2 by 3 (H,V) cell matrix. Thus, you have true T-junctures as graphic characters only in the horizontal direction. For example, a right-T can be displayed with character value 157D and a left-T with character value 174. As a further drawback, the block graphics cell is developed using an underlying image only 10 dots in height. The cell is divided up into blocks of 4, 4, and 2 dots; thus, the graphics blocks are not of equal height.

One could use this algorithm by maintaining an array of values equivalent to that for the PC, and convert to available displayable characters. That is left as an exercise.

Now if someone has an answer as to the access of keystrokes in MS-DOS BASICs using ON KEY, I would be interested in seeing it.

AMORT1

```
10 '*************************************************************************
11 '**                                                                     **
12 '**                          AMORT1/BAS                                 **
13 '**                                                                     **
14 '**                    By Andrew M. Kunz, 2 August 1988                 **
15 '**                        revised 10 August 1988                       **
16 '**                                                                     **
17 '*************************************************************************
18 '**                                                                     **
19 '**   This program will estimate (very closely using double precision)  **
20 '**   your interest and principal at any time during the period of      **
21 '**   a loan with monthly compounded interest.  It will request that    **
22 '**   the user supply an initial balance, interest rate, and monthly    **
23 '**   payment, and/or the duration of the loan, and from that compute   **
24 '**   the rest.  This program may be used to budget your expenses.      **
25 '**                                                                     **
26 '*************************************************************************
27 '**                                                                     **
28 '**                        Variable Dictionary                          **
29 '**                                                                     **
30 '**  B - Balance remaining on the loan at any time (in dollars).       **
31 '**  D - Duration of the loan in months.  Used only to calculate the   **
32 '**        monthly payment when user enters 0 for monthly payment.      **
33 '**  FP - Final payment on the loan.  This amount may cause an extra    **
34 '**       month if it is significantly more than the monthly payment.   **
35 '**  HALF- Always 0.5.  Used to compute monthly payment, and to round.  **
36 '**  ID - Interest paid to date.                                        **
37 '**  IP - Interest computed on the balance for the current month.       **
38 '**  M - Monthly payment (in dollars).                                  **
39 '**  MO - Current month number.                                         **
40 '**  PD - Principal paid to date.  This value is computed as if the     **
41 '**       payment for the month has already been made, not at the start **
```

```
'**        of the month.  The value for the previous month is then the   **
'**        correct one.                                                  **
'**  PP - Principal paid in the current monthly payment.                 **
'**  R - Interest rate.  This value may be entered in either the         **
'**        annual rate (10.5) or decimally adjusted annual rate (.105).  **
'**  TP - Total paid to date.  This shows you how much your loan is      **
'**        really costing you.                                           **
'**  US$ - This string is used to format the output to pretty print      **
'*****************************************************************
CLS:DEFDBL A-Z
ON ERROR GOTO 1000
DEF FNINTEREST(B,R) = INT(B * R * 100 + HALF) / 100
HALF = .5
MO = 1
PRINT TAB(28);"Loan Amortization Program";TAB(70);"AMORT1/BAS"
PRINT:PRINT:PRINT
INPUT "Initial Balance:  ",B
INPUT "Annual Interest Rate:  ",R
IF R > 1 THEN R = R / 100
R = R / 12
PRINT:PRINT USING "Your first month's interest is $$###,###.##";FNINTEREST(B,R):PRINT
INPUT "Monthly Payment (Enter 0 for automatic computation):  ",M
IF M = 0 THEN    INPUT "Enter term of loan in months:  ",D:    IF D = 0 THEN
   PRINT:PRINT "You must enter either Loan Term or Monthly Payment!":        SOUND 0,0:
   GOTO 190    ELSE        M = INT(HALF+B*(R/(1-(1+R)^(-D)))*100)/100
IF FNINTEREST(B,R) > M THEN        PRINT USING "Error - you are not paying enough to
   cover interest of $$###,###.##";FNINTEREST(B,R):        PRINT:PRINT:GOTO 190
PRINT:PRINT "Printing amortization schedule started at ";TIME$
LPRINT "Date & Time of Run:  ";DATE$;"  ";TIME$
LPRINT
LPRINT USING "Initial Balance:  $$###,###.##";B
LPRINT USING "Loan Interest Rate:     ##.###%";R * 1200
LPRINT USING "Monthly Payment:   $$##,###.##";M
LPRINT:LPRINT
LPRINT "<------ Before Payment ------>  <------ After Payment ------>":LPRINT
LPRINT "                    Month's   Month's    Interest   Principal   Total Pd."
LPRINT " Mo.   Balance     Interest  Principal    to Date    to Date      to Date"
LPRINT "--- ------  ------  ------  ------  ------  ------  -------"
US$ = "#### ######.##   #####.##  ######.##  ######.##  #######.##  #######.##"
WHILE B + FNINTEREST(B,R) >= M
        TP = TP + M
        IP = FNINTEREST(B,R):ID = ID + IP
        PP = M - IP: PD = PD + PP
        LPRINT USING US$; MO,B,IP,PP,ID,PD,TP
        B = B - PP
        MO = MO + 1
        WEND
IF B <= 0 THEN LPRINT STRING$(LEN(US$),"-"):LPRINT:GOTO 500
        IP = FNINTEREST(B,R): ID = ID + IP
        PP = B: PD = PD + PP
        FP = B + IP
        TP = TP + FP
        LPRINT USING US$; MO,B,IP,PP,ID,PD,TP
        LPRINT STRING$(LEN(US$),"-"):LPRINT
        LPRINT USING "Last month's payment:  $$###,###.##";FP
LPRINT
LPRINT USING "Your total payment for the duration of the loan is:  $$#,###,###.##";TP
LPRINT:LPRINT "Processing complete at ";DATE$;"  ";TIME$
LPRINT CHR$(12);
END
PRINT "Error - ";:IF ERR = 57 THEN PRINT "Printer not ready" ELSE PRINT ERR$
PRINT:PRINT "Press any key to restart . . .";:
IF INKEY$ = "" THEN 1020
RESUME 1040
RUN
```

Yet Another HiRes Graphics Format

by Hans de Wolf

Extending /CHR

When I was working on the Monosave program I discovered that the /CHR format was capable of storing images that use the full 32k RAM of hires memory by ignoring the limit of 80 bytes per line, just as the /SHR format does. Monosave creates such files if the X parameter is specified on the command line. In order to distinguish these files from /CHR and /SHR formats I introduced the /XHR extension (for eXtended High Resolution). Who wants to write a program that can read and display or print this new format?

Load Module Graphics

Although the /XHR format does its job (storing 32k pictures efficiently) I did not like it very much; it adds yet another graphics format to the already existing chaos. This made me think: I would like to have a graphics format that combines the strong points of all other TRS-80 graphic formats: the easy loading and writing of /HR files, the efficient storage of the /CHR format, a maximum image size 1024 by 255 pixels like /XHR, and support for image cropping like in the /BLK files. I came up with the following solution to this problem: Load Module Graphics. At this moment Load Module Graphic files are just an idea, but maybe the TRS-80 programmers out there could make it reality. Let me explain ...

LMG files are constructed along the design of the LDOS Load Module file formats, like used for /CMD files, the /SYS library files and PaDS data sets. If there is any accepted system standard for TRS-80 file formats this is it. All these files are constructed from Load Module blocks: packages of 256 bytes or less, each preceded with a type indicator and byte counter (more information can be found in the Pro-Cess/CMDFile manual). A single byte is used as type indicator, allowing for up to 256 types of load modules. The actual number of types in use is much less than this (01-08, 0A, 0C, 0E, 10 and 1F), leaving enough room for extensions to the format. Why not introduce a few new load module blocks to contain graphics data instead of memory load data?

An example: the Object Code load module block (type 01) consists of a byte 01 indicating the type, a single byte indicating the number of data bytes in the block and a two-byte load address, followed by the actual bytes to be loaded. Let's use the same structure for a new Load Module type 21H, and use the 2 bytes in the load address as the values for the X and Y address where the load should start. The data bytes in the load module should be the bytes along a row (like a line in a /BLK or /HR file). Remember, a single row of a screen image can contain 1024 pixels, but no more than 128 bytes and will always fit in a load module. Because each block contains information about length and load address also parts of a screen can be stored in this format (the changing parts in an animation!).

We can even improve on this: introduce a 22H load module that is constructed in the same way, but do not store the raw data bytes for the image in data part of the module: store the image data bytes in the compressed RLE format that is used in /CHR files. While we are working, we can also add a 23H type block which is the same as 21H, but contains a column of an image instead of a row, and a 24H type for an RLE-encoded column.

In order to finish the job, we should patch the system loader in L(S)DOS to recognize these new load module types.

Then add load modules for control purposes (switching video modes) and imagine what would be possible: complete animated slide shows could be stored in a single /CMD file. HiRes images belonging to a program would be loaded automatically by running the program. Any program would be able to load an image or start an animation by executing a DOS command, like SYSTEM "LOAD MOVIE/LMG" in BASIC ...

There may be technical reasons why this concept may not be feasible, but if anyone is looking for a programming project: why don't you give this idea a try?

SMALARCH/CMD Small File Archiver

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CompuServe 72411,650

If your Model 4 is a floppy-only system, you only have to keep "backups" to guard against the inevitable loss of data. But when you graduate to a hard drive, Murphy's Law requires you to start keeping "archives" of your files.To this end, MISOSYS, Inc., supplies the programs ARCHIVE and RESTORE with their hard drive systems.

ARCHIVE makes it possible to store, on floppies, copies of hard disk files which are too large to store on floppy via normal means.It's a bit slow, but it does the job, and does it well.But it is not efficient when dealing with files small enough to fit on your floppies. It adds and extra sector to each file, and the speed is such that (F)BACKUP would be much faster. However, (F)BACKUP does not store the files very efficiently. Whenever the next file to be copied will not fit on the target floppy, you are prompted to insert another disk, even if the free space is only one granule less than the file size. This usually results in a great deal of wasted floppy disk space.

The accompanying listing, SMALARCH/ASM, is one solution to this problem. It makes use of the LS-DOS COPY command; so is reasonably fast, and it makes nearly optimum use of floppy disk space.To do this, it functions as follows:

1. It analyzes the target disk, and determines its capacity.

2. It analyzes the files on the source disk (hard drive partition), and determines which files to copy. It will not copy any file too large for the floppy, nor any /SYS, invisible, empty or password-protected files.

3. It sorts the files to be copied in descending order by size, and in ascending order alphabetically by file name within size. "Size," in this case, means the number of 6-sector granules of floppy disk space.

4. For each floppy in turn, it goes through the sorted list of files and selects a set of files which most efficiently fills the floppy's unallocated free space.

5. The selected files are then copied from hard drive to floppy and removed from the sorted list, (go to Step 3, above) until all files are copied.

Assuming the source disk contains files with a fairly broad range of file sizes (and/or lots of small files) SMALARCH will virtually always create floppy archive disks with zero free space. In my own experience, I have never seen SMALARCH leave a single granule of wasted disk space on a target floppy.However, the theoretical worst case is if every file to be copied is larger than half the size of the target floppy. In this case, SMALARCH would write one file per floppy, and waste just as much disk space as (F)BACKUP would.

To give you an idea of how SMALARCH's BEST_FIT algorithm "thinks," one of the tests I ran consisted of a set of 25 files: 5 each of 78 sectors (13 floppy grans), 5 each of 210 sectors (35 grans); 5 each of 300 sectors (50 grans); 5 each of 360 sectors (60 grans); and 5 each of 450 sectors (75 grans). All of these were to be archived to 360K DSDD floppies which hold 233 grans of data, after the requirements of DIR/SYS and BOOT/SYS.

The human brain would typically select five sets of 75 + 60 + 50 + 35 + 13 = 233 each to exactly fit the data on five diskettes.

The original SMALARCH merely stepped through the sorted list and picked the largest file which would fit on the disk. Using the above file sizes, this would result in the first disk having 75 + 75 + 75 = 225 granules used, and 8 granules wasted. The second disk would have had 75 + 75 + 60 + 13 = 223 grans used, and 10 grans wasted, etc., spreading five disk's worth of data over six disks.

Obviously, a more sophisticated approach was required.Enter the BEST_FIT algorithm. I originally wrote BEST_FIT rather differently than it appears here. Originally, it was part of an order-filling system for a manufacturer who wanted to fill distributor orders as efficiently as possible without "breaking" boxes of the items to be shipped. Thus it had to pick the smallest combination which was equal to or greater than the quantity desired by the customer.

Obviously, this new version of BEST_FIT, since it tries to fill available space, must pick the largest combination which is equal to or less than the requested total quantity.

Using the set of test files described above, the algorithm (because it prefers to use the largest files first) created two floppies of 75 + 75 + 35 + 35 + 13 = 233; one floppy of 75 + 60 + 50 + 35 + 13 = 233; and two floppies of 60 + 60 + 50 + 50 + 13 = 233. It succeeded, in other words, in fitting exactly five disk's worth of data on exactly five disks.Essentially, BEST_FIT is a "brute force" approach to the problem. The recursive nature of the algorithm

creates, in effect, up to one FOR-NEXT loop for each quantity in the list. Thus, if you have 15 files to copy, there could be as many as 15 nested FOR-NEXT loops created in the program.

The following BASIC pseudo-code is a ROUGH representation of how this works:

```
TOTAL = 0 : BEST = 0
FOR X0 = 0 TO 14
TOTAL = TOTAL +
   QUANTITY(X0)
IF (BEST < TOTAL AND TOTAL
   <= GOAL ) THEN BEST =
   TOTAL
IF TOTAL < GOAL THEN FOR X1
   = X0 + 1 TO 15
TOTAL = TOTAL +
   QUANTITY(X1)
IF (BEST < TOTAL AND TOTAL
   <= GOAL ) THEN BEST =
   TOTAL
IF TOTAL < GOAL THEN FOR X2
   = X1 + 1 TO 15
TOTAL = TOTAL +
   QUANTITY(X2)
IF (BEST < TOTAL AND TOTAL
   <= GOAL ) THEN BEST =
   TOTAL
IF TOTAL < GOAL THEN FOR
   X3...(etc.)
IF TOTAL = GOAL GOTO
   JOBDONE
TOTAL = TOTAL -
   QUANTITY(X3) : NEXT X3
IF TOTAL = GOAL GOTO
   JOBDONE
TOTAL = TOTAL -
   QUANTITY(X2) : NEXT X2
IF TOTAL = GOAL GOTO
   JOBDONE
TOTAL = TOTAL -
   QUANTITY(X1) : NEXT X1
IF TOTAL = GOAL GOTO
   JOBDONE
TOTAL = TOTAL -
   QUANTITY(X0) : NEXT X0
```

As can be seen from the above, if no combination of quantities in the list adds up exactly to the goal, the search can be quite extensive and therefore extremely time-consuming (something like five or ten minutes to go through a list of 40 files). Normally, the only time this will occur in SMALARCH is for the last disk, when the total size of all files is less than the goal.

```
; SMALARCH/ASM 08/12/90
;
; Utility to complement ARCHIVE and RESTORE routines from
; Misosys, Inc.
;
; Author:  J.F.R. "Frank" Slinkman
;          1511 Old Compton Rd.
;          Richmond, Va.  23233
;          Phone:  804/741-0204
;          CompuServe 72411,650
; Assembler:   Pro-MRAS
; Change log:
;   8/25/92 Support 16-bit gran values for 720K drives
;   8/29/92 Add BEST_FIT & CALC_BEST to replace simple
;           sort algorithm
;
; SMALARCH copies files too small for ARCHIVE in such a
; way as to make optimum use of floppy disk space (the
; inefficient use of which is the main drawback to using
; (F)BACKUP for archival purposes).
;
; Files written to floppy by ARCHIVE will have their MOD
; flags set, and those written by SMALARCH will normally
; have their MOD flags reset, making it easy to tell which
; files must be RESTOREd and which must be (F)BACKUPed
; when restoring a files.
;
; To learn how many formatted floppy disk you will need,
; run ARCHIVE with it's (t,s=0) parameters. Virtually 100%
; of the time, this will tell you the number of floppies
; you will need.  However, it is theoretically possible
; SMALARCH will take more disks (or one fewer disk) so be
; sure to have at least one extra disk handy.
;
; Run ARCHIVE first, if necessary [do NOT use the (s=0)
; parameter] to archive files larger than the size of your
; floppies.  Then, starting with the last floppy disk used
; by ARCHIVE, run SMALARCH to store the smaller files.
;
; Syntax:  smalarch :s :d [(update=Y|N,verify=Y|N)]
;
;  :s is the number of the HD partition to copy from
;  :d is the number of the floppy drive to copy to
;  "update=no" (u=) preserves set MOD flags
;     (default is YES, reset flags)
;  "verify=yes" (v) causes verified disk writes
;     (default is NO, do not verify writes)
;
; Entering SMALARCH with no parameters will cause an
; informational "correct syntax" message to be displayed.
;
;*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*
*GET EQUATES          ;SVC macro & definitions
BLANKEQU 20H
;
GETWORD  MACRO        ;LD HL,(HL)
     LD A,(HL)
     INC HL
     LD H,(HL)
     LD L,A
     ENDM
;
; allow max RAM for COPY buffer and STACK, plus reasonable
; amount (4K+) for himem routines.
```

To avoid such "endless" searches, this special case is handled very quickly by code in BEST_FIT.

To see how this concept is implemented, let's go to the program listing, starting at the label BEST_FIT.

Because all references to the variable arrays in the program are base zero, the number of the last array element in use will always be one less than the number of elements. For example, if there are 100 files to copy, array elements 0 through 99 will be in use. For convenience later on, the variable LAST (which refers to the last array element in use) is set to one less than COUNT, which is the number of not-yet-copied files in the sorted list.

Whenever the algorithm finds a better BEST solution to the problem, the files selected are recorded in an array of one-byte flags which are related by position to the elements in the main ARRAY of files. That is, the 10th flag relates to the 10th element of ARRAY, etc. Obviously, these must be initialized to zero (FALSE) upon entry.

