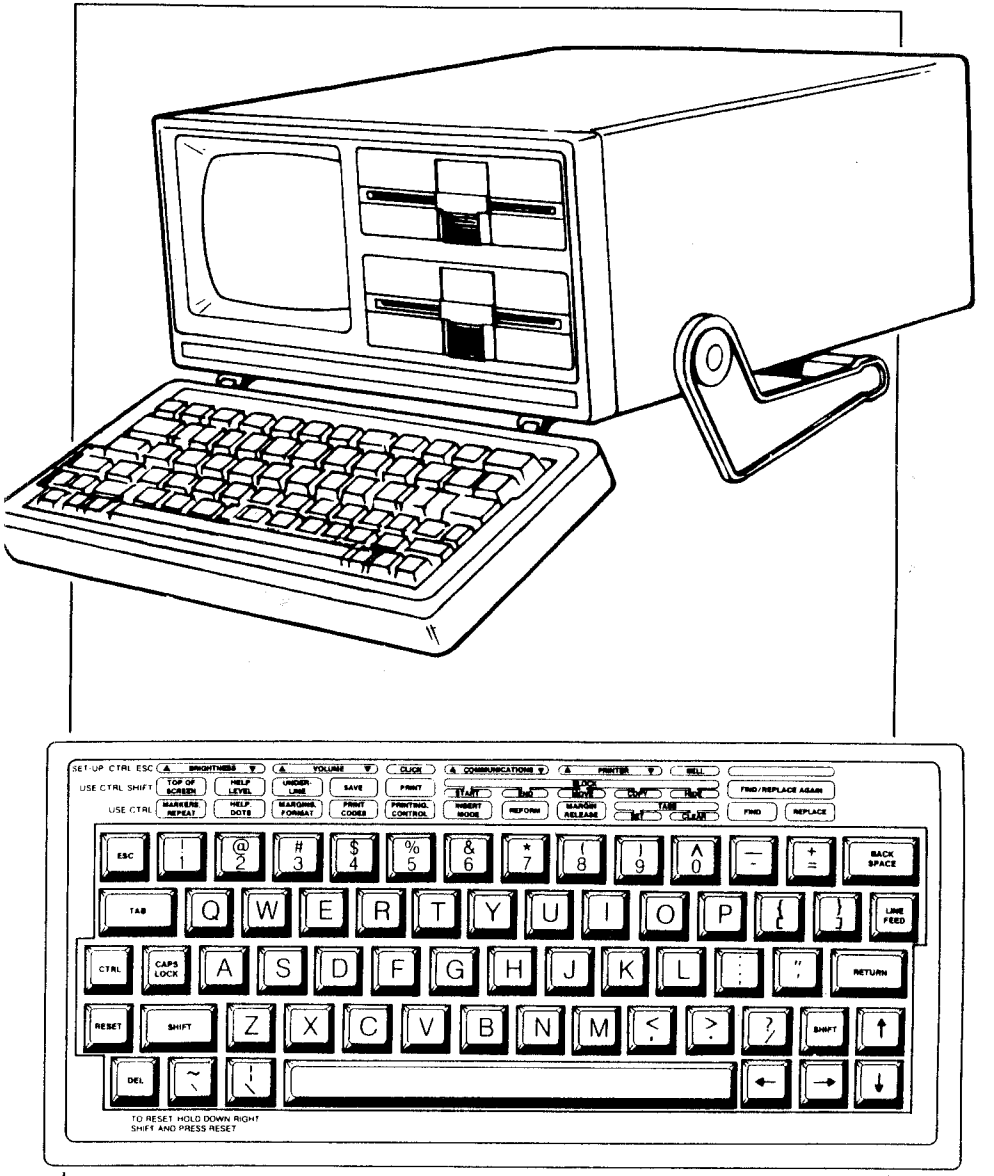
The Z-Letter

Number 5 November 1989



The Otrona Attache, a CP/M portable

WELCOME

Welcome to *The Z-Letter*, a newsletter for the community of CP/M and Z-system users. Everything in this issue is copyright © 1989 Alpha Systems Corporation, 711 Chatsworth Place, San Jose, California 95128, phone number (408) 297-5594. Publisher: Joseph W. Wright, c/o Alpha Systems Corporation. Editor: David A.J. McGlone, 720 S. Second Street, San Jose, California 95112.

The purpose of this magazine is to spread the news about new developments in the community, and to help newcomers get the most out of their machines. So send us the news about your new software or hardware, your opinion of someone else's product, that article you've been meaning to write, your praise, gripes, or just plain questions! This is the place.

Submitting material for publication

Material may be submitted on 5¼" diskette in almost any format, on 8" diskette, or printed or typewritten on clean white unlined paper. Mail letters, articles, and news to the editor, address above. The deadline for submission of material is one full week before the end of the month. We cannot pay for articles, but for every article we publish, the author will receive that issue of *The Z-Letter* free. If the author has a subscription (see below), the subscription will be extended for one issue.

Letter policy

The editor and the publisher reserve the right to edit letters received to conform to standards of taste, decency, and language. We will NOT distort the meaning of any letter; we'll simply not print it first. If you are not willing to have any letter you send printed, or edited before printing, please say so in the letter. All other letters will be assumed to be for publication and become the property of Alpha Systems Corporation upon receipt.

Subscriptions

Subscriptions will be accepted for 12 or 24 issues. A subscription starts with the first issue after the subscription payment is received. The cost is $24 for 12 issues, or $48 for 24 issues, for subscriptions

(Continued on inside back cover)

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THE STATE OF THE ART

Marie Wilkinson joins Alpha staff

Alpha Systems Corporation has hired Marie Wilkinson for the position of Manager of Customer Service. Joseph W. Wright, President of Alpha, states that he is "immensely pleased" with the way that Marie has brought Alpha up to date on customer orders. Not a moment too soon, as the sale of TURBO Pascal to schools has become "brisk."

Elliam Associates CP/M catalog

Last issue I listed the address and price of the CP/M software catalog from Sound Potentials. It would be greatly remiss of me not to also mention Bill Roch's Elliam Associates. Bill has things you've been looking for but have probably been unable to find elsewhere, such as Ellis Computing's languages, SuperCalc2, and the complete set of CP/M public-domain software from CPMUG, SIGM, and the C User Group. If you have Elliam's catalog, Sound Potential's, and our own, there is very little you're missing! The catalog is $1 from Elliam Associates, P.O. Box 2664, Atascadero CA 93423, phone (805) 466-8440.

