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PHIMON

296-022-A-56

PHIMON
OPERATING SYSTEM
MANUAL

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PHIMON OPERATING SYSTEM MANUAL
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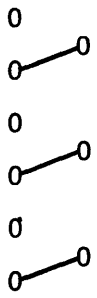
GETTING STARTED WITH PHIMON

0. Read the manual COMPLETELY.

1. Before you can begin to use PHIMON in your Digital Group Z-80 system, you must change the memory address jumper wires on your CPU card. These three wires are located in the top-center of the CPU card. It is necessary to change these so that the memory on the CPU card has the addresses 56K - 58K since this is where PHIMON resides. The new form for the CPU jumper wires is:



Z-80 CPU CARD 56K - 58K JUMPERS

57344 - 59392

2. Next, *without* changing your ROM to the PHIMON ROM, read in the **white** labeled side of the cassette as you normally would any other audio-recorded program. Then place a good **blank** cassette in the Phideck #Ø and press 7 on your keyboard to make a copy of PHIMON. When the "shopping list" reappears, pressing Ø (zero) will jump you into PHIMON. It is suggested that you make several copies of PHIMON from the audio-cassette maker, especially if you have only one Phideck. (There is no other way to copy PHIMON on a system which has only one Phideck.) After you have made several copies, turn your computer off, remove the CPU board and change ROM's.

3. Place the PHIMON cassette supplied or one of the ones made in step 2, above, in Phideck drive #Ø **green-side-up** and turn on the power. There should be an audible click as the system attempts to rewind the cassette and then, depending on where the tape was on the cassette, it will be rewound automatically. After the tape has been rewound, you will hear the read-head latch in and the tape will begin to read. Within 15 to 20 seconds, the message RD OVLY should appear in the upper left hand corner of your screen. Within a few seconds, the HElp display should appear on the screen.

4. If you do not get the RD OVLY message or the HElp display, then what to do next depends upon what actually happened when you turned on the power.

   a. **Nothing**:
      1) Is the computer plugged in?
      2) Have you tested your Phideck(s) with the software supplied when you bought them and do they work?
      3) Did you put the tape in drive #Ø?
      4) Did you change the ROM?
      5) Are the drives connected to the system?
      6) Did you wire the data and control I/O channels according to The Digital Group, Inc. (DGI) standard?

   If the answers to all of the above questions are "yes" then . . .
      1) Scream for HELP; or
      2) Sell your computer and take up needlepoint!!

   b. **The tape rewound and started to read then rewound and started to read again . . . ad nausium!!:**
      1) Your deck is not synchronized with ours as far as speed is concerned. This is why you made the copies from the audio version in step 2. Remove the supplied cassette from drive #Ø and substitute one of the tapes made in step 2. Then go back to step 3 and start over.
      2) You did not change your jumper wires and you did a read-in, jump to no-where, which causes a RST 7Ø or something its equivalent, and you are in some kind of an oddball loop.
      3) If you have more than one Phideck, try swapping the decks and going back to 1), b., and starting all over again.

5. Using PHIMON to copy PHIMON is explained in the manual; however, since the procedure is fairly simple, we will explain it again here:

   a. Place an operational copy of PHIMON in Phideck #Ø and boot it up.
   b. Place a good blank cassette in any other drive; e.g., drive #1.
   c. Type ZE!#1cr to create a zeroed directory for a system monitor tape.
   d. Then when the prompt character appears again, type BU#1cr and the operating system will be copied from the system resident drive #Ø to drive #1.

6. **TVC - 64 Adaption Procedure**
   To adapt PHIMON to the 64 character TV display, it is necessary to change only one byte. The procedure to make this change is as follows:

   a. Boot in PHIMON or boot in the audio maker.
   b. If PHIMON is booted in:
      1) Type DTOcr or DTHcr
      2) When the Breakpoints message appears, type
         (if DTO) 343205Ø ← 58245.
         then 3Ø3space
         then ESC or G
         (if DTH) E385Ø ← LETTER O NOT Ø ZERO
         then C3space
         then ESC or G
      3) If the audio-maker is in, change the same addresses to the same values using the appropriate option but use ESC only to return. G will return you to the audio maker "shopping list".

c. If you are operating under PHIMON, the display should change immediately such that a space follows every character. While this is not the most elegant method of converting to the TVC-64, space limitations prohibit any other method at this time.

d. Make a copy which has the changed byte using the following procedure:
   1) Under PHIMON type BUcr.
   2) Under the audio maker, select option #7.