Next the sum of all files in the list is accumulated. If this sum is less than the goal (which is the free space on the target disk), it makes no sense to make a long search for a sum which can never be found. Also, if the sum is exactly equal to the goal, there is no need to make a search. Thus, in these special cases, the BST_FLG flags for all remaining files will be set, and the sum of all files returned to the calling routine in the HL register.

In the only other case is that the sum of all file sizes is greater than will fit on a floppy, which means a selection of a set of the remaining files must be made, which is done by CALC_FIT.

Now that we know we'll be invoking CALC_FIT, and since the BST_FLG array is filled from the contents of the TMP_FLG array whenever a better value for the BEST solution is found; all TMP_FLGs are now initialized to zero

```
;
      ORG 0D600H
;
HIT   EQU $
;
; these messages are disposable after syntax checked:
;
HELLO$   DM LF,'SMALARCH - (c)1990/92 by J.F.R. '
      DM 'Slinkman',LF,CR
SYNTAX$  DM LF,'Syntax is:  SMALARCH :s :d '
      DM '[(update=Y|N,verify=Y|N)]',LF
      DM 'where  :s  is the drive number of the '
      DM 'hard drive partition to copy from',LF
      DM TAB+7,':d  is the number of the floppy '
      DM 'drive to copy to',LF,LF
      DM 'Parameters:',LF,LF
      DM TAB+7,'"update=no" (u=) preserves set MOD'
      DM ' flags',LF,TAB+7,'"verify=yes" (v) '
      DM 'causes verified disk writes',LF,CR
HDTARG$  DM 'Target drive is not a floppy - function '
      DM 'aborted',LF,CR
STARG$   DM 'Target drive cannot be system drive - '
      DM 'function aborted',LF,CR
;
STACKEQU $  ;program stack after HIT is read
;*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*
; variables:
;
PTR0  DS  2*254  ;pointers to array elements
ARRAYDS  13*254 ;struct { int   grans;
            ;     char filename[11]; }
ARRAY_SIZE  EQU $-ARRAY
BST_FLG  DS  255;one flag for each array element
TMP_FLG  DS  255;  plus one
BEST  DS  2
ACCUMDS  2
LAST  DS  2
FREE  DS  2   ;storage for free space on floppy
DIRBUF   DS  20  ;buffer for directory records
SVCMSB   DS  1   ;storage for msb of SVC tbl addr
COPYCTR  DB  0   ;inits to zero
;*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*
; messages:
BREAK$   DM 'Break key detected - program '
      DM 'terminated',LF,CR
BFTERR$  DM 'best_fit function error - program '
      DM 'terminated',LF,CR
NEWDSK$  DM LF,LF,TAB+19,'Insert new disk in drive '
DRIVNO   DM 'x and hit <ENTER>',CR
COMAND$  DM 'copy filename/ext:s :d',CR
FILNAM$  EQU COMAND$+5
DRIVE$   DM ':x :x',CR
SOURCE$  EQU DRIVE$+1
TARGET$  EQU DRIVE$+4
;*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*
;  subroutines
;
PERFORM  PUSH   IX     ;issue LS-DOS COPY command
      CALL   SWAPCOD      ;change @EXIT code
      LD  (PRGSTK),SP   ;save program stack ptr
      LD  SP,$-$
SYSTACK  EQU $-2    ;load SP w/system stack
      LD  HL,COMAND$
      SVC @CMNDI    ;issue copy command
```

```
PFM010   LD SP,$-$     ;@EXIT is vectored to here
PRGSTK   EQU $-2       ;load SP w/program stack
         PUSH  HL      ;save error code
         CALL  SWAPCOD      ;restore orig @EXIT vector
         LD C,ESC      ;ESC = 1BH
         SVC @DSP      ;don't double space
         POP HL     ;restore error code
         POP IX
         RET
;
TERMCOD  JP PFM010
;
SWAPCOD  LD HL,$-$     ;HL -> @exit code
@_EXIT   EQU $-2
         LD DE,TERMCOD    ;DE -> replacement code
         LD BC,3       ;count 3 bytes to swap
SWP010   LD A,(DE)
         LDI           ;(HL) -> (DE)
         DEC HL
         LD (HL),A     ;old (DE) -> old (HL)
         INC HL
         JP PE,SWP010
         RET
;*=*=*=*
SHELSRT  LD HL,(COUNT)    ;shell sort "borrowed"
         LD (STORM),HL    ; from DIR and modified
CYCLE    EI
         LD HL,$-$
STORM    EQU $-2
         SRL H
         RR L
         LD A,H
         OR L
         RET Z
         LD (STORM),HL
         DI
         EX DE,HL
         LD HL,$-$
COUNT    EQU $-2
         SBC HL,DE
         LD (STORK),HL
         LD HL,0
         LD (STORJ),HL
AGAIN    LD HL,$-$
STORJ    EQU $-2
         LD (STORI),HL
REPEAT   LD DE,$-$
STORI    EQU $-2
         LD HL,(STORM)
         ADD HL,DE
         ADD HL,HL
         EX DE,HL
         ADD HL,HL
         LD BC,PTR0
         ADD HL,BC
         EX DE,HL
         ADD HL,BC
         PUSH  HL
         PUSH  DE
         PUSH  DE
         LD E,(HL)
         INC HL
         LD D,(HL)     ;DE -> higher element
         POP HL
```

(FALSE).CALC_FIT uses two kinds of variables which, in C parlance, are called "global" and "local". The ARRAY of file sizes and names, the array of pointers (PTR0), ACCUM and BEST are examples of "global" variables. They can be accessed by code anywhere in the program, including CALC_FIT.

The "local" variables, on the other hand, are known only to CALC_FIT, and cannot be accessed by any code outside of CALC_FIT. Because CALC_FIT is recursive (i.e., it calls itself), all its local variables must be stored in such a way that each level of recursion has it's own unique set of local variables. The best way to do this is to store the variables on the stack, a la C. Each invocation of CALC_FIT uses six levels of stack, and since there can be as many as 254 files in a list, there must be about 3K of stack space available. This is provided for elsewhere in the code.

Before calling CALC_FIT, the calling routine must push three variables on the stack, namely the number of array elements to search, the array position at which to start the search (initially element number zero), and the sum of sizes to find. In CALC_FIT itself, these are called "number", "start", and "target," respectively. CALC_FIT also uses two other "local" variables, namely "total" and "local_best," which it also pushes onto the stack. The order of appearance on the stack is of crucial importance, as this is how CALC_FIT accesses them.

Of the six levels of stack required, five contain variables (the sixth being the RET address), and are accessed via their location relative to the stack pointer, as follows:

number	SP +10
start	SP + 8
target	SP + 6
RET address	
total	SP + 2
local_best	SP + 0.

The references for the next recursive iteration of CALC_FIT will access its five local variables the same way, but these five will be different from the five used by the previous level of recursion, and each will be six levels of stack (12 bytes) lower in RAM than the corresponding variable used by the calling level.Each successive recursive call will generate a new set of five variables and one RETurn address. When a level of recursion returns to a higher level, the value found is returned to the caller in the HL register, and the stack pointer increased by 12 through a series of POPs so it once again references the local variables of the current level.The CALC_FIT listing is commented with the original C source statements, and is well enough commented in general that it would be redundant for me to go through the listing step by step in this article.The only area that needs explanation is the logic behind the C statement:

```
if ( total < target )
    total += calc_fit( target - total,
start + 1, number - 1 );
```

the implementation of which begins at the label CFT030.At this point, total holds the value of array[start].grans — the size of the file at the top of the current portion of the list being searched.

If total is too small, then it must be increased, which is done by adding the size of some file further down the list. To do this, a new search is initiated starting with the next array element, with the target being the difference between what we need and what we've got, and the values for "start" and "number" adjusted to describe where to start the search and how many elements to search. Then CALC_FIT calls itself to perform this search.

The new iteration has a new total (the size of the first file for this search) and a new target, as described above. If the total is too small, then CALC_FIT calls itself again, with new values for target, start and number.

Thus the program will loop from the label

```
      LD A,(HL)
      INC HL
      LD H,(HL)
      LD L,A    ;HL -> lower element
;
;  sort by file size in descending order
;
      INC DE    ;DE -> msb of higher
      INC HL    ;HL -> msb of lower
      LD A,(DE)
      CP (HL)       ;compare msbs
      JR C,FINIS      ;no swap if lower > higher
      JR NZ,POPEM  ;swap if lower < higher
      DEC DE
      DEC HL
      LD A,(DE)
      CP (HL)       ;compare lsbs
      JR C,FINIS      ;no swap if lower > higher
      JR NZ,POPEM  ;swap if lower < higher
      INC DE    ;here if sizes equal
      INC DE    ;DE -> higher filename+ext
      INC HL
      INC HL    ;HL -> lower filename+ext
;
; sort by file name + ext in ascending order
;
      LD B,11       ;count 11 ASCII characters
BACK  LD A,(DE)
      CP (HL)
      JR C,POPEM      ;swap if lower > higher
      JR NZ,FINIS  ;no swap if lower < higher
      INC DE
      INC HL
      DJNZ  BACK
      JR NZ,FINIS  ;no swap if lower = higher
POPEM POP DE
      POP HL
;
      LD BC,2
SWAP  LD A,(DE)
      LDI
      DEC HL
      LD (HL),A
      INC HL
      JP PE,SWAP
;
      LD DE,(STORM)
      LD HL,(STORI)
      XOR A
      SBC HL,DE
      LD (STORI),HL
      JR NC,REPEAT
      JR EXITSRT
FINIS POP DE
      POP HL
EXITSRT  LD HL,(STORJ)
      INC HL
      LD (STORJ),HL
      XOR A
      LD DE,$-$
STORK EQU $-2
      SBC HL,DE
      JP NC,CYCLE
      JR AGAIN
```

```
;*=*=*=*
@0TO7CP  30H    ;check drive # validity
     JR  C,ILDRIVE
     CP  38H
     RETC       ;no return if <0 or >7
;
ILDRIVE  LD  A,32       ;'Illegal Drive Number'
     LD  HL,-1
;
ERROROR  0C0H
     LD  C,A
     SVC@ERROR
     JP  EXIT
;
WPDISK   LD  A,15       ;'Write Protected Disk'
     JR  ILDRIVE+2
;*=*=*=*
BFTERR   LD  HL,BFTERR$   ;error exits
     DB  0DDH
HDTARG   LD  HL,HDTARG$
     DB  0DDH
STARGLD  HL,STARG$
     DB  0DDH
BREAKLD  HL,BREAK$
     DB  0DDH
SYNTAX   LD  HL,SYNTAX$
     SVC@DSPLY
     LD  HL,-1
     JP  EXIT
;*=*=*=*
BEST_FIT
;int best_fit()
;{
;last = count - 1;
;memset( &bestflag[0], 0, 254);
     LD  HL,(COUNT)
     DECHL
     LD  (LAST),HL ;fast ref to last element
     LD  HL,BST_FLG
     LD  DE,BST_FLG+1
     LD  BC,254
     LD  (HL),0
     LDIR          ;reset best flags
; check if sum of all < goal to avoid "endless" searches
     LD  A,(COUNT)
     LD  B,A    ;count number of files
     LD  DE,0       ;init size accumulator
     LD  HL,PTR0       ;ptr to first
BFT010   PUSH   HL      ;save ptr
     GETWORD           ;-> size
     GETWORD           ;get size
     EX  DE,HL      ;DE = size, HL = sum
     ADDHL,DE       ;add size to sum
     EX  DE,HL      ;DE = sum
     POPHL     ;ptr
     INCHL
     INCHL     ;-> next ptr
     DJNZ   BFT010    ;do next
;
     LD  HL,(FREE) ;goal
     SBCHL,DE       ;sum > goal?
     JR  C,BFT020  ;go if so
     PUSH   DE      ;if sum <= goal, save sum,
     LD  HL,BST_FLG   ;& set flags for all files
```

CALC_FIT to the CALL CALC_FIT instruction until a sum greater than or equal to the target is accumulated. In each of these iterations, the total of all sizes held in ACCUM is compared to BEST, and BEST and the BST_FLG array updated each time a better fit is found.

Once a total equal to or greater than target is found, the program will loop from the first POP DE instruction after CALL CALC_FIT to the first RET instruction executed by the code as many times as CALC_FIT called itself (i.e., if CALC_FIT calls itself ten times, it must return to itself ten times).

Finally, when either an exact solution has been found (i.e., ACCUM == GOAL) or all possibilities have been exhausted, return is made to the calling routine with the solution value in the HL register and the component parts of the solution identified in the BST_FLG array.

To illustrate further, consider an example where there are 3 files in the list, with the sizes 10, 5 and 3 grans respectively, and a "target" of 18 grans. The calling routine would push a "count" of 3, a "start" of 0, and the "target" of 18 onto the stack, and then call CALC_FIT.

The first iteration of CALC_FIT would make "total" equal to 10 (the size of the first file in the list), and then call itself with a "count" of 2, a "start" of 1, and a "target" of 8.

The second iteration would assign 5 (the size of the 2nd file on the list) to "total,", and then call itself with a "count" of 1, a "start" of 2, and a "target" of 3.

The third level of recursion would return a value of 3 (the size of the LAST file on the list) in HL. This 3 would be added to the "total" (5) in the second level of recursion, which would then return the value 8 in HL to the highest level of recursion. This 8 would be added to the first level's "total" of 10, and the value 18 would be returned to the calling routine in HL. Now consider what would happen if,

in the above example, the target is 9 instead of 18.In the first level, the "total" of 10 is larger than the "target" of 9, so the routine does not call itself, but rather restores ACCUM to zero, and starts a new search with "count" = 2, "start" = 1, and "target" = 9.

This time through, "total" becomes 5; so the routine calls itself with count = 1, start = 2, and goal = 4. The second level of recursion returns 3, which the first level adds to its total of 5. Because the accumulated 8 is not equal to the goal of 9, a new search is started at the 3rd file, which returns 3.

All possibilities are now exhausted; so return is made to the caller, which loads BEST into the HL register, and returns to its caller with the second and third BST_FLG flags set and 8 in HL.

In this way, BEST_FIT tells the caller the closest it could come to the goal of 9 was 5 + 3 = 8, and the 10-gran file will have to be written to another disk.

One final example: 5 files with sizes of 16, 11, 8, 7 and 3 grans, and a goal of 18.

In the first level, count = 5, start = 0 and target = 18. The first total is 16; so the routine calls itself with count = 4, start = 1 and target = 2. Since subsequent levels of recursion cannot find a value <= 2, zero is returned to the top level, and a new search started with count = 4, start = 1, and target = 18.

The first total becomes 11; so the routine calls itself with count = 3, start = 2 and target = 7. In this level, total becomes 8—too large—so ACCUM reverts to 11, and the next file size is checked. Total now becomes 7, which is equal to target; so is returned to the top level of recursion, where the 7 is added to 11 to get 18. Because 18 = goal, the routine returns to the caller.

Note that in this case there is another solution: 8 + 7 + 3 = 18; but the algorithm found 11 + 7 = 18 first; so that's what it

```
      LD DE,BST_FLG+1
      LD BC,(COUNT)    ;can't be > 254
      LD (HL),-1
      DEC C
      JR Z,$+4         ;no LDIR if only 1 file
      LDIR
      POP HL           ;return sum
      RET
;best = accum = 0;
BFT020   LD HL,0
      LD (BEST),HL
      LD (ACCUM),HL
;memset( &temp_flag[0], FALSE, 254 );
      LD HL,TMP_FLG
      LD DE,TMP_FLG+1
      LD BC,254
      LD (HL),0
      LDIR
;return calc_fit( goal, 0, count );
      LD HL,(COUNT)    ;number to search
      PUSH  HL
      LD HL,0          ;where to start search
      PUSH  HL
      LD HL,(FREE) ;# of granules to find
      PUSH  HL
      CALL  CALC_FIT
      POP AF
      POP AF
      POP AF
      RET
;}
;*=*=*=*
CALC_FIT
;int calc_fit ( target, start, number )
;int target, start, number;
;{    int total, local_best = 0;
      LD HL,0
      PUSH  HL         ;total
      PUSH  HL         ;local_best
;-------------------------------------
;|  stack:  number (count)      SP +10 |
;|          start          SP + 8 |
;|          target (free) SP + 6    |
;|          ret address       |
;|          total          SP + 2 |
;|          local_best     SP + 0    |
;-------------------------------------
;
CFT010
;if ( start == last && array[last].grans <= target )
      LD HL,8
      ADD HL,SP
      GETWORD          ;start
      LD DE,(LAST)
      OR A
      SBC HL,DE        ;start = last?
      JR NZ,CFT020 ;go if not
      EX DE,HL         ;HL = last = start
      ADD HL,HL
      LD DE,PTR0
      ADD HL,DE        ;HL -> ptr[last]
      GETWORD          ;HL -> array[last].grans
      LD E,(HL)
      INC HL
```

```
        LD  D,(HL)      ;DE = array[last].grans
        LD  HL,6
        ADD HL,SP
        GETWORD
        EX  DE,HL       ;DE = target; HL = size
        INC DE
        OR  A
        SBC HL,DE       ;size <= target?
        JR  NC,CFT020 ;go if not
;(      local_best = array[last].grans;
        ADD HL,DE       ;HL = array[last].grans
        POP DE
        PUSH   HL       ;replace local_best
;       best_flag[last] = TRUE;
        LD  DE,(LAST)
        LD  HL,BST_FLG
        ADD HL,DE
        LD  (HL),-1
;)
;while ( start < last )
CFT020  LD  HL,8
        ADD HL,SP
        GETWORD         ;start
        LD  DE,(LAST)
        OR  A
        SBC HL,DE       ;start < last?
        JR  C,$+5       ;go if so
;
;if start == last, search done - return local_best
        POP HL      ;local_best
        POP AF      ;clear stack
        RET
;
;{      memset( &temp_flag[start], FALSE, number );
        ADD HL,DE       ;HL = start
        LD  DE,TMP_FLG
        ADD HL,DE       ;HL -> temp_flag[start]
        LD  (HL),0
        LD  D,H
        LD  E,L     ;DE -> temp_flag[start]
        LD  HL,10
        ADD HL,SP
        LD  C,(HL)
        INC HL
        LD  B,(HL)      ;BC = number
        LD  H,D
        LD  L,E     ;HL -> temp_flag[start]
        INC DE      ;DE -> temp_flag[start+1]
        DEC C
        JR  Z,$+4       ;no LDIR if none to copy
        LDIR
;       temp_flag[start] = TRUE;
        LD  HL,8
        ADD HL,SP
        GETWORD         ;start
        LD  DE,TMP_FLG
        ADD HL,DE
        LD  (HL),-1
;       accum += total = array[start].grans;
        LD  HL,8
        ADD HL,SP
        GETWORD         ;start
        ADD HL,HL
        LD  DE,PTR0
```

settled on. In general, it's better to use up larger files first anyway, because they're harder to "fit" than smaller files.