Hewlett Packard unveils new laser printer

Hewlett Packard recently announced the LaserJet IIP laser printer. At a list price of $1495, the street price could be as low as $1000, which would make it HP's cheapest laser printer. Current street prices for the older LaserJet II printer are between $1500 and $1600.

The new printer offers lower performance in some ways than the LaserJet II, in some ways better. The IIP has a speed of 4 pages per minute to the II's 8, 1 font-cartridge slot instead of two, has no video interface, and no extended I/O slot. On the other hand, it has 2 input trays; while the standard input tray contains only 50 sheets of paper or 5 envelopes, an optional lower cassette adds another 250 sheets, or 20 envelopes. The IIP has 14 built-in fonts to the II's 6, 24 symbols sets instead of 23, and the number of downloaded fonts or macros and the number of fonts per page are limited only by memory, instead of being fixed at 32 and 16, respectively.

Like the LaserJet II, the IIP has a resolution of 300 dots per inch, comes with 512K of memory (expandable to 4 Mb), serial or parallel interface, and supports HP's PCL (Printer Control Language), and has both Epson FX and IBM Proprinter emulations. PostScript is promised "early in 1990".

COMPUTER SHOPPER drops CP/M column

It appears that *COMPUTER SHOPPER* has dropped Cheryl Peterson's CP/M column. I have not been able to confirm this officially, or find out why (no one will return my calls), but the July 1989 issue was the last one with the column. The three issues since, while continuing the other Commodore column and the columns for Coleco Adams, Timex Sinclairs, etc., have been without the CP/M column.

Benjamin H. Cohen of KaftorWare Corporation writes that "Bill Roch of Elliam Associates and I both had the same idea and wrote to Stan Veit suggesting that we would be happy to take over the column. Neither of us noted the change in editorship at the time. I'm writing now to the current editor to make the suggestion that one of us or SOMEBODY please be assigned to write the column. There are, after all, MILLIONS of CP/M users out there, many of whom read *COMPUTER SHOPPER*. Even if they don't buy clones, we do buy disks, modems, printers, and lots of other stuff."

LaserStuff 2/2 comes out

LaserStuff is a magazine "published every so often" by Orbit Enterprises, Inc., a Chicago company that sells LaserJet fonts, PC software for use with LaserJets, and digitizes signatures and logos. While the software can't be used on our superior machines, there is a certain satisfaction in using a PC as a peripheral. By this I mean that you can run the software on a PC, and then use the product of the software between a CP/M or Z-System machine and a LaserJet, whether that product is a font, digitized logo, etc. This issue has a list of addresses of companies that sell LaserJet fonts. For a free copy of *LaserStuff*, write to Orbit Enterprises, Inc., P.O. Box 2875, Glen Ellyn IL 60138.

TURBO Pascal manual typos

There are two typos that you may wish to correct in your *TURBO Pascal Reference Manual*. Although we corrected quite a few errors and omissions in producing a new edition of the manual to accompany orders, it is certain that we introduced at least a couple, as well.

On Page 125 of the Third Edition, it states incorrectly that the *Int* function returns an *Integer*. This is incorrect! *Int* and *Frac* return the part of their arguments that are greater than zero and less than zero, respectively. Both results are *Real*, not *Integer*. *Frac (4.53)* returns 0.53; *Int (4.53)* returns 4.0; both results are real numbers. This same error appears on Page 136 of the Fourth Edition.

On Page 151 of the Third Edition, *variable* is mis-spelled as *varialbe*. In the Fourth Edition, this error appears on Page 257.

My personal apologies for these mistakes. They will be corrected in the next and subsequent printings of the manual. Please write to me directly with any other errors you may find, so that they can be corrected. Thank you.

SUPERMICRO's on a roll!

Issue 3 of *SUPERMICRO* offers a lot of food for thought. Jay Vilhena's "Editor Interface" dissects "the five S-100 fallacies" quite clearly. Don Pannell's S-100 column discusses the differences between old (pre-IEEE standard) S-100 boards and newer ones, how to tell whether a board meets the older or newer standard, and sometimes even what to do about it. Mark D. Pickerill begins a column on the STD bus in this issue with an introduction to the bus. There's also "Selecting a Bus System Enclosure" by Carl Zmola, and lots of product announcements and ads. Keep it up, *SUPERMICRO!*

Old CP/M magazines wanted

I am looking for old computer magazines that covered CP/M computers or software, or had a CP/M column, for my library. If you have some that you are willing to donate or sell, please write to me at 720 S. Second Street, San Jose CA 95112, with a list of your extras.

I would really appreciate it, and would be glad to show my appreciation in spendable form. Thanks.

All sold out

Last issue I passed on the address of Robert C. Bender, who was selling *Beginner's CP/M and Assembly Language*. I also sent him a check for my own copy. He returned my check, saying "Sorry, but I have run out of the CP/M manuals." Why do I always learn about things just a little too late?

Vengeance adds 12MHz, 16MHz models

Vengeance Computing has announced that their PC-Z computer, formerly known as the Grudge computer, will henceforth be available with 12.5 MHz and 16MHz CPUs, as well as the 10MHz CPU available until now. Present owners of the PC-Z-10 will be able to purchase an upgrade kit consisting of a new CPU chip, RAM chips of a higher speed, and a CPU crystal of the appropriate speed. The price of the upgrade is not yet known. The price of a PC-Z-10 remains $550; the price of the new PC-Z-12 and PC-Z-16 systems was not announced.

The PC-Z is a Z-System computer with a CMOS Z80, using PC-bus hardware and form factors because PC hardware is so plentiful and cheap. PC I/O cards are mapped into the Z80's address space, allowing I/O cards such as internal modems to be used. The system provides two serial ports, a parallel port, floppy and SCSI disk ports, and 7 PC AT bus slots. System memory consists of 128K divided into 32K EPROM, 32K banked Shadowram, and 64K main RAM. The EPROM contains the boot code, the system BIOS, and the Z-System. All RAM is battery backed, using two alkaline AA batteries; a selectable jumper enables charging if NiCad batteries are used instead. A Z280 CPU card is planned for the future.

For more information, contact Vengeance Computing, Inc., P.O. Box 15023 Industrial Station, Santa Ana CA 92705-0023, or phone (714) 991-2441 (voice mail) or (714) 546-5407 (BBS).

Zilog marches on

Sources at Zilog have confided to us that a 20MHz Z80 is under development and will be announced this year. Meanwhile, small batches of a 25MHz Z280 are rumored to be in beta testing. If the community incorporates these into new hardware, what computers we will see!