7. **Using MAXI-BASIC or Tiny-Basic (TBX-TVCOS) with PHIMON:**

There are a number of ways to effectively utilize MAXI-BASIC or Tiny-Basic with PHIMON . . . at least with respect to program files (data file support is not available at this point in time but will be available under MAXI-BASIC, Ver. 2.0).

The quickest and easiest way to get started is to put your original audio-cassette ROM in the CPU card and bootstrap in the maker; place a working copy of PHIMON in drive #Ø (or alternatively, a blank cassette in drive #Ø and make a PHIMON first); and then type option Ø to enter PHIMON. The following instructions apply equally to both MAXI-BASIC and Tiny-Basic:

a. While in PHIMON place the audio version of either MAXI-BASIC or Tiny-Basic in your cassette player/recorder and type

   REcr

   and when the START message appears, start the recorder and once the tone stabilizes, type a space to begin the read. This will read the MAXI-BASIC or Tiny-Basic into RAM starting at page 1 just like a bootstrap load would.

b. When the REad is completed, type

   DTOcr

   and when the breakpoint message appears, type

   5100ØØ
   ØØØspace
   34Øspace
   ESC or G

   You have just set the address of option #Ø in Basic shopping list such that any time the shopping list is being displayed, typing a Ø (zero) will return control to PHIMON. (NOTE: There will not be any message associated with this zero option . . . just remember that it is there.)

c. Depending upon whether you type an ESC or a G at the last character of step b., you will end up in either PHIMON or the Basic shopping list. (This is due to the EXIT procedure which uses RST Ø which, of course, goes through the ROM and the audio ROM will take you to the Basic shopping list.) If you ended up in the Basic shopping list, type Ø (zero) to get to PHIMON. If you ended up in PHIMON, go on to step d.

d. At this step we will SAVE the Basic itself as a program to the PHIMON systems tape. This is done as follows:
   1) MAXI-BASIC: Type SAVE MAXBAS 1-63*5ØØØcr
   2) Tiny-Basic: Type SAVE TNYBAS 1-24*5ØØØcr

   As you perform either of these SAVES, a series of messages will appear on the screen; the last two of which are:

   SAVE PGM HDR
   SAVE PROGRAM

   Then the prompt character will appear again.

e. Now type STcr and the Basic shopping list will appear on the screen.

f. Remembering that the audio ROM is the one in the system, load your old programs one at a time and SAVE them using the following procedure:
   1) Read the program into Basic (LOAD with MAXI after selecting Option 7; Option 1 under Tiny-Basic).
   2) As the program is reading in, keep track of the page number (this is the number, the least significant digit of which is displayed on the screen during the audio read process).

      MAXI-BASIC page numbers begin with 63
      Tiny-Basic page numbers begin with 24

   3) When the read-in is completed, if you are in Tiny-Basic the shopping list will be displayed; in MAXI-BASIC, the READY message will appear. Respond ESC to the READY message.
   4) You should now have the audio shopping list on the screen. Type

      Ø (zero)

   5) You should now have PHIMON on the screen. To SAVE the program in Basic language, type
      (a) MAXI-BASIC program: SAVE progname 63-LP*5ØØØcr
      (b) Tiny-Basic program: SAVE progname 24-LP*5ØØØcr

      Where: LP = Last Page Number

   In either case, you must have kept track of the pages in octal as they loaded in so that you can insert the appropriate value for LP in either SAVE command.

   The *5ØØØ which is specified as the starting address of the programs, in both cases, causes a jump to the shopping list whenever a Basic program in LOaded or RUn from PHIMON. You will then proceed to use the program the same way that you always have.

6) After step 5) is completed, type STcr to get back to the Basic shopping list and repeat this process from step 1) until all of your old programs have been SAved.
7) To SAve new programs, simply enter with Basic normally and key in the program. Then use the SZE command of Tiny-Basic or the FREE (Ø) command of MAXI-BASIC to determine how big your program is. Then SAve it by using the ESC in either Basic to get to the shopping list and follow steps 4), 5), and 6), above.

g. After you have SAved all of your old programs, power-down your computer, insert the PHIMON ROM, power-up the computer and when the HElp display appears, type LOad MAXBAS or TNYBAS if you want to run an older program or RUn MAXBAS or TNYBAS if you are going to enter a new program.

h. Then while in PHIMON type RUn prognamecr and PHIMON will go and find your Basic program, load it into memory and jump to the Basic shopping list.