O.K. Now that we know how the data is processed, let's go to the label BEGIN to learn how the program obtains the data, and then disposes of it.

First, the pointer to the remainder of the command line (everything after "SMALARCH" plus the following space) in HL is pushed.

Then, so the state of the system can be restored at the end, the value of the current state of the D flag is stored, and the vectors for the @EXIT, @WRITE and @VER SVC's are retrieved from the SVC vector table and stored various places in the program code. The same is done with the high memory pointer.

Now the high memory pointer is saved in case of an error exit.

Next the command line pointer is restored, and the command line parsed. The code looks for the required ":s" parameter, and aborts either if it does not exist or if the specified source drive number is out of legal range.

Next, the required ":d" parameter is sought, with an abort if it is not present or contains an illegal value.

Finally, the optional UPDATE and VERIFY parameters are checked by the @PARAM SVC. If the VERIFY=YES parameter is used, then the @WRITE SVC vector in the SVC vector table is replaced with the @VER vector, and the verify bit in the D flag set to tell the system about this change.

Because SMALARCH will not copy / SYS files, and there are a minimum of two /SYS files per directory and a maximum of 256 file slots per directory, the maximum possible number of files to be copied is 256 - 2 = 254. Therefore, SMALARCH sets up 254 array elements, each initialized with NULLs, a value which signals

"end of data" to the program.

Therefore, the next two small sections of code fill the array data area with bytes of 00H, and create 254 pointers, one to each array element.Each 13-byte array element contains the following data:

size (in floppy grans)	2 bytes (lsb,msb)
file name	8 characters, right padded with blanks
file extension	3 characters, right padded with blanks.

Next, the Hash Index Table (HIT) of the source drive is read. Each non-zero entry in this table is associated with a file; so each is checked in turn, and the directory entry for each existing file is read. The file type is then checked, and only visible, non-protected normal and PaDS files are accepted.

When a file passes these tests, it's size in sectors is checked. If it is too large to fit on the floppy, or it's an "empty" file (i.e., one with no records), it is skipped.

Five is then added to the number of sectors, and the sum is divided by 6, the number of sectors per floppy granule. This yields the number of floppy grans required to hold the file. This value is written (in lsb,msb order) to the first two bytes of the next unused array element. Then the file name and file ext are copied from the directory record to the array element, and the next HIT entry checked until all 256 have been checked.

Finally, a count is made of the number of files to be copied, with the result placed in the word COUNT in the shell sort subroutine.Now that we have dispensed with the need for the HIT table and the initial informational messages, the stack is switched to STACK (the program stack) to accommodate the large stack requirements of CALC_FIT, as well as cope with

```
        ADD HL,DE
        GETWORD
        GETWORD         ;HL = array[start].grans
        POP BC      ;local_best
        POP DE      ;total
        PUSH   HL      ;total=array[start].grans
        PUSH   BC      ;restore local_best
        LD  DE,(ACCUM)
        ADD HL,DE
        LD  (ACCUM),HL    ;accum += total
;    if ( best < accum && accum <= goal )
        EX  DE,HL      ;DE = accum
        LD  HL,(BEST)
        OR  A
        SBC HL,DE      ;best < accum?
        JR  NC,CFT030 ;go if not
        EX  DE,HL      ;HL = accum
        LD  DE,(FREE) ;(goal)
        INC DE
        OR  A
        SBC HL,DE      ;accum <= goal?
        JR  NC,CFT030 ;go if not
;    {best = accum;/* record better best */
        ADD HL,DE      ;HL = accum
        LD  (BEST),HL
;       memcpy( &best_flag, &temp_flag, count );
        LD  HL,TMP_FLG
        LD  DE,BST_FLG    ;record which elements
        LD  BC,(COUNT)    ;  used in new best
        LDIR
;    }
;    if ( total < target )
CFT030   LD  HL,6
        ADD HL,SP
        LD  E,(HL)
        INC HL
        LD  D,(HL)     ;DE = target
        POP AF
        POP HL      ;HL = total
        PUSH   HL
        PUSH   AF
        OR  A
        SBC HL,DE      ;total < target?
        JR  NC,CFT040 ;go if not
;       total+=calc_fit(target-total,start+1,number-1);
        LD  HL,10
        ADD HL,SP
        LD  C,(HL)
        INC HL
        LD  B,(HL)
        DEC BC      ;BC = number -1
        LD  HL,8
        ADD HL,SP
        GETWORD
        INC HL
        PUSH   HL
        POP IY      ;IY = start + 1
        POP AF
        POP DE      ;DE = total
        PUSH   DE
        PUSH   AF
        LD  HL,6
        ADD HL,SP
        GETWORD         ;HL = target
```

```
        OR A
        SBC HL,DE       ;HL = target - total
        PUSH  BC        ;number - 1  -> number
        PUSH  IY        ;start + 1   -> start
        PUSH  HL        ;target - total    -> target
        CALL  CALC_FIT  ;recursive
        POP DE      ;clear stack
        POP DE
        POP DE
        POP BC      ;local_best
        POP DE      ;total
        ADD HL,DE       ;add total to return value
        PUSH  HL        ;total += result
        PUSH  BC        ;restore local_best
;   if ( local_best < total && total <= target )
CFT040  POP HL      ;local_best
        POP DE      ;total
        PUSH  DE
        PUSH  HL
        OR A
        SBC HL,DE       ;local_best < total?
        JR NC,CFT050 ;go if not
        LD HL,6
        ADD HL,SP
        GETWORD         ;target
        EX DE,HL        ;HL = total; DE = target
        INC DE
        OR A
        SBC HL,DE       ;total <= target?
        JR NC,CFT050 ;go if not
;       local_best = total;
        ADD HL,DE       ;HL = total
        POP DE
        PUSH  HL        ;replace local_best
;   if ( total == target )
CFT050  LD HL,6
        ADD HL,SP
        LD E,(HL)
        INC HL
        LD D,(HL)       ;DE = target
        POP AF
        POP HL      ;HL = total
        PUSH  HL
        PUSH  AF
        OR A
        SBC HL,DE       ;total == target?
        JR NZ,CFT060 ;go if not
;       return target;
        EX DE,HL        ;HL = target
        POP AF
        POP AF      ;clear stack
        RET
;   accum -= array[start].grans
CFT060  LD HL,8
        ADD HL,SP
        GETWORD         ;start
        ADD HL,HL
        LD DE,PTR0
        ADD HL,DE       ;HL -> ptr[start]
        GETWORD         ;HL -> array[start].grans
        LD E,(HL)
        INC HL
        LD D,(HL)       ;DE = array[start].grans
        LD HL,(ACCUM)
```

the effects of using the @CMNDI SVC to invoke the LS-DOS COPY command.

At DSKDONE, the array is sorted, and a check made to see if there are any more files to be copied.If so, COUNT is updated, and then, at PROMPT, the user is prompted to insert a diskette in the drive specified in the ":d" parameter.

The diskette is then checked, and the amount of its free space in granules is calculated and stored in the word labeled FREE.

If there is no free space, the user is prompted to insert another disk. Otherwise, BEST_FIT is called to select which files to copy.

Now the BST_FLG array is stepped through in order. If a flag is set, then the associated file's size is set to zero to mark it as "used".

Since the files are sorted by file size in descending order, and the value of COUNT updated after each sort, a size of zero will cause the array element to be sorted out of the active portion of the array the next time the list is sorted. This will, in effect, remove the used files from the list.Next the file name and file extension are copied in "FILENAME/EXT" format to a portion of the COMAND$ string, and the source and target drive numbers added to the end of the string in ":s :d"+CR format. The file is then counted in the COPYCTR byte pointed to by IX, and the PERFORM subroutine called to issue a system COPY command.

At PERFORM, the IX register is preserved, and SWAPCOD is called to replace the code pointed to by the @EXIT SVC vector to a JP to PFM010. Then the program stack pointer is saved, and the system stack pointer switched in. The COPY command contained in COMAND$ is now issued via invocation of the @CMNDI SVC.

Normally this SVC does not return, but in this case it does, because the program has

changed the code for the @EXIT SVC. Return is to PFM010, where the program stack is switched in again, the original code for the @EXIT SVC restored, and any error code from the COPY command and the IX register are restored before return to the caller.

Upon return, the value in HL is checked for an error code, and, if none, a jump is made to SCT010 to get the next file to copy.In case of any error, or end of job, exit is via the code at EXIT.

Here any error code in HL is preserved, and the original high memory pointer restored. If SMALARCH was invoked with the (verify=yes) parameter, both the @WRITE SVC vector and the D flag are also restored to their original values.

(Note that if the system is already in "verify=on" mode, SMALARCH will not change it. The program's "verify=yes" parameter will turn verify on, but the "verify=no" parameter or default does not turn verify off. In other words, SMALARCH uses the status of verify upon entry as its default.)

Finally, the error code in HL is restored, the system stack is switched back in for the last time, and return to LS-DOS is made via the @EXIT SVC.

The positioning of SMALARCH/CMD in RAM is such that 4K+ have been preserved for high memory routines by the ORG address. I would think (hope) that 4K should be adequate for virtually any system configuration.

However, if it is not (i.e., the MEMORY command shows a himem pointer of x'ef03' or lower) you need to change the ORG statement (reducing it by an even multiple of 100H) to accommodate your himem needs.

SMALARCH could be rewritten to automatically relocate itself to high memory, but including that code in this article would have greatly lengthened and complicated the listing, making it harder to

```
      OR A
      SBC HL,DE
      LD (ACCUM),HL   ;accum-=array[start].grans
;   temp_flag[start++] = FALSE;
      LD HL,8
      ADD HL,SP
      GETWORD         ;start
      LD DE,TMP_FLG
      ADD HL,DE
      LD (HL),0
;
      LD HL,8
      ADD HL,SP
      PUSH HL
      GETWORD
      INC HL     ;++start
      EX DE,HL
      POP HL
      LD (HL),E
      INC HL
      LD (HL),D
;
;   -number
      LD HL,10
      ADD HL,SP
      PUSH HL
      GETWORD
      DEC HL     ;-number
      EX DE,HL
      POP HL
      LD (HL),E
      INC HL
      LD (HL),D
;
      JP CFT010
;}
;*=*=*=*
SVCVCT  ADD A,A   ;get vector from SVC
      LD L,A    ;   table in DE
      LD E,(HL)
      INC HL
      LD D,(HL)
      RET
;*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*
; main program code begins
;
BEGIN PUSH HL     ;cmd line ptr
      SVC @FLAGS
      LD A,(IY+'D'-'A')
      LD (DFLAG),A ;store entry D flag value
      LD A,(IY+26) ;msb of SVC vector table
      LD (SVCMSB),A   ;   base address
      LD H,A
      LD A,@EXIT
      CALL  SVCVCT    ;get @EXIT SVC vector
      LD (@_EXIT),DE  ;   and store it
      LD A,@WRITE
      CALL  SVCVCT
      LD (@_WRITE),DE ;store entry @WRITE vector
                ;   (could be @VER vector)
      LD A,@VER
      CALL  SVCVCT
      LD (@_VER),DE   ;store @VER vector
;
```

```
      LD HL,0
      LD B,H
      SVC@HIGH$
      LD (STORHI),HL  ;store entry HIGH$
;
; Protect this code and 64 levels of program stack.  Also
; defines COPY buffer size.  No need to protect CALC_FIT
; stack, as it will be obliterated only after used up.

      LD HL,STACK-81H
      SVC@HIGH$
      LD HL,HELLO$ ;greet user
      SVC@DSPLY
      POP HL
      LD (SYSTACK),SP ;store system stack in
                ;   case of error
; parse command line
;
      LD A,(HL)
      CP ':'    ;MUST have :s param
      JP NZ,SYNTAX
      INC HL
      LD A,(HL)     ;p/u source drive #
      CALL  @0TO7     ;check validity
      LD (SOURCE$),A  ;stuff in command specs
BGN010  INC HL
      LD A,(HL)
      CP BLANK      ;skip spaces
      JR Z,BGN010
      CP ':'    ;1st char = ':'?
      JP NZ,SYNTAX ;MUST have :d param
      INC HL
      LD A,(HL)     ;p/u target drive #
      CALL  @0TO7
      LD (DRIVNO),A   ;stuff in message
      LD (TARGET$),A  ;stuff in command specs
BGN020  INC HL
      LD A,(HL)     ;cycle until CR or '('
```

understand the actual functions taking place.

To see how SMALARCH organizes the files on archive floppies, take the disks, in order from first to last, and execute a DIR :d (o=n) command. A typical (o=n) directory appears below:

Note the files appear in descending order by size. Look at the two 25.5K (17 gran) files, ELVIS2/GIF and GOTHIC17/GIF. They are not the same size in sectors and bytes, but they are the same size in grans. This is why they were written in alphabetical order. The same is true of the three 11-gran files (BRINKLEY/GIF, CAPITOL/GIF AND JUNE/GIF) and the two 10-gran files (COKE/GIF and JANUARY/GIF). The last file, AUDREY/GIF, was obviously at the top of the list of 3-gran files; and was selected because it was the first file encountered which exactly filled the remaining 4.5K of free space on the floppy.