Ladera becomes Z-Node Central

Since Frank Gaude's retirement and the end of Echelon, Richard Jacobson's Lillipute Z-Node has been Z-Node Central, which means it has been the official root of the tree of Z-Nodes (Z-System bulletin boards) in our community, and the one from which other Z-Nodes download new software. A combination of hardware troubles and pressing personal commitments have forced Richard to give up that position, much to his own regret, and that of our community.

Just as Alpha Systems picked up the torch that Echelon, Inc. had to let fall, so Al Hawley's Ladera Z-Node has been serving unofficially as Z-Node Central in this difficult transition time. Some of the gurus of our community, namely Jay Sage, Joe Wright, Bridger Mitchell, and Cameron Cottrill, have asked Al Hawley to assume the duties of Z-Node Central officially. Al has accepted. The phone number for Al's Ladera Z-Node is (213) 670-9465. Al lives in Los Angeles, so bear Pacific Time in mind when turning on your modems.

ASK ALPHA

26 October 1989

Dear Mr. McGlone:

We are a group of disabled veterans that specialize in computer and peripheral repair work. We get donations and issue tax-deductible certificates for materials received. We have just had a donation of a Kaypro II and this is our first sally into CP/M. We have a problem; seven letters to Kaypro including a request for quotation have had no replies of any use at all.

The Kaypro II we acquired is in good working condition. Our problem is not the computer; it is the documentation and the

programs. The TAB book titled *The Kaypro Plain & Simple* furnishes a list of what was sent out with the original shipment of these machines, and we find that we are missing most of the documentation and some of the disks. The WordStar that we have is defective, so even that cannot be used.

We need some help – a lot of it! Can any of your readers help us? In particular, we need the instruction manual for this unit. If you feel that you can help, and are willing to, we will send you a list of what we have, what we found missing, and you can see if you can be of assistance. If you need it, we will give you a tax-deductible write-off on whatever you can donate to help us. Send your replies to James Dolan, The Disabled Veterans Computer Group, 4380 Grant St., Gary IN 46408. All letters will be answered.

Editor: I am enclosing a copy of our original appeal that went out to the members of my post, and later to the veterans in the N.W. Indiana district. This will give you the best idea of what we are doing.

Yours most sincerely,
James E. Dolan
Chairman, DVCG
VFW Post 1563

Good luck to your group, Mr. Dolan. I've never had a Kaypro myself, but there are many Kaypro users out there; here's hoping this puts you in touch with them. Readers: the text of the DVCG's letter to the VFW follows.

Disabled Veterans Computer Group
4380 Grant Street, Gary IN 46408
(219) 980-4508

DEAR MEMBER OF THE VETERANS OF FOREIGN WARS:

I am organizing a group of disabled veterans for the purpose of repairing, reconditioning, and upgrading computers, their peripherals, and accessory equipment.

IF YOU ARE DISABLED:

I have a workshop with instruments where you can work on computers and their peripheral equipment – printers, disk drives, hard drives, monitors, tape drives, modems, and all the accessories used with computers, as well as working on the mother boards or guts of a computer system.

I have a plan whereby you can earn extra cash to add to your disability or social security check, which, in view of the miserable checks that we are getting, I am sure will be welcome. Your allowance this year is $8,800.00 that your can earn before it affects your disability check.

Are you interested? I don't need your money – I do need your brains!

If you have previous experience in electronics, TV repair, or electrical work, it would be very beneficial to our goal. My aim is to make a specialist out of you in one phase of computer repair work, and then to expand your capabilities into other phases of this work, until you are qualified to work on the whole computer system.

Want to join up? Call me at 980-4508 and let's discuss what you can do and what you would like to do; then let's go to work!

IF YOU ARE *NOT* DISABLED:

There is a place in this endeavor for you, too. You can help with outside contacts; you can help with the sale of equipment; you can help with programming; perhaps you can even help us with instructions on computer repair work.

Most important, you might help us with contributions. Again, I don't want your money. What we do need is computers, dead or alive! We need computers, modems, power supplies, drives, and even programs – just about anything to do with computers. Even if it is so bad that it cannot be repaired, or just isn't worth repairing, at least it will give us some spare parts.

If you have dead non-working equipment, or if it's obsolete to your present needs and just gathering dust in the back room or garage, to be eventually thrown out, WE NEED IT and we can use it one way or another.

If you can help us and are willing to, then give me a call at 980-4508. I'm home most evenings except our VFW post meeting nights. Or leave your name and phone number on my recorder, and I'll call you.

Most sincerely,
James E. Dolan
Chairman, Disabled Veterans Computer Group
VFW Post 1563

Editor's Note: The Apple II (II+, IIe, III) is not a CP/M machine. But with a Z80 card, it can run CP/M or even the Z-System. Therefore the matter in the following letter concerns our community, if only peripherally.

A Letter from Applied Engineering

Dear Apple II Enthusiasts:

For many years now, in May and September, a trade show has been held called AppleFest. This trade show has featured software and hardware products for the Apple II.

Nearly 100 exhibitors (including Applied Engineering) attend AppleFest to show their current and newest products to the interested public as well as the Apple dealers who frequently attend. These valuable shows allow companies to display their latest products and give customers and dealers hands-on experience with their products. They also provide a gathering point for all Apple II enthusiasts, dealers, and third-party developers to get to know each other personally.

However, the May 1989 AppleFest included a development that concerns Applied Engineering very much. For the first time, the promoters of AppleFest included Macintosh and Macintosh products. Applied Engineering believes that this was a grave mistake. Macintosh already has a bi-yearly show called MacWorld, which is

100% Macintosh and solely dedicated to that computer. This year a new Macintosh show, MacDex, will begin. Including Macintosh in the traditional Apple II show only dilutes the significance of and support for the Apple II.

Applied Engineering has nothing against the Macintosh or its users and developers. In fact, on a smaller level we develop products for Macintosh as well. Should we choose to exhibit these products, we will attend MacWorld or MacDex. Considering the fact that the Apple II series continues to be the #2 or #3 best-selling computer in the world today, we think it's certainly worthy of a trade show all its own.

Applied Engineering encourages you to write to the addresses below. If you believe as we do, that AppleFest should remain pure to the Apple II series, please express those thoughts in your letter. We know it's asking a lot, but if you enjoy your Apple II and want to continue to see it thrive, Apple Management and the trade show promoters need to know how you feel.