INTRODUCTION

The PHIMON Operating System is a sophisticated operating system designed for the Z80 microcomputer with one or more Phideck drives and The Digital Group Phideck Controller. This system permits the use of a wide range of peripheral devices and all available memory.

PHIMON provides a set of executive routines which allow user programs easy access to files and file creation. With user support through contributions to a software library, a comprehensive set of system programs will soon be available. These features, combined with the low cost Phideck system, make a true file-oriented hobby computer system possible with all of the features of a larger, more expensive professional system.

HARDWARE CONFIGURATION

The PHIMON Operating System is designed to operate in a minimal Digital Group Z80 system. Minimum hardware would include:

1) Digital Group Z80 CPU card

2) Digital Group Input/Output card

3) Digital Group 8K X 8 RAM memory card

4) Digital Group 16 X 32 TV readout/cassette interface card

5) Digital Group Phideck controller card

6) 1 to 4 Digital Group Phideck drives

7) Digital Group keyboard

8) Digital Group motherboard and power supply

9) Video monitor

The system will self-configure to utilize all available memory. The system supports up to four user-supplied input device handlers and up to four user-supplied output device handlers for easy adaptation to special I/O configurations.

USING THE PHIMON SYSTEM MANUAL

The PHIMON Operation Manual provides a complete user's guide for the PHIMON Operating System. The manual is divided into three parts. Part One contains detailed instructions for getting on line with a new PHIMON system. Part Two describes how to use the PHIMON keyboard monitor commands. Part Three describes how the user can write programs that can access and create files using the PHIMON executive routines, implement user-made patches, and write input and output device handlers.

You, the PHIMON Operating System user, can help make the system easy to use, flexible, and extensive, by critiquing the manual and offering suggestions on how it can be improved. Please report any bugs found in the system and supply as much information as possible as to how they came about, in addition to submitting user-written system programs with quality documentation. This information should be submitted to:

PHIMON System
The Digital Group, Inc.
PO Box 6528
Denver, Colorado 80206

A form for submitting PHIMON manual corrections and suggestions is included at the back of this handbook.

PHIMON SYSTEM COMMAND SUMMARY

The following commands are available when PHIMON is in the command mode (prompted with ">". Only the first two letters of the command are required; remaining ones are optional. Each command line is terminated with a carriage return. All commands default to Unit 0 if #N is omitted. All addresses and page numbers are typed in octal.

Typing 'ESCAPE' while in the monitor clears the screen. 'CNTRL/U' deletes the current line and (DELETE) or (RUBOUT) deletes one character back.

1) **HE**LP FORMAT: >HELP (CR)

Displays system commands.

2) **DI**RECTORY FORMAT: >DIR#N.EX (CR)

Displays all files on unit number N with extension .EX. If the .EX is omitted all files are printed. The length of each file can be found next to its filename.

3) **LO**AD FORMAT: >LOAD#N NAME (CR)

Where name represents a .GO filename. Moves the RUN file into memory and returns to monitor.

4) **RU**N FORMAT: >RUN#N NAME (CR)

Where name represents a .GO filename. Moves the RUN file into memory and starts execution at address specified during SAVE (see **SA**VE command).

5) **SA**VE FORMAT: >SAVE#N NAME XX-YY* ZZ (CR)

Where name represents a .GO filename. Saves program located at pages XX to YY inclusive with starting address ZZ where ZZ is full page and byte address. (Location 23 on page 10 enters as '* 10023').

6) **ST**ART FORMAT: >START ZZ (CR)

Where ZZ is full page and byte address as in SAVE format above. Starts execution at address ZZ. If ZZ is not specified execution will start at ZZ from last LOADED, RUN or SAVED program.

7) **ZE**RO FORMAT: >ZERO#N (CR)
OR >ZERO!#N (CR)

Zeros the dictionary as a non-system (storage only) cassette. With the '!' option, zeros the directory as a system cassette. (The system area is written with the **BU**ILD command).

8) **DE**LETE FORMAT: >DEL#N FIL1.EX,FIL2.EX,FIL3.EX (CR)

Deletes specified files. A space must precede first file name.

9) **RN**AME FORMAT: >RNAME#N OLDNAM.EX, NEWNAME.EX (CR)

Renames a file on the specified device.

10) **DTO & DTH** DEBUGGING TOOL OCTAL AND DEBUGGING TOOL HEX

Will allow: Location examination & modification, set & clear breakpoints, start at a given location, continue from breakpoints with register restoration, direct ASCII input & Z80 register modification.