I have found SMALARCH to be very useful in making my own archives of hard disk files, and hope and trust TMQ readers will find it equally useful.

```
Drive :7  ACRV3C01   40 Cyl, DDEN, Free =    0.00K /   360.00K,  Date 24-Aug-92
Filespec    MOD Attr   Prot  LRL  #Recs  EOF  File Size  Ext  Mod Date   Time
KINSKI17/GIF           FULL  256   274  202     69.00K    2  20-Jan-92  23:02
INQUIRY/GIF            FULL  256   121  143     31.50K    1  23-Jan-92  11:28
BANDB/GIF              FULL  256   105   78     27.00K    1  22-Jan-92  15:20
ELVIS2/GIF             FULL  256   101  152     25.50K    1   4-Feb-92  15:14
GOTHIC17/GIF           FULL  256   102  235     25.50K    1   4-Feb-92  14:59
KINSKI/GIF             FULL  256    96  219     24.00K    1  22-Jan-92  16:44
DOGNCAT/GIF            FULL  256    87  186     22.50K    1  23-Jan-92  11:04
AUGUST/GIF             FULL  256    81    7     21.00K    1  20-Feb-90  18:30
DEBHARRY/GIF           FULL  256    73  210     19.50K    1  22-Jan-92  12:12
BRINKLEY/GIF           FULL  256    66   60     16.50K    1  22-Jan-92  16:22
CAPITOL/GIF            FULL  256    62   47     16.50K    1  25-Jan-92  21:53
JUNE/GIF               FULL  256    64  236     16.50K    1  23-Jan-92  12:21
COKE/GIF               FULL  256    55  101     15.00K    1  21-Jan-92  14:09
JANUARY/GIF            FULL  256    60  240     15.00K    1  23-Jan-92  12:06
AUDREY/GIF             FULL  256    13  196      4.50K    1  22-May-90  17:06
                    15 files of  17 selected.   349.50K
```

```
      CP BLANK
      JR Z,BGN020  ;skip spaces
      CP CR     ;end of command line?
      JR Z,BGN030  ;no params if so
      CP '('    ;1st char = '('?
      JP NZ,SYNTAX ;error if not
      LD DE,PARAMS
      SVC@PARAM    ;parse params
      JP NZ,ERROR
      LD A,(URESP)
      OR A      ;was update param used?
      JR Z,$+6     ;go if not
      AND40H    ;correct type of response?
      JP Z,SYNTAX  ;error if not
      LD A,(VRESP)
      OR A      ;was verify param used?
      JR Z,BGN030  ;go if not
      AND40H    ;if so, correct type?
      JP Z,SYNTAX  ;error if not
BGN030   LD A,(VERIFY)
      OR A      ;verify requested?
      JR Z,BGN040  ;go if not
      LD A,(SVCMSB)
      LD H,A
      LD A,@WRITE
      ADDA,A
      LD L,A    ;HL -> @WRITE vector
      LD DE,$-$
@_VEREQU$-2
      LD (HL),E
      INCHL
      LD (HL),D    ;replace w/@VER vector
      SET2,(IY+'D'-'A')   ;set verify bit in
   D flag
;
; get target drive attributes
;
BGN040   LD A,(DRIVNO)
      AND7
      JP Z,STARG        ;target can't be sys
   drive
      LD C,A
      SVC@CKDRV    ;is target drive ready?
      JP C,WPDISK  ; if disk write protected
      SVC@GTDCT    ;get DCT of target drive
      LD A,(IY+0)
      CP 0C9H      ;is drive disabled?
      JP Z,ILDRIVE ;   abort if so
      BIT3,(IY+3)  ;is target a floppy?
      JP NZ,HDTARG ;   abort if not
      LD C,(IY+6)  ;C = # of cylinders - 1
      LD A,(IY+8)  ;  (omits DIR/SYS cyl)
      AND0E0H      ;isolate grans/cyl/side
      RLCA         ;bits 7-5 to 2-0
      RLCA
      RLCA
      INCA      ;base 0 adjust
      LD L,A
      LD H,0    ;HL = # grans/cyl/side
      BIT5,(IY+4)  ;double-sided drive?
      JR Z,$+3     ;go if not
      ADDHL,HL     ; else double grans/cyl
      SVC@MUL16    ;multiply * # of cyls
      LD H,L    ;HL = # of free granules
      LD L,A    ; on an empty disk
      DECHL     ;remove 1 gran (BOOT/SYS)
      LD C,6    ;# sectors/floppy granule
      SVC@MUL16
      LD H,L    ;HL = # free sectors on
      LD L,A    ;  empty disk of this type
      LD (SLIMIT),HL  ;store result
;
; fill sort data w/nulls (size of x'0000'
   means EOD)
;
      LD HL,ARRAY
      LD DE,ARRAY+1
      LD BC,ARRAY_SIZE-1
      LD (HL),0
      LDIR
;
; build 254 pointers to array elements
;
      LD B,254
      LD IX,PTR0
      LD HL,ARRAY
      LD DE,13
BGN050   LD (IX),L
      INCIX
      LD (IX),H
      INCIX
      ADDHL,DE
      DJNZ  BGN050
;
; read source drive HIT, and check all
   files for copying
;
      LD HL,HIT
      LD DE,1
      LD A,(SOURCE$)  ;p/u source drive #
      AND7      ;convert to binary
      LD C,A
      SVC@RDSSC    ;read the HIT
      JP NZ,ERROR
      EX DE,HL     ;DE -> HIT
      LD IX,ARRAY
BGN060   LD A,(DE)    ;p/u HIT entry
      OR A      ;slot in use?
      JR Z,BGN100  ;try next slot if not
      LD B,E    ;DEC to B
      SVC@DIRRD    ;read directory entry
      JP NZ,ERROR
      PUSH  HL
      POPIY     ;IY -> directory record
      LD A,(HL)    ;p/u 1st byte
      AND11011111B ;0 means "don't care"
                ; (re PADS files)
      CP 10H    ;exclude FXDE, SYS, INV,
                ;and protected files,
                ;require file to be ACTIVE
      JR NZ,BGN100 ;go if not to be copied
      PUSH  DE     ;   else save HIT pointer
      LD E,(IY+20)
      LD D,(IY+21) ;DE = # of sectors (ERN)
      LD A,D
      OR E      ;empty file (zero size)?
      JR Z,BGN070  ;  don't copy if so
      LD HL,$-$    ;# free sectors on empty
```

```
SLIMIT  EQU $-2     ;  floppy disk
      SBC HL,DE     ;will file fit on disk?
      JR NC,BGN080 ;go if so
BGN070  POP DE      ; else restore HIT ptr
   and
      JR BGN100     ;   try next DEC
BGN080  PUSH  BC    ;save DEC & drive #
      PUSH  BC      ;   twice
      LD HL,5       ;value for rounding
      ADD HL,DE     ;HL = # sectors + 5
      LD C,6    ;# of sectors/floppy-gran
      SVC @DIV16    ;HL = # floppy grans req
      LD (IX),L     ;store lsb
      INC IX
      LD (IX),H     ;store msb (1st word of
      INC IX    ;sort key is size [grans])
      EX DE,HL
      POP BC    ;DEC & drive #
      PUSH  IY
      LD A,(UPDATE)
      OR A      ;update flag set?
      JR Z,BGN090  ;skip next section if not
      RES 6,(IY+1)  ;   else reset MOD flag
      PUSH  IY
      POP HL    ;HL -> DIR record
      SVC @DIRWR    ;rewrite DIR entry
      JP NZ,ERROR  ; w/MOD flag reset
BGN090  POP HL    ;HL -> DIR record
      LD DE,5
      ADD HL,DE     ;HL -> filename + ext
      PUSH  IX
      POP DE
      LD BC,11      ;length of filename + ext
      LDIR          ;copy to sort key
      PUSH  DE
      POP IX    ;IX -> start of next sort
   key
      POP BC    ;DEC & drive #
      POP DE    ;restore HIT pointer
BGN100  INC E       ;DE->next HIT entry
   (falls
      JR NZ,BGN060 ;   thru when 256
   checked)
;
; determine how many files to copy (for
   sort & search)
;
      LD IX,COUNT  ;->lsb (cannot exceed
   254)
      LD HL,ARRAY  ;-> first element
      LD DE,12      ;array element size - 1
      LD B,254
BGN110  LD A,(HL)     ;p/u lsb of size
      INC HL
      OR (HL)       ;is size zero?
      JR Z,BGN120  ;end of data if so
      INC (IX)      ;  else bump COUNT
      ADD HL,DE     ;HL -> next element
      DJNZ  BGN110    ;check next
BGN120  LD IX,COPYCTR   ;COPYCTR inits to
   00H
      LD (SYSTACK),SP
      LD SP,STACK  ;switch over to pgrm
   stack
;*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*
DSKDONE  CALL   SHELSRT          ;sort in
   size/alpha order
      LD A,(COUNT) ;p/u # files B4 last disk
      SUB (IX)      ;sub # copied to last
   disk
      JP Z,EXIT     ;done if none left to
   copy
      LD (COUNT),A ;   else update COUNT
      LD (IX),0     ;   and reset COPYCTR
;*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*
PROMPT  LD HL,NEWDSK$   ;prompt user for
   new disk
      SVC @DSPLY
PMT010  SVC @KEY      ;wait for keystroke
      CP 80H    ;break?
      JP Z,BREAK
      CP CR     ;enter?
      JR NZ,PMT010 ;nfg if not
      LD A,(DRIVNO)    ;p/u target drive #
      AND 7     ;convert to binary
      LD C,A
      LD B,4
      LD HL,DIRBUF
      SVC @DODIR
      JR Z,PMT020
      CP 8      ;device not available?
      JR Z,PROMPT  ;if so no disk - reprompt
      JP ERROR     ;else report error, quit
PMT020  LD HL,(DIRBUF+18)      ;p/u free K
      LD A,H
      OR L
      JR Z,PROMPT  ;go if no free space
      ADD HL,HL     ;free K * 4 + 2 is maxi-
   mum
      INC HL    ;   possible of # of free
      ADD HL,HL     ;   sectors on this
   floppy
      LD C,6    ;divisor is sectors/gran
      SVC @DIV16
      LD (FREE),HL ;store # of free grans
;*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*
; Call best_fit() to determine which files
   to write to
; floppy.  Step through best_flags and set
   sizes of marked
; files to x'0000' (causes element to sort
   out of active
; portion of array next sort), and COPY the
   file.
;
SELECT  CALL  BEST_FIT  ;flag files for
   COPYing
      LD A,H
      OR L      ;did function return NULL?
      JP Z,BFTERR  ;something wrong if so
      LD HL,BST_FLG
      LD BC,(COUNT)
      INC BC
SCT010  LD A,-1
      CPIR          ;search for set BST_FLGs
      JP PO,DSKDONE   ;go if none left
      PUSH  HL    ;save search start
      PUSH  BC    ;  and search count
```

```
      LD DE,BST_FLG+1
      OR A
      SBC HL,DE      ;HL = bst_flg element #
      ADD HL,HL      ;pointers are 16 bits
      LD DE,PTR0
      ADD HL,DE      ;-> ptr[set_flag]
      GETWORD        ;->
   array[set_flag].grans
      XOR A
      LD (HL),A      ;set size to x'0000' to
      INC HL     ;    mark as "used"
      LD (HL),A
      INC HL     ;HL -> filename+ext
      LD DE,FILNAM$    ;DE -> copy command
      LD BC,8        ;max # chars in file name
SCT020   LD A,(HL)     ;copy chars until
   space
      CP BLANK
      JR Z,SCT030
      LD (DE),A
      INC HL
      INC DE
      DEC C
      JR NZ,SCT020
SCT030   LD A,'/'
      LD (DE),A      ;put '/' after file name
      INC DE
      ADD HL,BC      ;HL -> file extension
      LD B,3     ;max length of file ext
SCT040   LD A,(HL)     ;copy chars until
   blank
      CP BLANK
      JR Z,SCT050
      LD (DE),A
      INC HL
      INC DE
      DJNZ   SCT040
SCT050   LD HL,DRIVE$ ;-> ':s :d',cr
      LD BC,6
      LDIR           ;append to end of command
      INC (IX)       ;bump COPYCTR
      CALL   PERFORM      ;execute COPY
   command
      LD A,H
      OR L       ;was there an error?
      POP BC     ;search count
      POP HL     ;search location
      JR Z,SCT010  ;go if no COPY error
      LD A,L     ;else p/u error number
      JP ERROR       ;  and make error exit
;*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*
EXIT  PUSH   HL      ;save error/no error
      LD HL,$-$
STORHI   EQU $-2
      LD B,0
      SVC @HIGH$     ;restore original high$
      LD A,(VERIFY)
      OR A       ;is program VERIFY active?
      JR Z,XIT010
      LD A,(SVCMSB)     ;if so, restore val-
   ues of
      LD H,A     ;   @WRITE SVC vector and
      LD A,@WRITE ;    D flag to their entry
      ADD A,A    ;   values
      LD L,A
      LD DE,$-$
@_WRITE  EQU $-2
      LD (HL),E
      INC HL
      LD (HL),D
      SVC @FLAGS
      LD (IY+'D'-'A'),$-$
DFLAG EQU $-1
XIT010   POP HL      ;restore error number
      LD SP,(SYSTACK) ;restore system
   stack,
      SVC @EXIT      ;    and return to LS-DOS
;
PARAMS   DB 80H     ;parameter table
      DB 56H
      DM 'UPDATE'
URESP DB 0
      DW UPDATE
      DB 56H
      DM 'VERIFY'
VRESP DB 0
      DW VERIFY
      DB 0
UPDATE   DW -1      ;default is YES
VERIFY   DW 0       ;default is NO
;
LBU   EQU $-1    ;last byte used
      END BEGIN
```

NEC Cartridge: continued from page 39

15. Properly align the previously removed hub into the left hand side of the drum. You may need to pull back on the spring clip using a thin tool (such as a popsickle stick) to fully engage the hub.

16. Re-insert the previously removed screw into the hub.

17. Insert the drum cover plate into the top of the assembly. Insert the right hand side first. Position so that the extra cutout on either side of the channel is positioned towards the handle. Note that the plastic fingers on the right are harder to correctly position.

You now have a refurbished PC cartridge to use in your machine. Depending on the condition of the photoconductive drum, your old cartridge may be good for another 3000 copies - at least as far as the capacity of the waste toner receptacle!

Reusing NEC Laser Cartridges

by Roy Soltoff

Long-standing readers of *The MISOSYS Quarterly* will recollect that I use a NEC LC-890 Laser printer (actually an LED printer). I have commented on this in the past, as the printer is used in production of TMQ as well as to produce manuals for MISOSYS products.

The printer has held up well over the years, with just a few problems. However, when problems occur, they appear to be expensive to fix. The predominate expense is labor, as the local NEC authorized repair center has charges of about $60 per hour. Therefore, when the machine produces a dirty image, it can be significantly less expensive to learn not only how to clean it, but why it gets dirty.

This article will discuss two issues concerning the LC-890. The first issue will be two reasons why a dirty image can result. The second is a means whereby you can *recondition* your own Photo Conductor (PC) cartridge.

To begin with, other machines are known to use the same print engine; and as such, this material applies as well. Based on the label of a toner cartridge I purchased from Quill, the NEC engine is used on the AES L5, Datasouth Pagewriter 8, Interface Systems Laser 8, Kaypro Page Printer I, NEC LC850, 860, 890, Nixdorf, Siemens PT10, and Telenorma Model ISY-70. All of these machines use a toner cartridge separate from the PC drum cartridge. I have always been impressed with the print quality - when the machine is clean and properly working.

One problem of a dirty image appears as incomplete coverage of toner - especially on large black areas (solid graphics or a large type size). The incomplete coverage may be on one side of the paper. If cleaning of the components as discussed in the User Manual do not clear up the problem, it is off to the shop for an expensive cleaning. Or is it? After one such trip, I discussed the issue with the shop technician.

It turns out that the LC-890, et al, is plagued with a problem of toner clumping depending on the frequency of use, and the environmental conditions (temperature and humidity). I have always been of the belief that a car will last longer the more it is used. When it stays parked a great deal of time, it will rust out. The same principle holds true with the printer - although *rust out* may not be the exact terminology to apply.

Toner is itself an extremely fine granulated material. When the toner particles clump together, they will cause the image to be incomplete as the clumps will not properly transfer as particulate to the paper. At this point, the toner clumps need to be removed. You can determine if your machine has toner clumping by examining the developer assembly once it is removed from the machine. That's a simple matter to do. Simply open up the toner cover used to add toner, then pull up on the cover to remove it; it's held in place by channels at either end. Then unscrew the two large screws located at either end of the developer assembly and lift the developer unit straight up. It may appear to not budge at first - the fit is tight. Incidentally, the screws will not disengage from the assembly.

As you look at the front of the assembly, notice the appearance of the toner on the roller. If its not a fine particulate, the toner has clumped. You may even want to slightly reverse the normal direction of the roller by rotating the roller gear to see how the toner appears. When it is clumped, you may be able to just vacuum away the clumps (using one of those small hand-held vacuums). If the problem is with the toner throughout the developer unit, all of the toner will have to be removed and the unit cleaned up. Since I did not have to go that route, I won't explain that here. I was able to remove the clumped toner just by vacuuming away the surface clumping. Once that was done and the normal areas cleaned, my machine performed nearly as good as new.

Now a laser printer is quite similar in operation to a copying machine. A charge is placed on a drum which rotates and attracts toner; a sheet of paper traverses the drum transferring the image to the paper. The paper is then passed through a heater which fuses the toner to the paper. Not all of the toner which comes in contact with the drum is used for the image; some is wasted (only the toner which adheres to the charge on the surface of the drum is used). When it comes to the wasted toner, there are two classical methods to deal with the waste. One method is to recycle the waste toner back into the supply toner. The other is to catch the wasted toner into a bag or bottle to be subsequently discarded.

I had a Minolta copier which recycled its toner; thus, there was never any need to discard a toner bag. I also have had - and still have - two Toshiba copiers which maintain a receptacle for accumulating the wasted toner. When the bag becomes filled, a warning light appears which renders the machine inoperative. I never thought about the method used to handle wasted toner on my laser printer until one day when I was having considerable difficulty keeping it clean.

PC cartridges are relatively expensive.

Quill's price is $129.88. These are supposed to last about 7000 copies; a toner bottle lasts for about 3000 copies. I always thought that the 7000 limit was based on the usability of the photoconductive drum. However, it turns out that this is not the case. The drum can last anywhere from 0 to 10,000 or more copies - depending on how many imperfections you want to live with; minute scratches on the surface can cause dot blemishes to appear on the image transferred to the paper. The other dependency is impacted by the method used to accumulate wasted toner. With $130 for PC cartridge replacement, there is a tendency to want to use a PC cartridge past the 7000 point - especially when using the machine to print out program listings.

I was sitting one day at the printer trying to determine why it was dirtying up continuously after just one page of printing when it hit me; the printer must somehow accumulate the wasted toner in the PC cartridge itself and the chamber used to *bottle* the waste was filled up - there could simply be no other mechanism because the print engine was too simple a device! Since I have saved every PC cartridge I purchased (never know when someone would start recycling them), I proceeded to examine one of my used cartridges.

A close inspection revealed an easy method to disassemble the cartridge. Once the drum was removed from the cartridge, it revealed a compartment which was fill of toner. My problem was the cartridge I had been using had its waste toner compartment filled up; thus the new waste toner had no place to go but spill over onto the paper dirtying up the image. The machine provides no warning when this happens - you're supposed to replace the PC after 7000 copies! All I had to do was clean out the waste toner compartment, and I would then have an *almost good as new* cartridge. The following procedure can be used to perform the job. I have cleaned two cartridges using this procedure which have provided me an economical way to extend the life of a cartridge. Pay close attention to the use of the plastic bag.

Cleaning a NEC PC Cartridge

1. Obtain a large plastic bag - one in which you can place the PC cartridge and a receptacle to receive the waste toner (I use an empty toner cartridge to receive the waste).

2. Roll up your sleeves and remove any jewelry (you want to minimize the chance of getting toner on you).

3. Open up the empty toner cartridge or other receptacle you will use to receive the waste toner and place it in the bag.

4. Looking at the top side of the PC, there is a plastic panel with a channel cut into it on the top front just over the drum. Four plastic fingers (two per side) keep it engaged. Slightly depress the left two fingers (there's rectangular holes on the side to reach the fingers) and pull up on the panel. Do the same for the right side. The panel can now be removed.

5. A Philips screw is located on the left side of the drum. Remove the screw and save it. Using a thin blade screwdriver, letter opener, or pocket knife, pry loose the drum hub end and plastic cover (they're a one-piece assembly).

6. From this point on, **always hold the PC such that the side with the drum is facing up** - the drum must be at the highest point. Otherwise, toner will come cascading out of the assembly from the used toner compartment. Also, avoid touching or bumping the reflective surface of the drum!

7. Disengage the drum from the side where the hub was just removed. Pull up and out at an angle until it clears the retainer; the right side will follow.

8. Place the removed drum on a soft surface. A sheet of bubble wrap saved for this purpose is fine.

9. Immediately below where the drum was located is the reservoir for holding the waste toner. This toner is what needs to be removed.

10. Place the PC assembly in the large plastic bag with the opened toner cartridge.

11. Carefully pour the toner from the PC into the empty receptacle. This will be a messy operation as the waste toner will not pour in a controllable flow. The plastic bag keeps the messy toner which you spill from getting onto everything. Toner is tough to clean up. I don't recommend re-using this waste toner as it may have some clumps in it. Nevertheless, it's your choice.

12. After all of the toner has been evacuated from the PC, you need to clean up the cartridge. You can vacuum any remaining toner misting on the surfaces. You can also wipe the assembly with a damp cloth - but I found that vacuuming is still required after wiping.

13. At this point, you should clean the drum. I use ordinary rubbing alcohol on a soft cloth for this. By positioning the drum vertically at the edge of a table and holding it at the top, you can rotate the drum while cleaning it with the cloth. Once clean, handle carefully by the edges of the drum.