Sincerely,
The Management and Employees of Applied Engineering

Addresses to write to:

Mr. Vidar J. Jorgenson
Managing Director
Cambridge Marketing, Inc.
One Forbes Rd.
Lexington MA 02173
(617) 860-7100

Customer Relations
Apple Computer
20525 Mariani Avenue
Cupertino, CA 95014

COMPUTER CLASSICS

The Otrona Attache, a light but rugged portable

When is an oscilloscope not an oscilloscope? When it's an Otrona Attache, a small, lightweight CP/M portable manufactured in the early 80s. The attache really does look like it's built into an oscilloscope case. This portable has a handle that locks in three positions for (1) carrying, (2) using with the machine standing at 45 degrees, and (3) nearly horizontal (our cover illustrates the third position). It has a keyboard that clamps to the front of machine for carrying, but comes off entirely for use, with a cord connecting the keyboard to the bottom left front of the Attache. The Attache is very light for a portable; at 18 pounds, it weighs half what a portable such as an Osborne or Compaq weighs, and only twice the weight of the average laptop. Its overall dimensions are 5.75" high by 12" wide by 13.6" deep.

Like most CP/M machines, the Attache's CPU is a 4 MHz Z80. It has 64K of memory, with a separate 10K for graphics. The monitor is small, as you'd expect in a portable: 5.5" diagonal. Nevertheless, it displays 24 lines of 80 characters each. These characters are very sharp and clear, and some Attache owners have been content to own only an Attache, instead of having two computers and using the Attache only on trips.

Selectable attributes of the Attache's screen include reverse video, subscript, superscript, double-size characters, boldface, underline, strikethrough, and intensified background highlighting. 256 characters are selectable in four sets. Graphics unique to the Attache (there is no graphics standard in CP/M) permit bar charts, pie charts, graphs, and forms.

The Attache comes with two half-height, 5¼" floppy disk drives. The Attache's native format is soft sector, double sided, double density, 48 tracks per inch, with a capacity of 360K. A standard option offered in its heyday was replacement of the 48-tpi drives with 96-tpi drives, along with a change of BIOS. Unfortunately, most format utilities, such as UniForm, know nothing about the 96-tpi format.

The Attache has no internal hard disk, and I have heard of no conversions. Otrona sold an external hard disk unit for the machine, with its own case and handle.

A special slot in back of the machine will hold one Otrona-specific add-on board. One board that was available contained an 8088 chip and added MS-DOS capability to the Attache. Converted machines, called 8:16s, can use the memory on the board as a RAM disk when running CP/M, which makes the conversion worthwhile even if you never intend to run MS-DOS.

The Attache has two serial ports and no parallel ports. It also has a special RCA-type pin plug for connecting an NTSC external monitor. This gives you another option if the built-in screen seems too small.

The operating system for the Attache is CP/M 2.2, with a few special features added by Otrona for this machine: (1) If the machine is turned on without a disk in drive A, the Attache goes into terminal mode. (2) The Attache has no reset button. Pressing RESET plus right SHIFT keys simultaneously reboots the machine. (3) CTRL + ESC activates Set-up Mode, in which serial port baud rates, keyboard volume, keyclick, screen brightness, and the day/date display from the Attache's internal clock can be changed. (4) During word processing, CTRL + any numeric key makes that key double as a WordStar-Plus function key; a second set of functions is executed through CTRL + SHIFT + any numeric key (see keyboard illustration on our cover). (5) CTRL + CAPS LOCK makes a block of keys double as a 10-key adding-machine pad.

Otrona altered some popular applications specially for this machine. The Attache comes with a special version of WordStar called WordStar-Plus that has extra features for using the Attache graphics, and a special version of Microsoft BASIC whose programs can use the Attache graphics to draw pictures on the screen. The software that came with my system included INSTALL, a program for installing printers for word processing. ATTACHE.BAS, BOXES.BAS, TIME.BAS, and DATE.BAS are BASIC demonstration programs.

In addition to the standard CP/M utilities PIP, STAT, DDT, SUBMIT, XSUB, ED, and ASM, Otrona wrote some unique utilities for the

Attache. Valet was an Otrona program that allowed the traveler to use his Attache as an alarm clock, calendar with online reminders, and generally as a travelling desk. VALET.VL1 contains Valet alarms, screen dump, calculator, and current installed printer programs. PRINTER.VL1 is used to install printers for use with Valet's screen dump. CHARTON.BAS and CHARTONF are programs for creating charts, and BARSAMPL.CHT, LINSAMPL.CHT, and PIESAMPL.CHT were sample charts.

Less exotic Attache programs include SYSDUP, the Attache version of SYSGEN; FORMAT, a diskette formatting program; and TIME, for setting the date, time, and day of the week on the Attache's internal clock. BACKUP copies the contents of a diskette to another diskette. PORTS.BAS temporarily changes the number of stop bits, data bits, and/or parity usage for communication with other systems. GO allows immediate execution of the program in memory, something which is standard in today's Z-System. GRAPH-N.BAS displays standard block-fill patterns for Attache Basic. AUTO supposedly allows easy access to the CP/M auto-start facility; but it is not documented other than a bare mention, so I can't say whether it was an alias mechanism, a program for patching the name of a program or SUBMIT file into the CP/M system, both, or something else.

The Attache was manufactured by Otrona Advanced Systems Corporation (4755 Walnut Street, Boulder CO 80301, (303) 444-8100, TWX 910 940 3445), from at least November 1982 until the company went bankrupt in November 1984. Models were the basic Attache, the Attache 96 (with 96-tpi drives), the 8:16 (with 8088 option installed), 8:16A (with 8088 board and 8087 chip), 8:16B (faster, and more IBM-compatible), and the Otrona 2001, a desktop PC.

Although Otrona is gone, at least two companies still service Attaches. Jim Ayers runs Computer Systems of Marin, 301 Poplar St., Mill Valley CA 94941, phone (415) 383-0473. Jim's involvement with Attaches is of long standing. When Tony Dowden, who published issues 0 through 8 of the *Attache Users Newsletter* (AUNL), could no longer do so, Jim took over the newsletter, and published it to the end. Back issues can still be obtained from him. He also ran the BBS of the Attache Users Group; his business phone number used to be the BBS phone number. Jim still repairs Attaches, and does some of the options such as installing the 8088 board; talk to him about prices.

Another company still supporting Attaches is Integrated Sciences Inc. (ISI for short), 331 Main Street, Longmont CO 80501, phone (303) 449-3872. ISI president Carl Fisher bought the rights to the Attache at Otrona's close-out sale, and quite a bit of hardware, too. ISI's price list includes Attaches at $1595 and Attaches 8:16 at $2195, the same with 96-tpi drives at $300 more, and a variable discount schedule for purchases of 5 to 10, 11 to 15, etc.! For the CP/M Attache they offer modules with two 48- or two 96-tpi drives, a DC power option, an external 10Mb hard disk, multifunction I/O board, 12-bit ADC option, a Math 9511 option at 2 or 4MHz, a GPIB Interface option, and a system extension board with CP/M Plus and a hard disk interface, plus cables, manuals, and software. Interested Attache owners should write to ISI, since I'm trying to keep this feature from turning into a commericial.