11) **AL**TER FORMAT: >ALTER#N (CR)

Where N is the system overlay number which is to be loaded into memory. **DTO** or **DTH** can now be used to make system overlay modifications.

12) **IN**SERT FORMAT: >INSERT#N (CR)

Where N is the system overlay number which is to be inserted into the system. Writes overlay number N onto system cassette.

13) **BU**ILD FORMAT: >BUILD#N (CR)

Where N is unit number. Transfers system area from system cassette (Unit 0) to Unit N. If the unit number is omitted a resident system update occurs.

14) **RE**AD FORMAT: >READ XX-YY (CR)

Reads Suding format cassette tape into pages XX to YY inclusive.

15) **WR**ITE FORMAT: >WRITE XX-YY (CR)

Writes Suding format cassette tape from pages XX to YY inclusive.

ACCESS TO MONITOR ROUTINES

PHIMON allows user programs to use any of its directory handling and Phideck routines, providing easy access to files and file creation. Among these routines are LOOKUP (searches directory for filename provided), ENTRY (searches directory for available user program file creation space) and CLOSE (adds user's program file to the directory). Also available are the Phideck routines READ and RECORD.

PART 1
GETTING ON LINE WITH PHIMON

The PHIMON Operating System is supplied to the user as a package containing:

1) The PHIMON Operating System manual;

2) A PHIMON System cassette tape maker (Suding 1100 baud format);

3) A Phideck Z80 Bootstrap PROM.

Instructions for using the PHIMON System cassette tape maker are included with the tape. Follow these instructions to prepare the PHIMON System cassette. Store the original system cassette maker carefully away.

MEMORY ALLOCATION REQUIREMENTS

PHIMON requires that the 2K of memory on the CPU module be jumpered for memory locations 340000 through 347377 (octal). See Figure 1 for the jumpering required on the Z80 CPU card.

Main memory should be jumpered to start at location 0 and build upward.

TV DRIVER & KEYBOARD PORT ASSIGNMENTS

The TV readout is connected to output port 0 and the keyboard is connected to input port 0. The Suding cassette input and output are connected to bit 0 of input and output port 1. These are the standard peripheral device assignments as described in the system writeups.

PHIDECK CONTROLLER PORT ASSIGNMENTS

The PHIMON Operating System assumes that the Phideck controller will be connected to the system as shown in the Phideck manual. (Refer to The Digital Group Cassette Storage Manual, page III-1 & 2, page V-3, and page VI-1 for more details.) Output port 2 is the data out and control port. Input port 2 is the data in and status port. Output port 1 (bits 4, 5, 6, & 7) serve as strobe bits.

BOOTING UP THE SYSTEM FROM THE SYSTEM CASSETTE

1) Make sure that the CPU board memory is jumpered correctly.

2) Make sure Z80 Phideck Bootstrap PROM is installed.

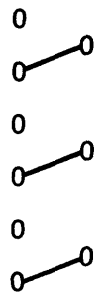
3) Turn power on.

4) Place the PHIMON system cassette in Phideck unit zero.

5) Push the RESET switch.

6) The system will engage the tape and start looking for the Bootstrap block. When it finds it, it automatically loads and configures itself and displays the **HELP** command display and the prompt character "**>**" at the lower left hand corner of the screen. Refer to Part 2 of the manual for instructions on utilizing the PHIMON keyboard commands.

Pressing the RESET button will cause PHIMON to restart itself if resident or re-boot itself if not.



Z-80 CPU CARD 56K - 58K JUMPERS

PART 2
PHIMON KEYBOARD MONITOR

The PHIMON keyboard monitor provides communications between the user and the PHIMON overlays by accepting commands from the terminal keyboard. The user can run system and user programs, save programs, zero and build system and non-system cassettes, delete files, run DTO & DTH, make modifications to the system, update cassettes to include these modifications, and read and write Suding format audio cassette tapes.

SYSTEM CONVENTIONS

The PHIMON System has various conventions which are quickly mastered by even the novice programmer. Naming procedures for files have been designed as simple mnemonics. Naming procedures for I/O devices are simple octal numbers 0 through 7. PHIMON makes use of the terms "word", "byte", "page", "record", and "block" as units of storage. In directory listings and elsewhere, file lengths are referenced in terms of octal blocks. The terms are defined as follows:

1 word = 1 byte

1 block = 1 record = 1 page = 256 (base 10) words

Each word or byte consists of 8 bits. A full page and byte address consists of 16 bits.