14. Re-insert the drum into the cartridge. The end with the shaft goes towards the right as you look at the housing facing the handle. Place that end in first by tilting the drum, then inserting the left end to the inner side of the cartridge. Note the spring clip on the left side of the cartridge housing; the clip goes into the inside left of the drum.

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BACKUP Basics

With ParmDir, /JCL and Job Logging Examples

by Scott Toenniessen

So, you've just installed that new MISOSYS 40 megabyte hard drive. You've got all your applications loaded up and running; everything's set, right? Wrong! You forgot the backup "plan".

On large computing systems, extensive backup plans are used to ensure the safety of user's files. Files need to be protected not only from hardware failures and cracker's, but from the user's themselves. It's easy to delete a file accidentally or purge several unnecessary files that become necessary two or three weeks later. I'll use the backup system in place at the State University of New York at Buffalo, which I attend, as an example. This 25,000 student university has computing systems used for administration, research, and other important work on several platforms, including, an IBM 3090 mainframe, UNISYS/Sperry 1100/90 mainframe, a cluster of Digital VAX mini's, and a large UNIX network based on SUN workstations and file servers. Under the backup plan, all new and modified files are backed up daily. This set of backups is kept for 32 days. All files are backed up weekly and kept for 4 months. Once a month, backups of all files are again made and this set of tapes kept for 8 months. Once a semester all files are backed up and retained a year.

It is certainly not necessary to take such extreme measures on a Model 4 (you may not even use your computer every day), but I'll outline a plan that should give equal protection. First, if you have changed several files or even made a lot of changes to one (a database for example), make a backup of new and modified files at the end of the work session. To do this easily, I have written JCL files which use the standard LS-DOS/LDOS backup utility along with MISOSYS' ParmDir utility (in the GO:SYS package). I have included these files here as an example of how to create your own; they will most likely have to be modified for your configuration.

To execute the backup with my JCLs type 'dopartback'. PARTBACK/JCL first uses MISOSYS' DOCONFIG/CMD to configure my basic system set up. It then executes the file MOD3PART/JCL which enables my Model 1/3 LDOS partition. My 720K floppy drive is then enabled as the destination disk. ParmDir is used to create DOFILE/JCL and then the PARBACKA/JCL file is executed. PARBACKA/JCL backs up all modified files on each hard drive partition. Backup will ask for a new disk if the current one runs out of room (the first PATCH in the JCL modifies BACKUP so that it won't abort if it needs a new destination disk. Normally BACKUP doesn't allow a destination disk change if it was executed from a JCL. The second patch reverses the first). After the partitions are backed up, DOFILE/JCL, created earlier, is executed. DOFILE will backup modified and new files found in every DiskDISK file on the system. Note that PARBACKA/JCL turns on job logging. Now we have a running list of backed up files. Neat! When the JCL is done, mark the disks as modified backups with the date and put them away. Do this as often as you feel is sufficient. If backing up daily seems like too often, do it every couple days, or even once every week. It all depends on how many files are created/updated on your system. Just remember, more backups are better than less.

I usually do full backups about every six months. This will also vary from system to system. Generally, I would do them as soon as a new system is configured and running, after installing (and debugging) a major upgrade (operating system, major change in the system set up, etc.) and when all the minor modifications found on the daily backups have added up to major ones since the last full backup.

For full backups I use PowerSoft's BACKREST (available from MISOSYS). This program creates an image of a hard drive partition on multiple floppies. Other similar utilities are available, take your pick. I first run my MOD3PART/JCL to enable my LDOS partition, then run BACKREST on each of my 5 partitions. BACKREST informs me of the number of disks I need before starting the backup, so if I need more I abort the program and format them (I usually format one more than BACKREST calculates it needs as it is occasionally off by one disk).

One problem with BACKREST is that it does not reset the modification directory flags, so even though all files have been backed up, the directories indicate otherwise. To correct this, I wrote RESMOD/JCL and RESMODA/JCL. RESMOD/JCL (execute with 'do resmod') executes ParmDir to create DOFILE/JCL which clears mod flags on all DiskDISKs. Then RESMODA/JCL is called which clears mod flags on all partitions and executes DOFILE/JCL. The CLRMOD/CMD program I use to clear the flags is a public domain program I acquired somewhere (CompuServe?). Because I don't have the source code or the author's name, I decided not to include the file. If you need such a program, look around on BBS's or CompuServe. If you happen to own Logical System's FM program, you can use 'FM :d (mod,cm)', where d is the drive number, to do the job.

I would suggest keeping two sets of full backups so that you have "latest full back-

ups" and "next to latest full backups". I would keep all the modified file backups made between these two full backups until the next full backup. For example, following this system you would have: Full backup made Dec 10, 1991; modified file backups made between Dec 10, 1991 and June 10, 1992; full backups made June 10, 1992; modified backups made since June 10. Now any file created for over 6 months will be available (if you did enough modified backups). If necessary, keep backups for a longer period of time.

Now, you may have noticed a couple of things about my JCL files. First, they are split into two parts. This is because I use the '//include' JCL command to execute DOFILE/JCL (created by ParmDir). '// include' actually inserts a copy of another file in place of the '//include' when the JCL is compiled by the DO command (DO compiles the file before running it). If I created DOFILE/JCL in the same JCL file as the //include, it would not be available at compile time. So, why use //include, why not use 'do dofile/jcl'? The answer is that I want control to pass back to PARBACKA/JCL after DOFILE/JCL is executed. The only way to do that is to use //include. Also notice that I remove DOFILE/JCL before the //include. Remember that the //include is used in the compilation phase. By the time the REMOVE is executed, DOFILE/JCL has long since been inserted into PARBACKA/JCL.

If you don't own ParmDir, I would recommend getting it. You may not use it a lot, but when you need it, you'll be glad you have it. Just the other day I was converting about 10 disks from Multidos to LDOS. Copying the files left garbage in the LDOS directory date fields. Instead of typing 'reset filespec (date=on)' for 75 or so files, I typed 'parmdir :7 dofile/jcl (a="reset "x="(date=on")' once for each disk followed by 'do dofile'. This helped do what computers are supposed to do, make life easier! (I've also included CHECKDIR/JCL and CHEKDIRA/JCL which check every partition's and DiskDISK's directory for errors using MISOSYS' Toolbox/Toolbelt utilities.z CHECKDIR produces the file 'checkdir/log' which contains any errors found).

As a parting suggestion, I would highly recommend getting a 720K floppy drive for your system if for nothing more than backing up your hard drive. MISOSYS has 720K 3.5" drives. If you want 5.25" 720K drives, I have included instructions for configuring Teac 1.2 megabyte drives to work as 720K drives.

Configuring the Teac FD55GFV

From TRSLink Online Magazine by Gerry Stuteville

This configuration takes the TEAC FD55GFV 1.2 Meg "AT" floppy disk drive and sets it to work with the Western Digital Controller used in the TRS-80 series of computers. It sets the drive as 80 track double side double density unit to give 720 K of storage. The jumpers on the board have to be set up in the following manner in order to work with our controllers. The first jumper has to be installed on the main logic board in Position "LG" this jumper is behind the drive select row pins. When I bought these drives this jumper was not provided with the drive, to jumper this you can either get a .01" space shorting block and place across the pins or solder a piece of wire across. The second jumper that has to be set is in a cluster of four pins set up in a "T" formation behind the "LG" jumper on the main board. These jumpers are labeled as SPEED and have roman numeral markings. You want to jumper the pair of pins marked as roman numeral one "I". Another way to identify the pins that need to be jumpered is that the pins are the vertical portion of the "T" shaped formation.

Once these pins have been set up set the Drive Select pins to what ever drive position the drive is in. Simply 0, 1, 2, 3 no other pins need to be set. One final note: the drive select does work slightly different on the Models III and IV. If these drives are external to the computer drive 2 would have to be configured on the drive as drive position 0 and drive :3 configured as drive position 1.

After setting your drives up you should now have the 720K storage available to your machine.

To set up your drives on LDOS and LS-DOS, type:

```
SYSTEM (DRIVE=d,CYL=80) <ENTER>
```

If you are adding drives externally under LSDOS (as drive :2 or :3), you need to enable it (them) with a command of the form:

```
SYSTEM (DRIVE=2,ENABLE)
```

After this has been set you can then make it part of your CONFIGURATION by typing:

```
SYSTEM (SYSGEN) <ENTER>        LDOS
SYSGEN <ENTER>                 LSDOS
```

Then the final part is to format your disk by typing:

```
FORMAT :d (SIDES=2) <ENTER>
```

This will format the disk both sides after you have answered the other questions in the format routine.

Using a TEAC FD-55GFR

Courtesy Vince Seifert

The Teac FD-55GFR 5.25inch 1.2M drive can be used as a 720k drive: Put jumpers on the pairs of posts marked LG and HL; they're at right angles to each other about 2 cm forward of the termination resistor SIP. Also, make sure there are jumpers on the FG posts over by the power connector, and on the RY posts (two of three posts in a right triangle near the termination resistor SIP - the other possible pair of the three is marked DC), and on the appropriate D0 - D3 drive select between the power connector and the termination resistor SIP.

TRS-80 Software and Hardware from MISOSYS

Window Application Popup

PRO-WAM

This desktop manager gives keystroke access to 4 memory resident **pop-up** applications and disk access of others. A Function Key lets you invoke DOS library commands. PRO-WAM turns your TRS-80 into a powerful machine because it comes with many useful and powerful time savers and desk organizers. Here's some of what you get:

✔ An **ADDRESS** file data base prints cards and mailing labels. Throw away that black book and your Rolodex file.

✔**HEAD** pipes formatted address data into your letters.

✔**BRINGUP** tickler file schedules up to 12 items per day by time. New print module. Remember those appointments.

✔**CAL**endar gives you a month at a glance; covers 4000 years. Flags days with BRINGUP items.

✔A 3x5 **CARD** filer for a free-form scratch pad of 40 columns by 12 rows. Or use the new **CARDX** with ***forms*** capibilities. It's great for keeping a small data base.

✔**PHRASE** is a KSM from disk for lots of automation.

✔A telephone list and auto**DIALER** for Hayes modems.

✔**CALC**ulator gives you 4-functions at your fingertips. **RPNCALC** gives 7-functions in bin, oct, dec, and hex.

PSORT puts your PRO-WAM data files in sort order. *EXPORT* and *IMPORT* functions allow you to move data across windows between applications and programs. There's even an online **HELP** facility!

PRO-WAM works with all programs which use standard DOS keyboard requests and honor the DOS high memory pointer; requires one 32K RAM bank, about 2K of high memory, and a small piece of low RAM. If you have a model 4, then you must have PRO-WAM!

PRO-WAM Application Pack

Mister ED

Mister ED is loaded with **editor** applications. All are full screen which make your editing jobs easy. Best of all, these are all **PRO-WAM** applications so they can **pop up** even when you are using other programs and applications.

✔**DED** edits disk sectors; **FED** edits file records; and **MED** edits memory pages (even alternate banks). All use a similar display screen and strikingly similar commands to enable you to edit anything. Get comfortable with one and you will know how to use all three of these editors.

✔ **VED** lets you edit the video screen with CARD-type editing. You get cut & paste; with this, you can easily use it as the *clipboard* facility found on more expensive systems.

✔ **TED** is just like the editor you get with LS-DOS 6.3; but ours works from PRO-WAM while you are using other pro-grams! It's friendly, fast, and great for writing notes when you are right in the middle of a program you can't interrupt.

Z80 Assembler

EDAS

This powerful combined disk-based **line editor** and Z80 **macro assembler** assembles from one or more nested source disk files or memory buffer; features nested conditionals with ten pseudo-ops, nested 7-level MACROs with parameters both positional and by keyword, cross reference listings; and a separate **full screen text editor.**

The expression evaluator supports left-to-right evaluation of add/sub/mul/div/mod/shift, logical AND/OR/XOR/NOT, binary ops EQ/GE/GT/LE/LT/SHL/SHR; unary HIGH/LOW. Labels may be up to 15 characters long; start with A-Z, "@", or "$"; positions 2-15 may also use "?" and "_".

A sorted symbol table listing is available during the assembly. A complete CROSS REFERENCE listing is performed by the **XREF** utility.

Line edit text in memory and use a command syntax identical to BASIC; with block move/copy; with string change/search. Invoke DOS commands within the editor.

If you are writing system software, support software, applications - big or small, EDAS will provide the power to make your job easier, faster, and more worthwhile.

Z80 RELocatable Assembler

MRAS

An advanced Z80 assembly package for the programmer who wants a powerful and flexible development system. It includes a macro assembler which generates either **relocatable object code** modules or CMD files directly, a linker, a librarian, a full-screen text editor, a utility for converting to/from line-numbered files, and a cross reference tool for directly generated CMD files.

MRAS generates M80 compatible /REL files. Macro support includes REPT, IRP, and IRPC as well as standard macro parameters by both **keyword** and **position**. It supports nested includes and a full range of nested conditionals. MRAS incorporates a fast binary-searched symbol table and the ability to enter symbol values from the command line. Labels can be any length with 15-character significance. It has flexible output redirection of listing and symbol table.

MLINK supports virtual memory bit-stream buffering, REL and IRL library searching, direct generation of complex program overlays, and does not generate disk space for DEFS regions in DSEGs and COMMONs. The linker can generate either a normal executable command file (CMD) or a core image file (CIM). MLINK supports the following special link items: 0-3, 5-7, 9-11, 13-15.

MLIB maintains both **relocatable** (REL) and **indexed** relocatable (IRL) module libraries. You can add, delete, extract, or replace a module; and get module maps.

SAID is an advanced **full screen text editor.** It can be used to generate your assembler source code, C-language source code, or edit any type of ASCII file. Model 4 128K operation provides multiple editing buffers.

8080 to Z80 Translator

CON80Z

A source translator to help you convert your Intel 8080 files to Zilog Z80 files. Converts CR-LF sequences to a single CR; By using the CR="c" parameter in the command line, the character "c" will be interpreted as a logical line end.

Translates "M" to "(HL)"; extended instructions (LDX); **B, D, H,** and PSW are changed to BC, DE, HL, and AF; changes <**DB/DS/DW/SET**> to <DEFB/DEFS/DEFW/DEFL>.

Z80 Disassembler

DSMBLR

This **disassembler** provides extensive capabilities such as direct disassembly from CMD disk files, automatic partitioning of output disk files, data screening for non-code regions, and full label generation. It even generates the ORGs and END statement - the complete ball of wax. You will find that the use of this disassembler - *even by a beginning assembly language programmer* - will be paying handsome rewards with the ease of its use and clarity of the documentation. It's a professional tool for your use.

The labeling disassembler produces an assembler source from in-memory code or directly from a CMD-type disk file. Labels are generated for 16-bit references; a reference is any relative instruction target address or a 16-bit target for load, call, jump, add, or subtract instructions.

The disassembler allows you to build a *screening data file* telling what segments of the program are to be interpreted as data regions. You enter the addresses of the "segments" after analyzing the target program's disassembly.

CRT output is in screen-sized pages. PRINTER output is paged with column headings, page numbers and titles for print-outs that look identical to an assembler listing. Output to DISK produces a file suitable for MRAS/EDAS (configurable for others), and is automatically segmented into manageable file sizes. You will even be prompted to change the output file diskette when the disk becomes full.

REL Disassembler

UNREL

Here's one of those rare utilities designed for the programmer. **UNREL** will decode a relocatable object module which has been assembled by either Microsoft's M80 or MISOSYS' MRAS assemblers. The output is an assembler source file compatible with MRAS and M80. **UNREL** assumes anything in a code segment is code, and anything in a data segment is data. It supports special link items: 0-3, 5-7, 9-11, 13-15.

We bundle in **SPLITLIB** which can be used to split a library into separate modules. We also include DECODREL, for displaying the *bit stream* of a REL file. This can be used to more fully understand the actual bit stream.

UNREL should be the perfect professional assembler's tool for your bag of tricks.

TRS-80 Software and Hardware from MISOSYS

Communications Terminal

LS-Host/Term

This communications' package gives you the tools needed to get communications chores done quickly and effectively.

ADDS25 is set up to look like a Radio Shack DT-1 emu-lating an ADDS-25 terminal. Full cursor positioning, reverse video, and blinking fields are supported.

TERM6 allows one Model 4/4P to be used as a remote terminal to another running **HOST** portion of LS-Host/Term.

HOST lets your 4/4P operate remotely with *password* access for log-in from another 4/4P using ADDS25. All video effects are properly transferred to the remote system.

We include a version of **XMODEM** for file transfer between systems using the MODEM7 protocol, as well as a utility that converts to/from binary and HEX-ASCII binary repre-sentation, to/from INTEL Hex format and checksum files.

Full C Compiler

MC

If you are looking for a **full C compiler**, look no further. If you are looking for a well stocked UNIX System V standard library, look no further. **MC**, reviewed in the January 1987 issue of *80 MICROCOMPUTING*, is a complete C compiler which adheres to the standards established by Kernighan and Ritchie. The library of functions is extensive and System V compatible. The compiler generates Z80 relocatable macro assembler code (M80 or our MRAS). The libraries are files of relocatable object modules. **MC** is a full-featured compiler for the discriminating programmer!

MC supports command line *I/O redirection* for compiled programs, *wild-card* file specifications, parsing for UNIX "." extensions in file specifications, *overlay* support (requires MRAS), a full pre-processor, lots of options, and is designed for the programmer wishing the ultimate in C compilers. The package is supplied with the compiler, pre-processor, an optimizer, assembler macro files, C libraries, a Job Control Language file, the header files, and a 400+ page user manual. MC requires the use of either M-80 or MRAS, 2 disk drives, and upper/lower case.

Structured BASIC

The BASIC Answer

The BASIC Answer is a text pre-processing utility that allows programmers to generate program code in a struc-tured manner. *Source* code is created with your text editor; **TBA** is then used to process this source code into ordinary interpretive BASIC code that uses a minimum of memory. TBA utilizes **labels** in lieu of line numbers; supports variable names to **14 significant** characters; allows the use of pseudo **Global** and **Local** variables (local variables retain their value only in a unique subroutine); and introduces the concept of *Conditional Translation*. This last feature allows co-existence of "machine-dependent" or other variable code within the same program source with the irrelevent sections ignored when processing the source to executable code.