ISI is also selling a 80286 "upgrade" designed by Ron Lingeman, the original designer of the Attache. The 80286 board replaces the original mother board, turning an Attache or Attache 8:16 into a new thing, an ISI Attache 286, for $800. As these conversions are done, ISI will have spare 8-bit Attache motherboards, which Mr. Fisher said they would be glad to sell with the schematics, etc. These could then find their way into new computers.

COMPUTER CLASSICS is a feature describing CP/M computers that are no longer manufactured. The point of the feature is to document the great diversity achieved before the IBM PC smothered innovation in microcomputers. Many CP/M computers had unique features not found in later computers of any kind. The editor welcomes further information on the computer described in this issue, as well as information about other brands of computers from informants who know them well.

PROGRAMMER'S NICHE

Type 3 and Type 4 Utilities
Joe Wright, 7 November 1989

Types of utilities in the Z-System

In CP/M, there was only one kind of executable program file. CP/M programs load at hexadecimal location 100. The CP/M command processor, the CCP, loads a requested program at 100h and then calls 100h, executing the program.

In the Z-System, programs that always load at 100h are called Type 1 programs. Type 2 programs were used for a time under ZCPR 2; a Type 2 program still loads at 100h, but includes a copy of the environment descriptor when it's assembled. This precludes the use of dynamic systems, and is no longer used.

Type 3 and Type 4 programs are usually short themselves, but may use large amounts of memory outside the program. A Type 3 program usually runs somewhere in the middle of the memory map, typically at 8000h. The Type 3 program may use memory below its own location, above its own location, or both. When it runs, the Type 3 program knows its own starting location, knows (by calling CODEND, a SYSLIB routine) the location of its end, and of course knows that the TPA starts at 100h and ends at the contents of location 6 (these are constant for CP/M and Z systems).

A Type 4 program has no fixed location, but gets moved to the top of memory, just under the CCP (or RSX). Any extra memory needed will be below it. A Type 4 program need not call CODEND and should not, as I will show. A Type 4 command is structured from a PRL file, usually created by some linker or other.

PRL files

PRL files are Program Re-Locatable files as defined by DRI (Digital Research). The PRL consists of a page (256 bytes) that is mostly blank (filled with zeroes), followed at 100h by the executable (org 100h) code. Immediately following the code segment is a relocation bitmap. This map contains a bit for each byte of the code segment indicating which bytes need to be modified if the code is moved to another location in memory. In the otherwise blank page zero at locations 0001 and 0002 is a word indicating the length of the code segment and, by implication, the start of the bitmap relative to the start of the code.

The actual task of moving the code into position and relocating the various bytes according to the bitmap is actually very short and simple and is often overlaid to page 0 of the PRL and the resulting file renamed to COM. DRI's DDT.COM is an example of this technique. If you look at the first page of DDT you will find that its first instruction is LXI B,CODESIZE (or LD BC,CODESIZE if you

prefer Zilog mnemonics to Intel mnemonics). The rest of the first page (0) will move the body of DDT from page 1 (200h) to high memory, use the bitmap to relocate addresses, and jump to the moved code. Simply disassembling the first page of DDT.COM will tell you how PRL (or SPR) files work. The Type 4 loader T4LDR is more complex than this because it is actually a subprogram of the Z34 command processor. The PRL structure, however, is identical.

We have three linkers that presume to create PRL files; LINK from Digital Research, SLRNK+ from SLR Systems and the new ZMACLNK from Al Hawley. Unhappily, they differ in how a bit is set in the bitmap for the value in $MEMRY.

Assembly-language programmers may have seen references to something called $MEMRY in some programs, and perhaps some discussion of it on bulletin boards or in publications. To my knowledge, the only "real" definition of $MEMRY comes from the Microsoft LINK-80 reference manual:

> LINK-80 stores the address of the first free location in a global symbol called $MEMRY if that symbol has been defined by a program loaded. $MEMRY is set to the top of the data area +1.

Programs that define $MEMRY at assembly time can read it at run time to see where the end of the program is.

The problem with $MEMRY

If we take the position that a bit should be set for the value in $MEMRY, then ZMACLNK sets it properly. SLRNK+ has a bug which sets the wrong bit in the bitmap. If the relocated value of ($memry) is important, SLRNK+ should not be used to create the PRL.

LINK does not set a relocation bit for the value in $MEMRY if it is defined as DEFS 2 or DEFW 0. Therefore, the value remains unchanged after the PRL is moved to a new location. LINK can be coerced into setting the bit by declaring $MEMRY a data word and assigning a relocatable label to it like $MEMRY:: DEFW $MEMRY. Because the label is always relocating, LINK will now set a relocation bit for the value at $MEMRY::.

Assuming that we would use any of the three linkers to create a PRL for Type 4 commands, how can we overcome the problem of the three different bit maps these linkers create for the same source code?

If we wait until run time we are hopelessly lost as there is no easy way to determine which linker was used. The bit map is already set. We need the value of $MEMRY at load time, before it is relocated. To use this we must define the form and use of a Type 4 command more rigorously.

Memory allocation by Type 4 commands

Type 3 and Type 4 command headers have identical forms:

```
entry:  rst   0                 entry:  rst   0
        dw    start                     dw    start
        db    'Z3ENV'                   db    'Z3ENV'
        db    3                         db    4
z3eadr: dw    00                z3eadr: dw    00
t3load: dw    entry             $memry:: dw   $memry

start:                          start:
```

The difference is the use of the word at entry+11. For a Type 3 program, it tells the command processor where to load the file. For a Type 4 program, it tells T4LDR how large the file is and, implicitly, how far under the command processor to load it.

If we enforce the convention that Type 4 programs always allocate dynamic memory below ENTRY:, then the value that the linker placed at entry+11 is 100h + CSEG + DSEG, and tells T4LDR where to load the program. The Type 4 program, therefore, has no reason to call CODEND, and will not be confused by the vagaries of the three linkers.

CODEND is not dependable in Type 4 programs even if ($memry) has been relocated correctly. In the best case, it might return the address of the CCP. But CODEND always returns a Page value. Since the CCP is no longer necessarily on a Page, CODEND might point 128 bytes below the CCP or 128 bytes into it!