DEVICE NAMES

Each I/O (Input/Output) device in PHIMON is designated with an octal digit 0 thru 7. Device numbers 0 thru 3 refer to the four Phideck tape drives supported with device 0 being the system device. Devices 4, 5, 6, and 7 represent user-defined and written device handlers for special input and output devices the user may wish to include in the system. Each device number can represent an input device and/or an output device. Each user-written device handler overlay has a specified entry point for an input device handler and a different one for an output device handler. See Part 3 of the manual for details on writing user-defined device handlers and instructions for installing them in the system.

Possible devices that might be included in a system would be a lineprinter, paper tape reader and punch, card reader, other audio cassette format drivers, graphics terminals, etc. These device handlers can be specified in PIP file transfers and can be called in and utilized by a user program.

FILE NAMES AND EXTENSIONS

Files are referenced symbolically by a name of up to six alpha-numberic characters, starting with an alphabetic character, followed by a period and an extension of two alphanumeric characters. The extension to a file name is used by both system programs and the user to specify and determine the format of the file. System programs will append the correct extension in most cases. For example, saved programs automatically get the extension .GO (meaning memory run file). **LOAD** and **RUN** automatically look for .GO files. Saved basic programs would automatically get the extension .BA.

Since the system text editor (when available) will be used for preparing files for many purposes, the user will have to specify the correct extension when he creates the file so that the system used will be able to find it and so that he will recognize its file type in the future.

It is essential for users to agree upon a set of extensions and adhere to them. A short list of approved extensions is listed below in Table 1. An extended list of extensions is contained in Appendix A. This list will grow as more system programs are developed.

TABLE 2-1 PHIMON FILE NAME EXTENSIONS

EXTENSION	MEANING
.AL	Assembly Language Assembled Source Listings
.AS	Assembly Language Source Files
.BA	Basic Program Listings
.GO	Memory Run Files

SYSTEM AND NON-SYSTEM CASSETTES

A PHIMON System cassette contains a directory, a PHIMON bootstrap, a set of PHIMON System overlays, and the file storage area. A system cassette must be inserted in Phideck Unit 0.

A PHIMON non-system cassette contains only a directory and the file storage area. This makes more room for files and saves time in accessing files since the system does not have to bypass all of the PHIMON System overlays each time it reads or writes a file. Either a system or a non-system cassette can be used in Phideck units 1, 2, or 3.

The PHIMON commands ZERO and BUILD allow the user to format cassettes as either system or non-system. Refer to the writeup on those commands for more details.

ENTERING PHIMON COMMAND STRINGS

When the system is waiting for a command, it prompts with a ">" at the left of the screen. A cursor shows where the next character will be accepted and indicates that the system is waiting for input.

Only the first two letters of the command need be entered but as many letters as desired may be typed. Typing 'RUBOUT' or 'DELETE' will omit the last character typed and 'CNTRL/U' will echo "$" and delete the entire line.

If a Phideck unit number is to be specified, the #N must follow the last command word letter typed. If the #N is omitted, the system defaults to Phideck Unit 0, the system cassette.

Only 31 characters are allowed in a command string. If more are typed, the error message "LINE TOO LONG" displays. A command string is terminated with the 'RETURN' key which is represented with a '(CR)' in the command string format examples.

PHIMON 'ACTION' MESSAGES

When PHIMON is busy it displays a message on the screen describing what it is doing. The following messages are displayed during system operation:

RD OVLY — Reading Overlay
RD DIR — Reading Directory
WR DIR — Writing Directory

Messages that appear during keyboard monitor command operations are mentioned in the command writeups.

PHIMON KEYBOARD MONITOR COMMANDS

ALTER

The **ALTER** command allows the user to fetch PHIMON System overlays into memory from the system overlay area on the system cassette. The format of the **ALTER** command is:

>ALTER#N (CR)

The octal number 'N' represents the overlay number that is to be loaded into memory. Control returns to the PHIMON keyboard monitor when the load is complete. The overlay can now be patched for errors or major modifications can be made using **DTO** or **DTH.** Overlays are loaded into memory on the page equal to the overlay number (e.g. Overlay #12 is loaded onto octal page 12). The overlay can then be written back onto the system cassette using the **INSERT** command. Refer to Part 3 of the PHIMON manual for additional information about changing overlays.

If the user types 0 or a number greater than 27, the system will display the error message "WHAT?".

The following 'action' message will be displayed:

RD OVLY — Reading Overlay

EXAMPLE:

>ALTER#12 (CR) Overlay #12 will be loaded into page 12 in memory and control will return to the PHIMON monitor.