BASIC Compiler

EnhComp

This is an enhanced **BASIC compiler** released in 1986 and reviewed in the March 1987 issue of *80 Microcomputing* and October 1987 issue of *COMPUTER SHOPPER*. This compiler has lots of great features. It handles the bulk of Model III Microsoft BASIC and supports additional commands and functions. Standard is floating point with both **single and double precision** functions; random file access ("X" mode for reclens to 32767), turtle graphics, pixel graphics, keyed array sort, multi-lined functions, user commands, IF-THEN-ELSE, REPEAT-UNTIL, printer control, sequential file positioning, line labels and more.

A *supervisor* program automates the edit-compile-test phases inherent when using compilers; this makes using EnhComp almost as easy to use as your BASIC interpreter. You also get CED, a **line editor** with string search/change, partial load/save, renumber, copy, and move.

Enhcomp has a built-in **Z80 assembler**. You can **easily** create hybrid programs of BASIC statements and in-line assembly code which **completely eliminate** contorted string packing and DATA statement high-memory module techniques for your BASIC program to access a machine code module. Z80-MODE accesses BASIC's variables!

You'll have to edit *existing* BASIC programs, but the power and completeness of EnhComp make that an easy task. Requires our BASIC Reference Manual

RATFOR Compiler

RATFOR-M4

RATFOR reduces your programming time and effort dramatically over that required when FORTRAN is used, because RATFOR code is **fully structured**, facilitating modification and debugging, and because program flow is apparent from the overall appearance of the program; comments are sim-pler and more versatile than in FORTRAN, simplifying self-documentation. This allows changes without the subsequent debugging tolerated when modifying FORTRAN. RATFOR *compiles* source code to an *object* of FORTRAN; use your existing FORTRAN compiler to convert this to executable.

RATFOR is free-field; blanks are significant as delimiters; numerical statement labels are mostly unnecessary; all 80 columns are available for statements; provides user-defined macros; and RATFOR provides powerful loop constructs.

RATFOR is an excellent language for general purpose use, but it is vastly superior to FORTRAN when working with a large number of modules without documentation, as is necessary when producing very large programs.

Extensions supported include the "arith" macro to perform binary arithmetic operations, read and print macros for short form READ and PRINT, and support of any valid FORTRAN expression for "switch" and "case" operands.

This package includes the language translator, a *batch* file to automate compilation, a language Reference Manual, an Installation Manual, application programs in source code on disk, and our LED text editor for source code preparation.

BASIC Sort Utility

BSORT

Here's a high speed **sort** for almost any number of one or two-dimensional BASIC arrays: *string, integer, single* and *double precision*. When invoked from your BASIC program, BSORT will perform the indicated sort, and execution will continue with the next statement in your program.

Multiple *key arrays* may be specified; the sorting on each key can be done in either *ascending* or *descending* order. **Tag arrays** that do not affect the sort, but merely follow along may also be specified. BSORT can also create an integer *index* array, without affecting the actual order of the elements in the "sorted" array. For string arrays, "*midstring*" parameters allow sorting based on a portion or "midstring" of the key array elements. BSORT goes far beyond CMD"O" in capabilities and performance.

Disk Sort Utility

Disk Sort Merge (DSM)

A high speed, **disk virtual sorting utility** that eliminates the burden of sorting from your applications software develop-ment project. DSM will create and maintain index files for you. Since the sort is disk virtual, your only limitation is the amount of available disk space, not available memory!

Sorts almost any type of field in a random access file: *integer, single* and *double* precision, and *strings*. Files can have 65,535 records with an LRL up to 1024. Specify up to 24 select fields (12 for DSM51). Relations (*EQ, LT*, etc) may be applied to your criteria; operators *AND/OR* may be used.

Sort **ascending** or **descending**; skip records that match a *deleted record* value. Save a *template* of the specifications to disk to automate the sort. This allows you to set up a sort operation that is transparent to even a novice user.

DSM is intended for use with user-developed applications software. Please note that DSM creates an index file, as opposed to actually re-ordering the records in the data file.

Quizzes and Answers

QuizMaster

QM is an educational question and answer program that can also be used as a game. It displays a question and four possible answers and scores the operator's response based upon speed and accuracy. **QM** comes with five subject files of up to 100 questions each derived from grades 6-9 textbooks: U.S. Information; Geography; Math; General trivia; as well as Fantasy and Science Fiction trivia.

QM randomizes both the order of the questions and the order of the answers to prevent memorization. The question sequence is never the same. Extended play provides a *sudden death mode* feature for the skillful user. QM includes all the programs necessary to establish and maintain your own series of *multiple choice questions* on any subject. Five support programs are provided to create, extend, edit, print, and maintain the question & answer files. All features are easy to use and easy to operate.

TRS-80 Software and Hardware from MISOSYS

Text Editor

LED

A full screen text editor for almost any type of ASCII file, including ASCII program source code for BASIC programs, TBA source, as well as JCL and KSM files. The command menu may be displayed while editing text. This display includes all command keys, the filename, the cursor column, the character hex value, and the available memory.

Cursor positioning uses the arrow keys. <CLEAR> key combinations move the cursor to the top, bottom, left or right. Has the following modes: *overtype*, *insert*, *insert line*, and *delete*. Block mode allows the manipulation of large text areas. Search and Search/Replace are also provided.

Hex mode allows characters to be input as two hexadecimal digits; makes possible the direct editing of graphics.

Action Game

The Gobbling Box

This fast-paced action **arcade-type game** runs on the TRS-80 Model I, III, and 4/4P/4D. The game generates a variety of special sound effects and music which complement the action on the screen. The arrow keys or Alpha Products joy-stick control the movements of the GOBBLER in this game.

You want your GOBBLER to eat as many dots as possible, while trying to avoid the ZONKERS who won't stop chasing your GOBBLER until one of them eats it or until the GOBBLER eats all dots on the GameBox. The GOBBLER's reward is a new Box; there's 3 in all. The GOBBLER can tame the ZONKERS for a short while by eating one of the ENERGIZERS on the board. Then it's the GOBBLER's turn to chase, catch and eat the ZONKERS.

The game has two skill levels; the pace is fast; the sound is great; the action is continuous. You can't beat this bargain of a game. Even Stacey plays it!

Adventure-type Game

Lair of the Dragon

If you thought the TRS-80 was dead, think again. Our Lair of the Dragon **MegAdventure** is unlike virtually any other interactive fiction adventure that you have ever played, for it will more than just paint its pictures upon the canvas of your imagination - it will slap the sweat right onto your forehead!

If you truly believe that discovery is one of the finest points in life, if you would like to test your ability to think logically to the fullest extent of your ability, if you would like to take on the largest adventure ever written in the genre of interactive fiction, and if you have the guts to face that which would make any other mortal elf cringe in fear, then ***Lair of the Dragon*** is your cup of poison; for reward is a hard-earned commodity here, not given easily to the timid and the faint-hearted. If you are an old hand at adventuring, then be pre-pared for a worthy opponent.

MegAdventure rips the door to adventure right off its hinges!

TRSDOS 6 Source books

THE SOURCE, 3-Volume Set

This will be the last time that these books will be made available for a *giveaway* price. *THE SOURCE* contains a vast wealth of information for the assembly language programmer. *THE SOURCE* is not only informative, but also an excellent learning tool.

These books contain the complete, **commented assembler source** code for TRSDOS 6.2, excluding hard disk support, the Microsoft BASIC and the HELP utility. Each book is softbound, 8-1/2 by 11. The complete set totals over eleven hundred pages of cleanly commented, elegant source code. Volume 1, The System, covers SYS0 to SYS5 and SYS9 to SYS13. Volume 2, The Libraries, covers all of the library commands making up SYS6, SYS7 and SYS8. Volume 3, The Utilities, covers all utilities, drivers, and filters.

Hard Disk Driver

RSHARD

Finally for your Radio Shack hard disk drive is this hard disk driver package from MISOSYS - at a reasonable price. You get support for both LDOS 5.3 and LS-DOS 6.3

❶ **RSHARDx** driver partitions by both head and/or cylinder; supports two 8-headed drives up to 1024 cylinders.

❷ **RSFORMx** formatter adds both low level and high level formatting to your drive's partitions.

❸ **HDCHECK** checks the performance of your drive.

❹ **ARCHIVEx** lets you backup some or all of the files on your hard drive to multiple floppies; BIG files and small files.

❺ **RESTOREx** lets you selectively restore some or all archived files to your hard drive.

All ten modules come fully documented and are ready to install into your LDOS 5.3 or LS-DOS 6.3 system (or both).

Hard Disk sub-partitions

diskDISK

Do you have a hard disk? If so, you need **diskDISK**. The diskDISK utility allows the creation of *logical disk partitions* as files on a physical disk drive. This is indispensable for hard disk users. Once a **diskDISK** file is *installed* into a logical drive slot, the diskDISK can be used just like any other physical drive; **diskDISK** provides for easy swapping of any currently active diskDISK file.

With **diskDISK**, you can easily group related files for ease of maintenance. DiskDISK files can also be set up as *images* of physical drives to allow mirror image backups.

DiskDISK drives allocate in granule sizes smaller than your hard disk system. Five inch diskDISK images allocate just like floppy drives. Also, there are special diskDISK types that allocate in one or two sector granules for maximum storage efficiency.

DoubleDuty doubles your Model 4

DoubleDuty

DoubleDuty, published previously by Radio Shack (cat 26-2231), is now available from MISOSYS. DoubleDuty divides your 128K or greater TRS-80 Model 4 computer's memory into three complete and independent partitions. Two partitions each operate as if they were there own 64K Model 4! This lets you run two programs concurrently switching between either at the flick of a function key. It doesn't support multitasking, so only the foreground application receives CPU time. The third partition can be used to execute DOS library commands.

Our new 2.6.0 release also works with expanded memory known to the DOS [such as our XLR8er board]. A BANK parameter lets DoubleDuty use any pair of adjacent memory banks. With expanded memory and DoubleDuty, run ScripsitPro along with other programs. If you thought you needed another computer, think again. With DoubleDuty, you can now have two for the price of one! DOS Manual

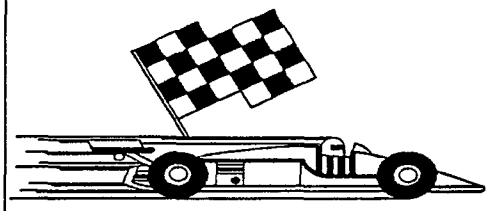
Hard Disk De-fragger

HDPACK

When your hard drive files become fragmented with excessive directory extents, access speed degrades. Your program will finish in less than the optimum time. Now with our HDPACK utility, you can restore that ZIP to your computer. HDPACK will automatically, and intelligently, re-pack the fragmented files on your drive which will improve the performance of file access time.

HDPACK provides a visual display of its de-fragging operation, which in minutes can restore a ten-megabyte directory of files to a mininum number of extents. HDPACK can even work on floppy diskettes, too.

PUTS ZIP IN YOUR DRIVE



Mod 4 features for Mod III

Hardware Interface Kit

This will allow you access to your Model 4 *hardware features* while using LDOS 5.3. Here's what you get: • KI4 keyboard driver uses <CTRL> key, <CAPS> key, and function keys. •**SET2RAM** switches to Model III RAM mode. @BANK provides bank switching capability; @EXMEM handler allows for easy programming of memory bank I/O. •**MemDISK** provides a one or two bank RAM disk. •**BANKER** manages bank utilization. All four modules come fully documented and are ready to install into your LDOS 5.3 system using a Model 4 computer. A 128K machine is required for MemDISK/DCT and the memory management facility.

TRS-80 Software and Hardware from MISOSYS

Model III Utilities

Utility Disk #1

14 utilities useful to novice and experienced LDOS users.

✔ **COMP** is a file and/or byte-for-byte comparison utility.
✔ **DCT** allows you to view or modify the Drive Code Table.
✔ **DIRCHECK** checks the directory on a diskette and corrects most recoverable directory errors.
✔ **MAP** displays or prints the allocation (granules or cylinders and sectors) of a file on a diskette.
✔ **RAMTEST** is a self-relocating RAM memory test.
✔ **READ40** allows access to a 40T disk in an 80T drive.
✔ **TYPEIN** combines the functions of JCL and KSM. Allows programs such as Profile 3+HD to be totally automated.
✔ **UNKILL** recovers files accidentally KILLed or PURGEd.

Model III Filters

FILTERS

This combines 23 filters and utilities from FILTER Disks 1 and 2 with assembly source code at a clearance price.

✔ XLATE translation for I/O devices
✔ LISTBAS print formatting for BASIC programs
✔ STRIP7 removes high-order bit off all characters
✔ STRIPCNT replaces output >127 or <32 with a # symbol
✔ MONITOR displays control chars in string form (%xx)
✔ TITLE prints a title after form feed
✔ UPPER converts lower-case character to upper case
✔ LOWER converts upper case character to lower case
✔ SLASH0 translates *zero* to *zero-backspace-slash*
✔ TRAP discards any user-defined character
✔ LINEFEED adds or removes a linefeed after return
✔ PAGEPAWS pauses after formfeed for <ENTER> key
✔ CALC performs hex/dec/bin conversion; hex add or sub
✔ REMOVE removes occurrences of a byte from a disk file
✔ COMM1 tests for modem carrier
✔ DICTATE toggles cassette on/off from the keyboard
✔ DOSPEED regulates output device speed from keyboard
✔ KSMPLUS features key re-definition *on the fly*
✔ LCOUNT adds a line number before each line of output
✔ MARGIN sends a 2-char control before margin spaces
✔ MAXLATE translates one character to a group of chars
✔ SLOSTEP for drives that require additional settling time
✔ VIDSAV saves the current video screen in high memory

Model 4 Utilities

LS-Utility Disk

Filters and *Utilities* for DOS 6.x:

✔ PRCODES gives control of **boldface** and <u>underlining</u>
✔ TRAP discards any user-defined character.
✔ MAXLATE is a translation filter system for I/O devices. Does 1:1 or :many; includes EBCDIC and DVORAK tables.
✔ KSMPLUS improves on the DOS; allows key re-definition *on the fly*; defines strings for the function keys.
✔ READ40 allows access to a 40T disk in an 80T drive.
✔ TYPEIN combines the functions of JCL and KSM. Allows programs such as Profile 4 to be totally automated.

FORTH Compiler

HartFORTH

HartFORTH is a ***full FORTH*** that conforms to the **79-STANDARD**. The Model I/III version is an indirect threaded version; the DOS 6 version is a direct threaded implemen-tation providing greater execution speed of 10%-40% depending on the details of the actual program. The kernal contains some additional useful words and utilities which turn HartFORTH into a full-fledged development system.

HartFORTH is designed to ***run under an operating system*** which is totally transparent to the programmer or user. The virtual Memory that it accesses for storage and retrieval purposes is a normal DOS file that is requested by the FORTH system when it is first entered. HartFORTH supports double length integers, string handling, cursor manipulation, graphics, random numbers, and floating point.

Maintenance

GO:MTC

The ***GO:MTC*** program collection provides maintenance support services for your computer operation. **DIRCHECK** performs an integrity check of your disk's directory and repairs certain kinds of errors; **FIXGAT** re-constructs a corrupted Granule Allocation Table; **IOMON** traps disk input errors; **MAPPER** checks the granulization of files; **RAMTEST** performs an exhaustive test of RAM; and **UNREMOVE** restores a deleted file.

System Enhancement

GO:SYS

The ***GO:SYS*** program collection is designed to provide additional features to LS-DOS 6.3 operation. **DOCONFIG** manipulates CONFIG/SYS files; **DOEDIT** provides command editing; **MEMDIR** gets a memory directory; **PaDS** provides Partitioned Data Sets; **PARMDIR** obtains parameterized directory information for listings and JCL processing; **WC** for wild card command invocation; and **ZSHELL** for command line I/O redirection, piping, and multiple commands on a line.

More Model 4 Utilities

GO:CMD

The ***GO:CMD*** program collection provides additional utility for your computer operation: **FASTBACK** and **FASTREAD** for hard disk large file archive/restore; **PRO-CESS** manipulates command files; **COMP** compares two files or disks; **FED2** zaps disk or file sectors on a full-screen basis; **IFC** to interactively copy, move, rename, delete, and invoke files; **ZCAT** catalogs 6.3 disks.

Cornsoft's arcade-type games

MISOSYS has licensed the action games previously published by The Cornsoft Group: Frogger™, Scarfman, Bouncezoids, Crazy Painter, and Space Castle are exceptional action games with great video and Alpha joystick support (even the MISOSYS HD joystick). All games are for Model III/I (or 4 in III mode). All five games are included on a single disk. Requires a DOS disk.

TRS-80 Mod I & III GAMES

Leo's Greatest Hits
Animated Game Disk with sound

This is one of the greatest values in games ever produced. Leo Christopherson wrote the very first animated game for the TRS-80 and the country went wild for it. Android Nim will make everyone laugh to watch these life-like creatures as they shake their heads up and down or side to side and blink at you stupidly as they wait for you to make a move. Then Leo invented how to make the TRS-80 produce sound and added it to NIM. He then followed Android Nim with the other games, even getting Radio Shack to sell Dancing Demons, which is a real scream. The disk includes the famous games: ANDROID NIM, BEEWARY, DUELING DROIDS, DANCING DEMONS , SNAKE EGGS, and ANIMATED LIFE. All games feature full sound effects and some of them are even in 3-part harmony! You and your family will just love this disk! Dancing Demon even features saving your song and dance routines to disk and four of them are included! The possibilities are endless and it is always entertaining. A great way to "show off" what your computer can do and always fun.

TRS-80 Mod I & III GAMES

KIM WATT GAME DISK

• Contains: Space Colony, Symon, Capture, Horse Race Slots

These are some games that Adventure International published back in the early 70's. Originally these were sold on three separate diskettes (or tapes), but we have combined them all on one disk for you collectors.