A common structure for Type 3 and Type 4 programs

In the past, Type 1 programs were rather easy to convert to Type 3 programs, by inserting an appropriate header section in the code. The resulting REL could be linked to run at any convenient address in memory, including 0100h, just like a Type 1 program. Type 4 programs were created by linking the Type 3 REL file to PRL, overlaying T4LDR, and renaming the result COM. Experience now shows that this is not exactly appropriate. A Type 1 or 3 program always has some free memory above it; a Type 4 program seldom does. Unless it actually allocates memory above itself at assembly time, a Type 4 program must use memory below its ENTRY: if it needs external buffers. This allocation was done by setting the word at entry+11 to point to the first free byte after allocated memory. At that point, the Type 4 program source was no longer compatible with the Type 3 source, because entry+11 is the Load Address in a Type 3 program.

I suggest that we drop our Type 1 roots, consider Type 3 and 4 programs as a separate class of programs, and write code specifically for them. Further, I suggest that the source file for these programs have an assembly conditional declaring whether they are Type 3 or 4 programs. The header would look something like this:

```
type      equ     4          ; 3 or 4

entry:    rst     0
          dw      start
          db      'Z3ENV'
z3typ:    db      type
z3eadr:   dw      0          ; Installed by Z34

 if type eq 4
$memry::                     ; Define it here if Type 4
 endif
          dw      entry      ; else the Type 3 load address
start:
```

The conditional is required to place $MEMRY at entry+11 in the PRL file for T4LDR. Note that all three linkers do this correctly.

The conditional also shortens code. Rather than a source-file structure like this:

```
        ld      a,(z3type)
        cp      4
        jr      z,t4stuff
t3stuff:
        ....
        ....
        jr      comstuff
t4stuff:
        ....
        ....
comstuff:
```

we get a simpler structure like this:

```
tnstuff:
 if type equ 4
    ....
    ....
 else
    ....
    ....
 endif
comstuff:
```

Upgrading the hard disk on a Micromint SB180FX

This article is for readers who have a Micromint SB180 or SB180FX system with XBIOS, who want to replace an existing hard disk with a larger one. I assume the reader knows enough about hardware, or knows someone who does, that needn't give very detailed instructions for such things are making a hard disk data cable. Instead I've recounted my experiences in upgrading my own system by way of a very general guide to the procedure. For readers who have this exact hardware and this BIOS, who want to install the same make of hard disk that I did, I supply the specific parameters needed for SYSBLD.

To anyone who would accuse me of writing an article on a very narrow topic, I plead guilty. In mitigation of the offense, let me

offer the observation that standards in our community are very few; our machines vary more than any other kind of microcomputer, since all they have in common is the ability to run CP/M programs. Any article dealing with hardware upgrades that is specific enough to be useful is therefore likely to be very narrow in the audience it addresses, however welcome it may be to those addressed. I would be glad to entertain other such articles for *The Z-Letter*.

The SB180 and SB180FX single-board computers by Micromint are the workhorses of today's CP/M and Z-System community. Unlike most of the other machines used by our people, the SB180 and SB180FX are not orphans; they are still made and sold by Micromint Inc. (4 Park Street, Vernon CT 06066, phone (203) 871-6170), who will sell them either as boards, or in complete systems lacking only a terminal.

The SB180 is a board the same size as a 3½" floppy disk drive. Because of this, and because the designers originally believed it would be wanted chiefly as a controller rather than the heart of a home computer, SCSI is not included in the SB180. It is available on a separate, even smaller board, the COMM180, which piggybacks onto the SB180. The SB180FX is the size of a 5¼" floppy drive, and has SCSI built into it.

The 10Mb hard disk in my SB180FX system served me fine until I got a laser printer and lots of fonts for it. Fonts on floppies are just too much trouble for casual use; I have to run Eureka! to find out which disk the font is on, put the disk in my system, and then either put up with the slowness of the floppy during printing, or copy the font onto the hard disk. It works, but the net effect is to keep me using the same few fonts all the time. If those are all I need, I might as well be using the kind of laser printer that emulates an Epson or Diablo printer and can only use the fonts built into it. What I really wanted was a hard disk large enough to put a lot of fonts onto it, for easy access.

If I get the same kind of hard disk Micromint puts into the systems it sells, I could be sure that it would work, and Micromint could help me if anything went wrong, so I got out my Micromint catalog. Micromint offers a complete FX system for $999, including two 48-tpi floppies, 512K of RAM expandable to 2 Mb, enclosure and board,

all put together. For $300 more they will make the system with one 48-tpi floppy drive and a 30Mb 3½" hard disk, instead of two floppies. The enclosure, incidentally, will hold four half-height devices; in my system it holds one 48-tpi floppy drive, two 96-tpi floppy drives, plus a hard disk.

I called Micromint to ask them whether that meant they would sell me a 30Mb hard disk for $300, and got the answer I expected. The $300 is only if you order the hard disk when you order the system. Micromint will sell formatted hard disks, but the price is $490. No doubt, though I didn't ask, this represents the cost of the drive plus the labor of the technician who will check the drive and format it. If you order it with the system, they can deduct the cost of the floppy drive that would otherwise have gone into the system, and the labor is about the same for putting in either drive.

Merrill Lathers in technical support patiently answered my questions about the drives they use. (Micromint has always been very supportive, and I'm on my second system from them; they recognize my voice when I call.) The drive they sell is a Seagate 138N, or ST138N. It has a built-in controller, an important consideration, as otherwise I'd have to find room for a separate controller board. Buying a hard disk with a built-in controller also means the disk and controller are already matched and configured, so you don't have to worry about whether this controller will work with this hard disk, and what you have to do to get them to talk to each other.

Another nice feature of this disk, and in fact of most Seagate drives, is that they automatically park the heads when you turn the power off. It's nice to be able to just turn off the computer, instead of having to remember to run a program first to park the hard disk. Failure to do so on a hard disk which does not have an auto-park feature can cause damage to the hard disk if something bumps the disk hard, such as a magnitude 7.0 earthquake.

The next step was to find such a drive. If my assumptions were correct that Micromint's $490 includes labor, I should be able to get one for less and format it myself. Merrill told me that Micromint simply runs the XBIOS utilities SYSBLD and HDIAS to format the drives. (XBIOS is a third-party BIOS written for the SB180 and

SB180FX by Malcolm Kemp of XSystems Software; unlike the original BIOS Joe Wright wrote for Micromint, XBIOS is banked, giving the system a large TPA.) Since I have XBIOS on my system, I saw no reason I couldn't get a drive and format it the same way Micromint would.