TRS-80 Mod I & III GAMES

Lance Micklus' Greatest Games

This 3-disk set is a great collection as it features space games (Space Trek), adventure games (Dog Star Adventure), gambling games (The Mean Craps Machine, which also includes a Craps tutorial booklet on disk), board games (Mean Checkers Machine), as well as some darn useful programs that you might use for real purposes. Also has some educational games for the kids..

TRS-80 Software and Hardware from MISOSYS

Mod 4P internal 1200 bps modem

TT512P Modem

MISOSYS has the **TeleTrends 300/1200 baud** Hayes compatible modem which slips right into the Model 4P's **internal** modem slot. This has a **full "AT" command set** capability. For now, you Model 4P folks can upgrade to a real Hayes-compatible modem operating at 1200 baud. It's just what you needed for your 4P.

Hard Disk Drives and Parts

MISOSYS MSCSI Hard Drives

Genuine MISOSYS MSCSI hard drive kit packages plug into Model 4/4P/4D and Model III computers. The 11" x 10" x 4.75" (LWH) beige drive case has space for a half or full height drive, 115V/230V 30 watt power supply and fan, hard disk controller (HDC), host adaptor (H/A), hardware real time clock (RTC), LED status lights, and 50-pin SCSI female connector. Optional Joystick port with joystick. Includes software for one DOS (Model III or 4), and 4-foot host cable.

20 Meg drive kit (ST225), complete
40 Meg drive kit (ST251-1), complete

Aerocomp Hard Drives

Genuine FCC-certified (EZU5PL3000) Aerocomp drives are now available from MISOSYS. These are new and complete units ready to run. The external hard drives are FCC Class B certified. They include continuous duty switching power supplies, filtered forced air ventilation, effective EMI filtration, and solid steel construction. Five front panel lights indicate power, ready, read, write, and select. Drivers available for Montezuma Micro CP/M, LDOS, or LS-DOS. Comes complete with 4-foot host cable.

Aerocomp 5 Meg drive Hard drive
Aerocomp 20 Meg drive Hard drive
Aerocomp 40 Meg drive Hard drive

Component Piece Parts:

Seagate ST225 5.25" 20M drive, 65ms
Seagate ST251-1 5.25" 40M drive, 28ms
MISOSYS SCSI H/A with software
Xebec 1421 Hard Disk Controller
Adaptec 4010 Hard Disk Controller
power Y cable
XT drive cable set (20P HDR-EDC.; 34P HDR-EDC)

Model I Double Density Controller

Double Density Controller (DDC)

80% more disk capacity is what you get when you add Aerocomp's DDC to your TRS-80 Model I. This controller has withstood the test of time. All the others are gone, yet the DDC endures. Why? Because it has proven itself as the only way to achieve reliable floppy disk operation on the Model I. Requires the Radio Shack Expansion Interface and software driver. Use our LDOS for top-notch up-to-date DOS performance.

Model III or 4 RS-232 Serial Card

RS232 Serial Card or Kit

MISOSYS acquired the remaining stock of genuine Aerocomp serial cards for your Model III or 4. Replace your broken serial card with this brand new work-alike replacement; or get a kit to install a serial port in the computer without an existing one.

Model III/4 Floppy Disk Controller

Floppy Disk Controller (FDC)

MISOSYS acquired the remaining stock of genuine Aerocomp floppy disk controller boards, 100% compatible with the original. Replace your broken FDC card with a brand new one. Complete kits with plated steel mounting towers and all necessary cables are available to convert a cassette machine into a disk powerhouse!

Floppy Drives and Parts

5.25" 360K 1/2-height; **3.5" 720K** in 5.25" frame; **2SV5 drive case & P/S**; Single drive cable; Dual floppy extender cable ""

Our Model 2SV5 dual vertical external floppy disk drive case will hold two 5.25" half-height disk drives. " needed for one or two drives; "" needed for two drives..

Computer Power Supplies

Astec AC8151-01: 40 -watt supply

Provides +5V @ 2.5A, +12V@2.0A, and -12V@0.1A. Size is 6.25"x4"x1.75"; mounting holes are 3.125"x4.75".

Astec AC12310: 68 -watt supply

Provides +5V @ 7.3A, +12V@2.5A, and -12V@0.1A. Size is 7.69"x4.125"x2"; mounting holes are 3.75"x7.25". Direct replacement for Tandy Model 4 power supply.

XLR8er'd Model 4 in III mode

LDOS 5.3 XLR8er Interface Kit

This is based on our Hardware Interface Kit but is for the XLR8er board operating under LDOS 5.3. The package includes: XLR2RAM, XMEMDISK, BANKER, VIDX, and SETX.

XLR2RAM adds a bank handler for the extra 64K of memory and the extended 256K of XLR8er board memory. The RAM disk driver can create a RAM disk of from 2 to 27 banks; however, only 10n are supported through XLR2RAM. The VIDX expands scroll protect from 0 to 15 lines rather than just 3; supports reverse video, and supports the @DSP of character codes from 0-31 and 192-255.

Model I/III Data Base Manager

Auto File Manager (AFM)

AFM is a language that you can program your database in! The package consists of three integrated modules that can be called from within each other. AFM - *Auto File Manager* - is the actual data-base program, AFR - *Auto File Reporter* - is obviously the module that prints out your reports, and AFU - *Auto File Utility* - recovers space and keeps the files' integrity intact.

AFM is a free-form entry system, which means that you can enter your data in any way you want! You are <u>not</u> limited to a particular screen format. In fact, each record can have its own individual display format! Really! A unique feature is the ability to define the same field repeatedly within a record. AFM's search routines will find every occurrence of a field within a record, no matter how many times it is repeated.

An AFM record can be up to 4096 bytes long (including field name information), but each AFM record takes up only as much space as it needs. If the record must be expanded, then more space is taken up on the disk. AFU will later allow you to recover unused space within an AFM database file. The size of an AFM database file can expand to accommodate a full fifteen megabytes.

AFM allows you to set printer parameters through a FORMS command very similar to the FORMS command of many popular disk operating systems. This allows you to control your report formats. Totally independent of FORMS, is a COLUMN parameter which is used for defining column widths on display. Thus you have complete control over the formatting of your data for printing and display.

Sorting within AFM is automatic. Once the sort field has been defined, every record entered with that sort field will automatically be placed in the correct position relative to the other records in the file. However, you can list the contents of ANY field in sorted order at any time. In addition, searching can be performed on the major key fields through the use of powerful relational operators including AND, OR, GREATER THAN, LESS THAN, EQUAL, NOT EQUAL, etc.

AFM has a second module included called AFR (Auto File Reporter). It is one of the MOST powerful report generators ever made available for the TRS-80 computer. Fully relational reports can be generated by applying any set of parameters do your data base. AFM also contains a BCD MATH Package which will allow you to have a running total on numeric fields in reports if desired, using + - * / operators. Accuracy is assured by using BCD math instead of floating-point and output is automatically formatted.

AFM contains numerous HELP screens, which can be invoked at the touch of a key. The help screens are user-controllable and user definable; you may set up your own help screens for a particular application if you wish! It is very easy to set something up for people who don't use the system all the time.

• Output of AFR is fully sorted by all fields and is fully relational. We can't imagine ANY report that cannot be performed by AFR. You can field your data each with different field lengths.

• FORM-LETTER output of AFM will allow you to write documents and have the data filled in automatically by AFR.

• RELATIONAL LOOKUP report allows multiple passes through the database while generating reports. You can utilize information from ALL NINE drawers in the same report.

• MAIL labels etc. are a cinch with AFR's <T>ext option which allows selected field output without fielding the information before hand.

• Forms filter parameters include Word Wrap, Page Numbering, Headers, and Vertical Justification.

TRS-80 Software and Hardware from MISOSYS

Floppy Disk Repair Utilities

SUPER UTILITY PLUS

• Reads, repairs and works with all the popular TRS-80 operating systems Models I, III, 4!

If you use a TRS-80 with disk drives, then this is a must-have program that you will wonder how you did without for so long! Super Utility is completely menu-driven with the most common defaults built right in. It is configurable for all the popular TRS-80 operating systems and will even allow you to set one drive for one system and another drive for a different operating system and copy files easily between the two. Even between Model I and III or 4, regardless of density, track number, number of sides, or system used.

Super Utility removes or decodes passwords, reformats a disk without erasing the data, fixes problems, backs up most protected disks, etc. Super Utility has over 65 functions and features.Does not work on hard disks. Our ToolBox or ToolBelt has similar features for hard drive use, as well as floppy. SU+ does not support Newdos/80 double-sided disks.

Super Utility Plus 4/4P/4D

The Model 4 version of Super Utility has all the features of the Model I/III version, but uses the larger amount of memory for quicker operations, plus utilizes the three function keys. It boots right up in a Model 4P without having to first load the MODELA/III ROM file.

Hard Disk Check, Repair, & Modify

LDOS ToolBox

If you own a hard disk and use LDOS, this is the perfect insurance policy for your data. The LDOS TOOLBOX is like a Super Utility+ for hard disks. Features Disk Check and Disk Repair, Sector Modification, plus many, many other useful utilities that makes using a hard drive even easier. Each program contains a builtin help command, so many times you don't even need to look things up in the manual - just press <Enter> for help! A very wise buy for hard disk users.

Model 4 ToolBelt

This is similar to the LDOS TOOLBOX, except it is for the Model 4 TRSDOS 6 operating system (all versions).

Super Fast Hard Disk Backup and Restore

Back/Rest

BACK/REST has proven to be a great time-saver for thousands of TRS-80 hard drive users. BACK/REST can back up 10 megabytes in about 10 minutes and 20 meg in about 30-40 minutes. It also tells you how many disks to have ready. Works under LDOS or TRSDOS 6 (both versions on same disk). Great utility for hard disk users!

Hard Disk Drivers for Tandy disk systems

Supreme HD Driver - RS

These hard disk drivers out-perform the Tandy drivers in many ways. Our Powersoft drivers allow you to combine LDOS and TRSDOS 6 on the same drive and boot from either system (with floppy disk). They run faster and take much less memory from the system. Only for use with Tandy Hard Drives.

SuperSCRIPSIT Printer Driver

PowerDriver Plus

• Allows EPSON or compatible printers to be fully utilized with SuperScripsit and SCRIPSIT PRO.

This is a replacement driver for the ones you got with SuperScripsit. It fully supports the various Epson and Epson compatible printers to the limits of their capabilities. Model I, III or 4 is supported in the same package. Easy to install.

Mailing List/Fixed Database

PowerMail Plus

This program was because all the other mailing list/data base systems couldn't keep track of all the types of data most folks wanted to keep track of. You needed speed, you needed hard drive support, and you needed a crash-proof data structure. PowerMail+ was top-rated (5 stars) in several publications and has never been topped. Works on floppies or hard disk under all popular TRS-80 operating systems. Allows importing of data from several other once popular mailing systems to avoid re-typing. Written in machine language by the author of Super Utility, this program is FAST and sorts up to 10 levels very quickly. If you keep track of names and addresses along with associated data for any situation, this is the one to use. Many churches, organizations and businesses use PowerMail+ for all the different kinds of lists they need to pull from. Each record has 24 user-definable "flags" to allow total customization for your exact needs.

Form Letter Module

Text-Merge

Create customized "form letters" and Labels with PowerMAIL+!

This optional module for PowerMail allows you to create customized "form letters" or custom labels, lists, etc. with PowerMail Plus and any word processor that saves text in ASCII format. Very easy to use and really gets the effect you want. Allows completely definable report generating from your PowerMail+ data.

A Major Enhancement for SCRIPSIT 4, III and I

PowerSCRIPT

This modification for Radio Shack's SCRIPSIT program turns it into a POWERHOUSE! Our program merges with your copy of SCRIPSIT to create a new program! PowerScript allows you to add printer control codes directly in the body of your text! Now it is easy to add underlining, bold face, the different sizes of print, etc. Initially set up for the EPSON type dot-matrix printers, it is configureable to just about any printer during set-up. If you have more than one printer type, then just set up a copy of PowerScript for each printer you have. PowerScript adds the ability to see an alphabetized directory without exiting the program seeing how much free space you have, and others. It works on the Model I, III or 4 versions of SCRIPSIT. It will even make a Model I version of SCRIPSIT work on a Model III or 4 (in the III mode). Lastly, PowerScript removes the limited copy "feature" of SCRIPSIT so that you may make as many copies as you need or copy it to your hard disk without hassle.

animated TRS-80 screen graphics!

PowerDraw

PowerDRAW allows you to create graphics (mixed with text if desired) and save them to disk. It allows you to create up to 33 "frames" of animation and "play" them like a movie. It also allows you to save the graphics in several modes, including BASIC listings, CMD file format, etc. These can then be merged into your own programs,, either in BASIC or machine language! Many of PowerSoft's opening screens were created with PowerDraw. In fact, it even creates animated opening screens to really pep up the program. It also allows you to print the screens on Epson-type and several other type of printers. Lastly, PowerDraw has the ability to load in many types of TRS-80 graphic's and convert them to BASIC listings like a BASIC program generator!

Block Graphics Drawing

PowerDOT 2.0

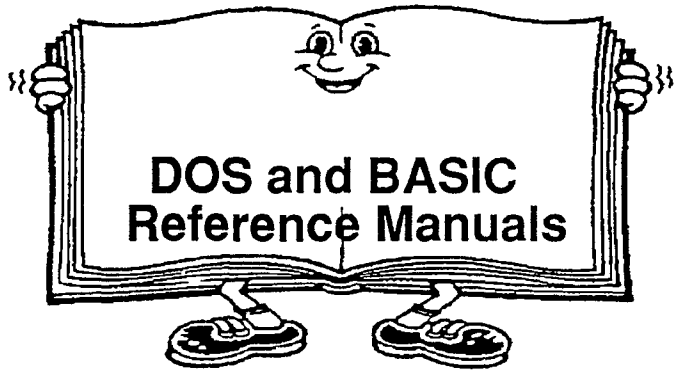
This program is similar to PowerDraw, but quite different. It allows you to create "hi-res" type screen graphics combined with text, and allows you to create drawings much larger than your screen. The screen is a "window" to a much larger drawing area and you use the arrow keys to move about the drawing. In a way, it is similar to Macpaint for the Macintosh computer. It also allows you to create custom fonts for ads, etc. Many of our early ads were created with PowerDot. It creates the hi-res effect due to each TRS-80 block pixel being printed as a single dot. Please specify if EPSON, Okidata, Prowriter, or Radio Shack printer.

Choose LDOS 5.3.1 or LS-DOS 6.3.1

- ☆ Both Model I and Model III LDOS support similar commands; DOS commands are virtually similar to Model 4 LS-DOS 6.3.1 syntax where possible.
- ☆ The DATE command, "Date?" prompt on boot, and the @DATE SVC now support a date range of 32 years; from **January 1, 1980 through December 31, 2011.**
- ☆ **Enable or disable the printer time-out** and error generation with SYSTEM (PRTIME=ON!OFF).
- ☆ Both ASCII and hexadecimal display output from the LIST command is **paged a screen at a time.** Or run it non-stop under your control.
- ☆ MEMORY displays (or prints) the status of switchable memory banks known to the DOS, as well as a **map of modules** resident in I/O driver system memory and high memory.
- ☆ Specify SYSTEM (DRIVE=d1,SWAP=d2) to **switch drive d1 for d2.** Either may be the system drive, and a Job Control Language file may be active on either of the swapped drives.
- ☆ The TED text editor has commands to **print the entire text buffer,** or the contents of the first block encountered. Obtain directories from TED, too!
- ☆ Have extended memory **known to the DOS?** The SPOOL command now permits the BANK parameter entry to range from 0-30 instead of 0-7.
- ☆ **Alter the logical record length** of a file with "RESET filespec (LRL=n)"
- ☆ Specify "RESET filespec (DATE=OFF)" to restore a file's directory entry to the old-style dating of pre-6.3 release. Specify "RESET filespec (DATE=ON)" to establish a file's directory date as that of the **current system date and time.**
- ☆ SYSTEM command supports removable and reusable BLINK, ALIVE, and UPDATE memory modules.
- ☆ **Double-density BOOT support for Model I** with embedded SOLE and FORMAT (SYSTEM). Supports mirror-image backup, too. Reworked FDUBL driver eliminates PDUBL and RDUBL and takes less memory; enhanced resident driver eliminates TWOSIDE.
- ☆ Model III version auto-detects Model 4 for installation of KI4 keyboard driver; supports CAPS, CTRL, and function keys.
- ☆ SPOOL command offers Pause, Resume, and Clear parameters. (OFF) attempts to reclaim memory used.

MISOSYS, Inc.
P. O. Box 239
Sterling, VA 20167-0239
703-450-4181
[orders to 800-MISOSYS (647-6797)]

- ☆ Both Model I and Model III support similar commands: all features of Model III 5.3.0 are in Model I 5.3.1. That includes such facilities as DOS and BASIC help files, SETCOM and FORMS library commands, TED text editor, BASIC enhancements, etc. All DOS commands have been groomed for Model 4 LS-DOS 6.3.1 syntax where possible.
- ☆ Felt uncomfortable with the *alleged* protection scheme of 6.3? **LS-DOS 6.3.1 has no anti-piracy protection!** Neither does LDOS 5.3.1. MISOSYS trusts its customers to honor our copyrights.
- ☆ Best of all, **a 5.3.1 or a 6.3.1 diskette is available as a replacement for your 5.3.0 or 6.3.0 diskette for $15** (plus $3 S&H in US and Canada, $4 elsewhere). There's no need to return your current master.
- ☆ The 5.3.1 or 6.3.1 diskette(s) come(s) with a 30-day warranty; written customer support is available for 30 days from the purchase date. Versions of 5.3.1 for the Model I and Model III are available. Versions of 6.3.1 for the Model 4 and Model II/12 are available; Model 4 French and German versions are also available (specify 6.3.1 F or 6.3.1 D). Some Model I 5.3.1 features require lower case or DDEN adaptor.



Two new reference manuals are available from MISOSYS. First, we have the the 349-page "LDOS™ & LS-DOS™ Reference Manual", catalog number M-40-060. This single manual fully-documents both LDOS 5.3.1 and LS-DOS 6.3.1 in a convenient 8.5" by 5.5" format. If you use one, or the other, or even both DOS versions, you may want to bring yourself up to date with a single manual. Gone are the many pages of update documentation. Price is $30 plus $5 S&H.

We also publish the "LDOS™ & LS-DOS™ BASIC Reference Manual". This 344-page book, catalog M-40-061, covers the interpreter BASIC which is bundled with LDOS 5.3.1 (even the ROM BASIC portion), the interpreter BASIC which is bundled with LS-DOS 6.3.1, and both Model I/III-mode and Model 4-mode EnhComp compiler BASIC. One convenient 8.5" by 5.5" manual covers all four BASIC implementations for $25 plus $3.50 S&H. Since this new manual covers our compiler BASIC, you can purchase the disk version of EnhComp for $23.98 plus $1.50 S&H when purchased along with a BASIC Reference Manual, or the disk version by itself for $29.98 plus $3 S&H if purchased separately.

Let LB Data Manager solve your data storage problems

LB Version 2.3: Modern up-to-date features provide this newest release of our Flat File Data Manager with a greater degree of flexibility and an increased level of ease-of-use. LB still provides strong data base capabilities with absolutely no user programming!

NOW WITH COLOR SUPPORT FOR PC USERS

We've added many features asked for over the past few years by LB users; yet LB is still about the easiest, most flexible data manager you can use for managing your data. Absolutely no programming is needed to create a database with up to sixty-four fields; construct input screens for adding, viewing, and editing data; and create your own customized report. Quickly you define your data fields in response to LB's prompts, and then draw your data input screen using simple keystrokes - or have LB automatically create your input screen. In no time at all, you're entering data. Customize your printed reports with user-definable print screen definitions. Or use LB's define print autogen module to automatically create Table or Form reports, or over a dozen different address label configurations including a Rolodex™ card and a 3" by 5" index card. LB is just what you need in a data manager! We even have many database templates available for download on our Compuserve forum!

Data capacity per database:

LB supports up to 65,534 records per data base; 1,024 characters (64 fields) per record; and up to 254 characters per field.

Field types supported:

LB allows ten field types for flexibility: *alphabetic* {A-Z, a-z}, *calculated* {operations on "numeric" fields using +, -, *, /, with 2-level of parentheses}, *date last modified* {YYYY/MM/DD automatically maintained}, *dollar* {±ddddddd.dd}, *floating point* {±ddddddd.ddddddd, *literal* {any ASCII character}, *numeric* {0-9, -, .}, *right-justified numeric* , *upper case alphabetic* {A-Z, automatic conversion of a-z}, and *upper case literal* { literal with automatic conversion of a-z}. All field types utilize input editing verification so invalid data cannot be added to a record. Field name strings can be up to 19 characters long.

Data entry and editing:

LB allows you to design up to ten different add/update view screens to provide extreme flexibility for selectively viewing your database fields. You can customize the appearance of any view screen by a simple drawing process, or use LB's built-in *autogen* capability. View screen definition even provides an intelligent line-drawing mode so you can create lines and boxes to enhance the appearance of your screen image. If your computer supports a color video adaptor, each view screen can be configured to a distinct foreground/background color arrangement to increase the distinction of it's data viewing.

Using a database password provides the capability of selectively protecting fields from being displayed or printed without entry of the correct database password, or they can be protected from being altered. This is quite useful in a work-group environment. Fields may be selectively established to require a data entry before a record being added or edited is saved. You can enable a special index file to keep track of records being added. This can be subsequently used, for example, for a special mailing to newly added *customers*. Flexible editing includes global search and replace with wild-card character match and source string substitution. Search and replace can be performed on all records, or on records referenced in an unsorted or sorted index file.

Record selection and sorting:

You can maintain up to ten different index files to keep your data organized per your multiple specifications. Records may be selected for reference in an index file by search criteria using six different field comparisons: EQ, NE, GT, GE, LT, and LE. You can select on up to eight different fields with AND and OR connectives. Index files can be left unsorted, or you can sort in ascending or descending order. By associating a sorted index file, any record can be found within seconds - even in a very large database.

LB even includes a special *Dup* command which uses the sophisticated Ratcliff/Obershalp pattern recognition algorithm for automatically finding duplicate or near-duplicate records! Duplicates can then be either manually deleted or automatically purged using the provided LBMANAGE utility program.

Automatic operation:

For automating your processing needs, LB can be run in an *automatic* mode, without operator intervention. Frequently used procedures can be saved by LB's built-in macro recorder for future use. Entire job streams may be produced, so that LB operations may be intermixed with literally any DOS function that can be *batch* processed. These named procedures are easily invoked via a pop-up list-box.

Maintenance utilities:

To make it easy for you to grow your database as your data needs grow, we provide three utility programs for managing your database. LBREDEF allows you to construct a new database with an altered data structure and populate it with data from your existing database. This facility is great for adding new fields, or deleting fields no longer needed. Or you can use LBREDEF to redefine the field type of an existing field and convert the existing data. Another utility, LBMANAGE, allows you to duplicate your database structure, copy or move records from one to another, or automatically purge un-needed records.

A third utility, LBCONV, converts to LB from pfsFILE4, Profile4, DIF, dBASE II, dBASE III, and fixed record. It also converts to DIF, dBASE, and tab or comma delimited files to enable easy porting of LB data to other systems.

Report generation:

Report generation incorporates a great degree of flexibility. Your report presentation can be totally customized through print definition formats which you define on the screen as easily as you define the add/update view screens. You can truncate field data, strip trailing spaces, or tab to a column. You control exactly where you want each field to appear on your report. LB provides for a report header complete with database statistics: database name, date, time, and page numbers. A report footer provides subtotaling, totaling, and averaging for calculated, dollar, floating point, and numeric fields; print number of records printed per page and per report.

Many report formats can be automatically created by LB's define print autogen module. You specify your printer type and character size from a pop-up list-box. Select one of four canned report formats: narrow or wide carriage Table reports; a Form report; or an address mailing label using one of six different sizes of labels including labels printed two, three, and four across. Label formats also include formatting for a Rolodex™ card and a 3" by 5" index card. Label formats automatically select the needed fields from your database definition.

For printing, associate any of the ten index files and you control exactly what records get printed; even a subset of indexed records can be selected for printing to give you a means of recovering from that printer jam halfway through your 30-page printout. You can even force a new page when the key field of an index file changes value. Up to ten different printout definition formats can be maintained for each database. Reports may be sent easily to a printer, the console display screen, or to a disk file - useful for subsequent printing or downstream data export to other programs. Report formatting allows for multiple across mailing labels, multiple copies of the same record, or even *form* printing one record per page for sales books. You can easily generate mail/merge files of address or other data for your word processor. Or you can use LB's built-in form letter capability.

Help is on the way:

The main menu even provides a shell to DOS so you can temporarily exit LB to perform other DOS commands. LB provides extensive on-line help available from almost every sub-command. A 200-page User Manual documents every facet of LB's operation.

Competitive Trade-up policy:

Send in an original Table of Contents page from any existing database program and get LB Version 2 for half price. That's only $49.50 + S&H!

Ordering Instructions

Specify MS-DOS (and media size) or TRS-80/4 version. LB is priced at $99 + $5 S&H US ($6 Canada; $7 Europe; $9 Asia, Pacific Rim, and Australia).

MISOSYS, Inc.
PO Box 239
Sterling, VA 20167-0239

703-450-4181 or orders to 800-MISOSYS

TRSCROSS™

(Pronounced TRISS-CROSS)

TRSCROSS runs on your PC or compatible, yet reads your TRS-80 diskettes! Copy files in either direction!

The FASTEST and EASIEST file transfer and conversion program for moving files off the TRS-80™and over to MS-DOS (or PC-DOS) or back

TRSCROSS™
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All rights reserved

1 - Copy from TRS-80 diskette
2 - Copy to TRS-80 diskette
3 - Format TRS-80 diskette
4 - Purge TRS-80 diskette
5 - Display directory (PC or TRS-80)
6 - Exit

Shown above is the Main Menu displayed when running TRSCROSS on your PC or compatible.

TRSCROSS is as easy to use as it looks to be! The program is very straight forward, well thought out, and simple to operate. TRSCROSS has several "help" features built into the program to keep operation as easy as possible. Just pop your TRS-80 disk into your PC and copy the files right to your PC data disk or hard disk. *It couldn't be any faster or easier!* All steps are detailed in the instruction manual. Advanced features, for those that desire to use them include executing menu options right from DOS or from a batch file or macro. This can really speed up transfers when similar operations are performed frequently.

TRSCROSS allows you to "TAG" all files to be moved in ONE pass!

TRSCROSS converts TRS-80 BASIC programs and SuperSCRIPSIT files in ONE PASS while COPYing to MS-DOS!

No need to save your programs or files in ASCII or run a separate conversion program first before transferring. TRSCROSS reads your tokenized BASIC program or SuperSCRIPSIT files directly off your TRS-80 disk and performs the conversion all in ONE pass while being transferred directly to your PC or compatible computer. ***Automatically*** **converts most BASIC syntax,** and lines that need special attention can be listed to a printer. (Does not convert PEEKs, POKEs, graphics, machine language calls or sub-routines.)

TRSCROSS will even FORMAT a TRS-80 disk right on your PC! (Handy for those who use both machines!) Former TRS-80 users who no longer have their TRS-80, but still have diskettes with valuable data... this is exactly what you've been waiting for!

TRSCROSS will READ FROM and COPY to the following TRS-80 double-density formats:
TRSDOS 1.2/1.3, TRSDOS 6.2*, LDOS 5.3*, DOSPLUS, NEWDOS/80*, & MultiDOS.

DOS formats listed above flagged with * signify that earlier versions of these DOS's are readable as well, but one or more sectors may be skipped due to a format problem in that version of the DOS. (Disks that were formatted with SUPER UTILITY™ or SUW4/4P™ do not have this problem.) TRSDOS 6.02.01, or higher should not have this problem. Disks formatted in any 5.25" 80 track format, or single density are not supported; 3.5" 720K disks are readable in a 720K 3.5" MSDOS disk drive.

TRSCROSS Requires: PC or compatible computer, 128K and a normal 360KB (40 track) PC or 1.2MB (80 track) AT drive. Double-sided operation is fully supported. If you have more than one disk drive, fixed drive, or RAM disk, operation will be much smoother. TANDY 1000 requires more than 128KB memory (DMA). TANDY 2000 is not supported at this time due to a difference in disk controller and floppy drives. "Special" data files (like PROFILE+) would need to be converted to ASCII on a TRS-80 first before they would be of use on a PC or compatible.

If you use both types of computers, or you plan to retire your TRS-80, this is for you. TRSCROSS will allow access to your TRS-80 diskettes for years to come. Copy your TRS-80 word processor data files as well as your Visicalc data files over to MS-DOS and continue using them with your new application.

Only $89.95

Plus $4 S&H (U.S.) or $5 Canada or $6 Foreign
Virginia Residents must add appropriate sales tax.

MISOSYS, Inc.
P.O. Box 239
Sterling, VA 20167-0239
Phone: 703-450-4181 (Orders only: 800-MISOSYS)

Super Utility™
for MS-DOS™

A powerful *file recovery* and disk media utility for floppies, internal fixed, and many external fixed and cartridge storage devices.

For IBM PC™, XT™, AT™ and many other PC compatibles including COMPAQ™, AT&T™, and TANDY 1000, 1200, 2000, and 3000.

MS-DOS users... your wait is over for a *GREAT* new disk utility! Accidental deletions and disk directory problems *can happen to anyone at anytime...* a power spike, fingerprint, speck of dust, hardware problem, or simply typing DEL *.* in the wrong sub-directory can destroy critical data in a moment *without warning.* It's gone. Therefore we introduce ***Super Utility***™ for the PC - an easy to use disk utility containing many functions sorely needed in today's MS-DOS computing environment.

With ***Super Utility***™ you can **restore damaged or deleted files** using two different methods (one easy, the other a little tougher). Even clusters of an erased file assigned to another file can still be restored, unless the user has physically written over every byte of the original data (especially useful in word processing files).

In addition to file repair and recovery, ***Super Utility***™ provides sector verify, sector editing, modification of sectors in Hex or ASCII, ease of renaming of files and setting their attributes, string search, copying sectors to a file, diagnostic sector checking, mapping of the FAT table of a file or an entire drive, visual graphics pertaining to your system, and full directory and sub-directory editing without endless menu-hopping - all in one program. The sector display mode displays all 512 bytes on-screen at one time and allows you to fully explore your disks. SEARCH and CHANGE are nice here! Compatible with DOS versions 2.0 - 3.1 on most systems. Some computers may require the use of PC-DOS. Color, composite, or monochrome video are supported. A great tool for fixed disk users as well as floppy. Also compatible with IOMEGA's Bernoulli Box" storage device (also sold by Tandy as the Disk Cartridge System). ***Super Utility***™ is a program that fills the gaps that PC users have most need of and have asked us for. It's aimed at the beginner, the "office user", hobbiests, students of the PC, and programmers alike.

So, why not be certain about the safety of your data (and your peace of mind) when you can have *Super Utility* disk insurance right on hand at an unusually low price? Make your new computing life easier, more fun, and knowledgeable all at the same time. *Super Utility* is easy to use, *unprotected*, and great insurance against disaster *if and when* it strikes!

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Requirements: IBM PC or compatible running PC/MS-DOS 2.x-3.x, min. 128K memory, one disk drive. PC-DOS may be required for use.

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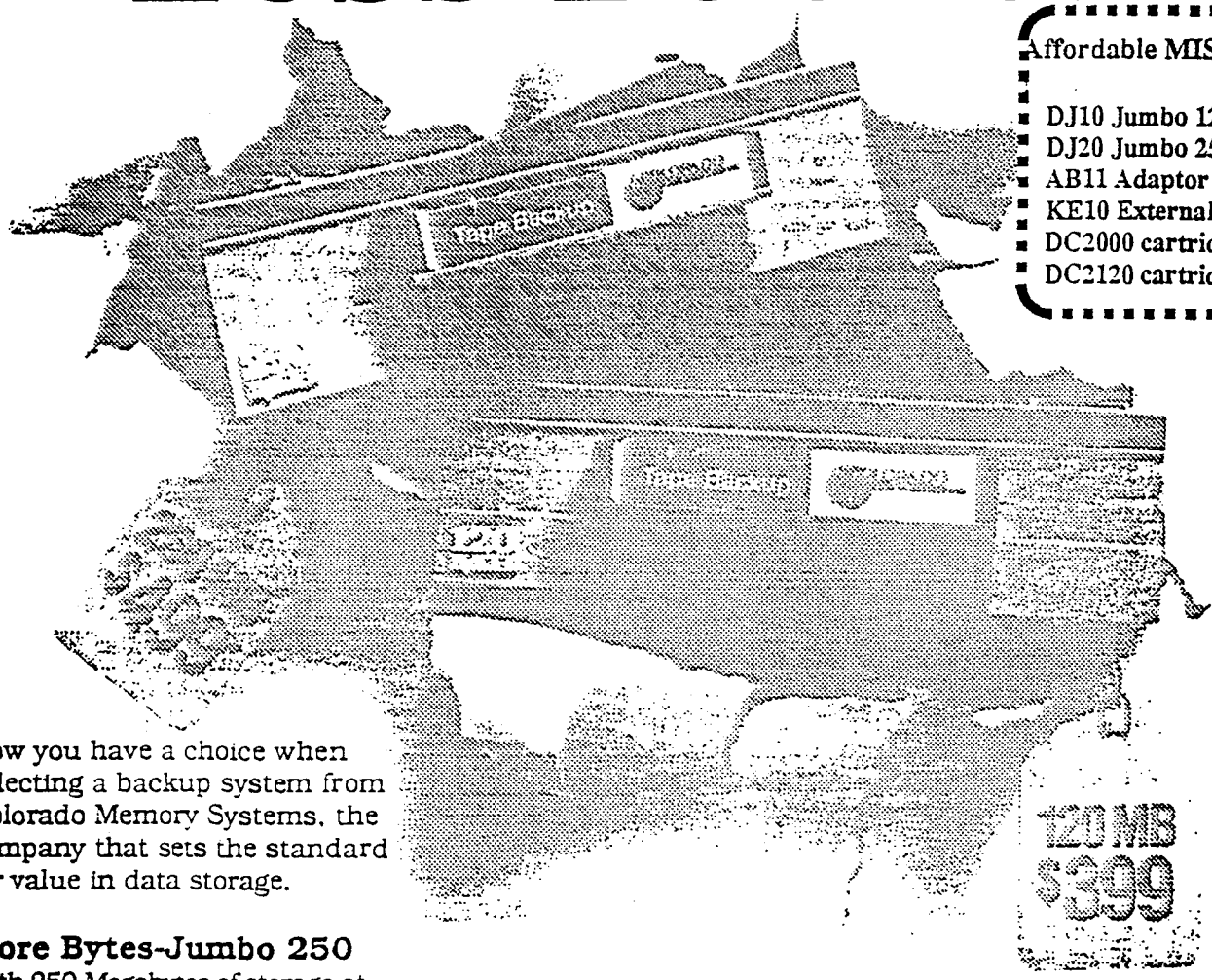

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With a 20 or 40 MB MISOSYS Hard Drive connected to your TRS-80 Model III or 4, your computer will sail through data access.

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Twenty megabyte drive packages are currently built with a Seagate ST225 hard drive; Forty megabyte packages use a Seagate ST251-1 28 millisecond drive. Drive packages are offered as '*pre-assembled kits*'. Your 'kit' will be assembled to order and fully tested; all you will need to do is plug it in and install the software. Drive kits include a 50-pin host interface cable and the hardware clock. Full implement of status lights included: power, ready, select, read, and write. Add a joystick or hardware clock for but $20 additional per option (see price schedule).

Aerocomp Hard Drives now available from MISOSYS

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Drive power Y cable	$5
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