Before disconnecting your old hard disk, format a bunch of floppies and *back up everything on your hard disk!* I don't care if you're one of those model people who use AC.COM to back up everything that's changed on your hard disk every time you use your computer. Once you disconnect your old hard disk and hook up the new one, the stuff on your old hard disk will be as lost to you as if you had taken a sledge hammer to it. You *won't* want to unhook your fancy new drive, dig out your old boot disk, and hook up your old drive again to copy that file you forgot to a floppy, so do it now. We'll wait.

My friend Jerry Davis of Morgan, Thielmann and Associates made me a very good deal on the drive, including installing it. Jerry's living is fixing microcomputers, and we do favors for each other all the time; for instance, I let him know when I hear of a good deal on hardware. Installation was very simple. All it took was a screwdriver to open the enclosure and remove the old hard disk; the cable from the SCSI port on the SB180FX to the hard disk came off with just a tug, as did the power connections from the power supply to the hard disk. *(Make sure you turn off the power to the system and unplug it before you do anything like this yourself!* In fact, if you have to be told that, you'd better have a hardware-minded friend do the installation while you just watch.)

Since the Seagate drive is a 3½" drive and the enclosure is designed for 5¼" devices, an adapter is needed. Seagate sells 5¼" frames for 3½" devices; only a medium phillips screwdriver is needed to install them. Simply put, you (1) mount right-angle brackets onto the side of the 3½" drive, using screws and the holes in the side of any hard or floppy disk; (2) attach the front panel to the frame, using screws; (3) run a small connector from the light on the drive to the light on the frame, so that you can tell when your system is using the hard disk; and (4) attach the drive to the frame by screwing the right-angle brackets into the lips provided for doing so. The holes on the side of the frame can then be used to mount the frame into your

system, just as your old drive was mounted. Anti-static precautions must be observed, as the Seagate drive is very sensitive to static shocks. You must also be careful not to put any pressure on the top of the drive.

My old hard disk cable had to be replaced, as the old drive used an edge connector, whereas the new drive had a 50-pin connector mounted on the back of the drive. Fortunately, Jerry had prepared for the possibility and had such a cable already made. Otherwise, we could have put a new connector on the old cable. It might have reached. Screwing the new drive into place, and attaching the power and hard disk cables completed the hardware installation.

Formatting a hard disk under XBIOS is a three-step task. First you must run SYSBLD and put in all the numbers that tell SYSBLD about the hard disk. Then you reboot on the new system and run HDINIT or HDIAS, depending on what controller the hard disk uses; these utilities format the hard disk using the information in the system. If you like your floppy disk drives to be A, B, etc., then these two steps complete the formatting, and you are now ready to copy files to the disk, set up directories, and so forth. But if you want the hard disk partitions to be A, B, C, and D, then you must run SYSBLD again to change the drive letters. You cannot, as I did, set up the hard disk as A in the first SYSBLD and then expect to boot from that system to format the hard disk. A CP/M or Z-System system always boots from drive A. If drive A is an unformatted hard disk, the boot process will naturally hang up. You have been warned!

For the first pass through SYSBLD, it doesn't matter whether you already had a hard disk on your system. You will change only the hard disk parameters, leaving all the menus that describe your floppy drives, memory, CPU, etc., strictly alone. Before doing anything else, back up your boot disk and run SYSGEN to make sure that you can boot from the backup. If you avoid mistakes like the one I made and described in the last paragraph, you won't need this backup. On the other hand, if you need it, you will *really* need it!

To run SYSBLD, you will need certain files on the boot disk. XSYSTEM.MDL is the file that represents your present system, and SYSBLD edits this system image. You will also need the relocatable

files containing the command processor, DOS, and XBIOS you are using; these will be on your backup disks, or, if you didn't keep them on your old hard disk, on your XBIOS distribution disk. My system uses ZCPR 3.3 (ZCPR33.REL), ZRDOS 1.7 (ZRDOS17.REL), and XBIOS 1.1 (XBIOS10.REL and XBIOSB11.REL).

When you run SYSBLD, the first menu you will see will look something like this:

```
SYSBLD Vers 1.12 System Configuration Utility for XBIOS System

        Main Selection Menu (Menu 0)


   1. SYSBLD Files.
   2. Change System Parameters.
   3. Change Disk Parameters.
   4. Change Z-System Parameters.

   Choice (CR=Edit, ^C=Abandon, ?=Help)?
```

Since you already had a working XBIOS system, all you want to change is the information about the disk drives. So choose **3**, which will take you to the disk-configuration menu.

```
SYSBLD Vers 1.12 System Configuration Utility for XBIOS System

        Disk Configuration Menu (Menu 3)


   1. Define Floppy Disk Drives (Physical).
   2. Define SCSI (Hard Disk) Controllers (Physical).
   3. Define SCSI (Hard Disk) Devices (Physical).
   4. Define Logical Disks 'A' Through 'H'.
   5. Define Logical Disks 'I' Through 'P'.

   Choice (CR=Prev Menu, ^C=Abandon, ?=Help)?
```

Presumably you already have your floppy disks set up and working. You don't want to get into choice **1** unless you've changed your floppy disk drives. Choice **2** leads to the SCSI controller menu. Use the space bar to toggle among the choices for SCSI Address 0 until it reads **Seagate 225N Controller**; leaves the other SCSI addresses saying **Not Configured**.

Similarly, for the SCSI configuration menu (choice **3** on this menu), Device 1 should say **SCSI Address 0, Device 0**; leave the other devices saying **Not Configured**. You select device 1 by typing **1** in that menu; this leads to a sub-menu which you must set as follows for the type of hard disk I chose:

```
SYSBLD Vers 1.12 System Configuration Utility for XBIOS System

        SCSI (Hard Disk) Configuration Menu (Menu 3.3.1)
                Device 1

  1. T Configured.
  2.   SCSI Address 0.
  3.   SCSI Device 0.
  4.   Number of Heads: 4.
  5.   Number of Cylinders: 605.
  6.   (Logical) Sectors per Track: 104.
  7. T Physical Sector Size: 512.
  8. T Pulse Rate: 3 ms.
  9.   Rest of Parameters.

  Choice (CR=Prev Menu, ^C=Abandon, ?=Help)?
```

Choice **9** on this menu leads to the rest of the parameters. For this hard disk, set **Reduced Write Cylinder** and **Increased Write Precomp. Cylinder** to **0**, and toggle **Maximum ECC Data Burst** to **11**.

The final adjustments you'll want to make are the logical disk assignments, menus 3.4 and 3.5. For this run of SYSBLD, drives A through D, assuming you have four floppy-disk drives in your system, should be set to **Floppy Disk, Device 0** through **Floppy Disk, Device 3**. Each of these should be designated a **Primary** device, and the disk type is **DEFAULT**.

You will be partitioning the hard disk into four partitions, since XBIOS does not yet take advantage of later DOSes like ZRDOS 1.9, ZDDOS, or ZSDOS to allow a drive to be greater than 8 Megabytes. Drives E through H will therefore all be set to **SCSI Disk, Device 0, SCSI Address 0** in menu 3.4. You do this by selecting **1** in menu 3.4, which brings up a sub-menu:

```
SYSBLD Vers 1.12 System Configuration Utility for XBIOS System

        Logical Disk Assignment Menu (Menu 3.4.1)
             Disk E

  1. T SCSI (Hard) Disk.
  2.   SCSI Address 0.
  3.   SCSI Disk, Device 0.
  4.   Tracks Before Directory ***.
  5.   Tracks For Data ***.
  6.   Number of Directory Entries 1024.
  7. T Allocation Block Size 2048.
  8.   Display Disk Map.

  Choice (CR=Prev Menu, ^C=Abandon, ?=Help)?
```

The only things that will differ when you fill out the sub-menus for Drives E through H are entries 4 and 5. The total hard-disk tracks available are 2420, calculated by multiplying the number of cylinders, 615, by the number of heads, 4 (we used 605 instead of 615 in menu 3.3.1 for good reasons too complicated to go into here). The information you put here determines how the hard disk will be partitioned between drives. The disk will format as 31.3 Megabytes. Provided no drive partition comes to more than 8 megabytes, and no partitions overlap, you can assign those tracks as you wish.

For instance, Micromint uses 2 and 603 for the first partition, 605/605 for the second, 1210/605 for the third, and 1815/605 for the fourth. After formatting this gives us a Drive E of 7.806 Mb, while Drives F through H are 7.832 Mb each. I wanted Drives E, F, and G to be as close to 8 Mb as I could get, allowing Drive H to be smaller, so I used the numbers 2/615, 617/615, 1232/615, and 1847/573. This makes Drives E, F, and G 7.962 Mb each, while Drive H is 7.416 Mb. Many other combinations are possible.

Once the disk parameters are all filled in, keep hitting ‹RETURN› to get back to the main menu, then once more to create a new XSYSTEM.MDL and exit. Booting on this disk will now load a system with the new drive parameters. Then run HDIAS to format the hard disk (HDINIT doesn't cover Seagate controllers). This will take a while, as HDIAS is doing both a "low-level format" and a "high-level format", as a PC owner would say. HDIAS will end with a SCSI error #70. Don't be alarmed; this is normal. It simply means that HDIAS ran out of disk to format.

Now that the disk is formatted, you can run SYSBLD again to change the drive assignments, if you wish your hard disk to be Drives A through D and your floppy disk drives to be E, F, etc. Make sure that the new partitions are set up with the same parameters as before, just under different letters. On the other hand, if you like the present assignment of drive names, you are done. Now you are ready to decide how to arrange the files you copied off your old hard disk onto your new one. Have fun.

BULLETIN BOARDS

Z-Node List #55
Sorted by State, Area Code, and Exchange
by Jay Sage

This revised Z-Node list as of October 28, 1989 supercedes #54, which was released a few days ago with a serious error in the phone number for Z-Node #73 (I mistakenly listed the voice number instead of the modem number). Please be sure to delete list #54.

A system listed here *in italics* is a node that has *not* registered with Z Systems Associates. Report any changes or corrections either to Z-Node Central (#2) or to Jay Sage at Z-Node #3 in Boston (or by mail to 1435 Centre St., Newton Centre, MA 02159-2469).

For each system I have listed Node, Sysop, Location, Phone number, RCP (US only), and the date this information was verified.

Z-Node Central

2 Al Hawley, Los Angeles CA 90056, 213-670-9465, CALAN/24, 10/25/89

Satellite Z-Nodes

9 Roger Warren, San Diego CA 92109, 619-270-3148, CASDI/24, 10/25/89
66 Dave Vanhorn, Costa Mesa CA 92696, 714-546-5407, CASAN/24, 10/25/89
36 Richard Mead, Pasadena CA 91105, 818-799-1632, --------, 10/25/89
17 Bill Biersdorf, Tampa FL 33618, 813-961-5747, FLTAM/24, (down)
11 Carson Wilson, Chicago IL 60626, 312-764-5162, ILCHI/24, 10/25/89
3 Jay Sage, Newton Centre MA 02159, 617-965-7259, MABOS/24, 10/25/89
73 George Allen, Ballwin MO 63021, 314-821-1078, MOSLO/24, 10/28/89
32 Chris McEwen, Plainfield NJ 07080, 201-754-9067, --------, 10/25/89
15 Liv Hinckley, Manhattan NY 10129, 212-489-7370, NYNYO/24, 10/25/89
7 Dave Trainor, Cincinnati OH 45236, 513-791-0401, --------, 10/25/89
33 Jim Sands, Enid OK 73703, 405-237-9282, --------, 10/25/89
58 Kent R. Mason, Oklahoma City OK 73107, 405-943-8638, --------, (down)
4 Ken Jones, Salem OR 97305, 503-370-7655, --------, 10/25/89
8 Ben Grey, Portland OR 97229, 503-644-4621, ORPOR/24, 10/25/89
6 Robert Dean, Drexel Hill PA 19026, 215-623-4040, PAPHI/24, 10/25/89
77 Pat Price, Austin TX 78745, 512-444-8691, --------, 10/25/89
45 Robert K. Reid, Houston TX 77088, 713-937-8886, TXHOU/24, 10/25/89
10 Ludo VanHemelryck, Mill Creek WA 98012, 206-481-1371, WASEA/24, 10/28/89
78 Gar K. Nelson, Olympia WA 98502, 206-943-4842, --------, 10/25/89
65 Barron McIntire, Cheyenne WY 82007, 307-638-1917, --------, 10/25/89
5 Christian Poirier, Montreal Quebec H1G 5G5 CANADA, 514-324-9031, 10/25/89
40 Terry Smythe, Winnipeg Manitoba R3N 0T2 CANADA, 204-667-5919, (down)

62 Lindsay Allen, Perth, Western AUSTRALIA 6153, 61-9-450-0200, 07/01/89

50 Mark Little, Alice Springs, N.T. AUSTRALIA 5750, 61-089-528-852

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Expires 1