BUILD

The **BUILD** command writes the system area from the system cassette (Drive 0) onto a zeroed (! option) cassette on one of the other drives. The format of the **BUILD** command is:

>BUILD#N (CR)

Where 'N' represents Phideck drives 1, 2, or 3. The bootstrap code and all of the system overlays will be copied from the system cassette to the specified cassette. The cassette to be **BUILT** must have been zeroed with the "!" option. (See the **ZERO** command for more information.)

If '#N' is omitted, or a 0 is typed for 'N', an update of only the boot code, not the overlays, will occur. This will allow the user to install patches in the resident code if necessary and incorporate them into the bootstrap block.

If a tape to be **BUILT** was not zeroed, the error message "ERROR 2 ON N", where 'N' indicates the unit number, will be displayed. If an attempt to **BUILD** a cassette that was not zeroed as a system tape (! option) is made, the error message "BUILD ERROR" will display.

The following system 'action' messages will display:

WT OPSYS — Writing Operating System Code
RD OVLYS — Reading Overlays
WR OVLYS — Writing Overlays

EXAMPLES:

>BU#3 (CR) Write the entire system area from Phideck 0 to Unit 3.

>Build (CR) Update the boot code only on the system cassette.

DELETE

The **DELETE** command allows the user to quickly delete files from any Phideck drive. The format of the DELETE command is:

>DELETE#N FIL1.EX,FIL2.EX,FIL3.EX (CR)

The digit 'N' represents one of the PHIDECK drives (0 thru 3) and defaults to Unit 0 if not specified. As many files as will fit on the command line may be deleted with commas separating file names. A space must precede the first file name.

Only 31 characters are allowed in the command line and the error message "LINE TOO LONG" will be displayed if more are typed. If the file name cannot be found in the directory of the specified device, the error message "NAME.EX NOT FOUND" will be displayed.

EXAMPLES:

>DEL#2 TEST.GO, TEST.AS,TEST.HL (CR)
Deletes the three files specified from Phideck drive #2 if found.

>DE TEST1.GO (CR)
Deletes the file TEST1.GO from the system cassette if found.

DIRECTORY

The **DIR**ECTORY command produces a video display of PHIMON device directories. The format of the **DIR**ECTORY command is:

>DIR#N.EX (CR)

The digit 'N' represents one of the Phideck drives (0 thru 3) and defaults to Unit 0 if not specified. The '.EX' is optional, but, if included, will cause only files with the two letter option represented by '.EX' to be displayed.

A video display of all the files on the specified device and their size in octal blocks will appear on the screen. The display is in two columns. If more than 28 files are on the device, typing a space will display the next 28 and so forth. After all of the files have been listed out, typing another space will list the number of empty blocks and the number of free blocks on the device and return the user to the PHIMON keyboard monitor.

While the directory is on the screen, typing a non-space character causes command mode re-entry with that character the first character in the command line.

The user may be interested in displaying only certain types of files stored on the device. Typing a period followed by a two letter extension will produce a directory display with only those files with the specified extension. For example, the user might want to list only basic files stored on the system device. The command string would be:
>DIR.BA (CR)
If the user wants to list all files that can be **RUN** (e.g. .GO files) on Phideck Unit 2, the command string would be:
>DIR#2 .GO (CR)
See Appendix A for a list of standard PHIMON extensions.

EXAMPLES:

>DI (CR) Lists all files on the system device, Unit 0
>DIR#3 (CR) Lists all files on Phideck Unit 3
>DIRECT#1 .HL (CR)
Lists all files on Phideck Unit 1 with a .HL extension

HELP

The **HELP** command prints out a condensed listing of the PHIMON keyboard monitor commands and the version number of the PHIMON tape being used. The format of the **HELP** command is:

>HELP (CR)

Only the first two letters are required.

The version number in the bottom center of the screen allows you to keep track of whether you have the latest version of PHIMON. All patches and additions will include changes to this number.

EXAMPLE:

>HE (CR)

PHIMON KEYBOARD MONITOR COMMANDS
VER 1.00

ALTER	**LOAD**
BUILD	**READ**
DELETE	**RNAME**
DIRECTORY	**RUN**
DTO	**SAVE**
DTH	**START**
HELP	**WRITE**
INSERT	**ZERO**

INSERT

The **INSERT** command allows the user to rewrite updated PHIMON System overlays back onto the system overlay area of the cassette. The format of the **INSERT** command is:

>INSERT#N (CR)

The octal number 'N' represents the overlay number that is to be written back on the system cassette. The first byte of page 'N' will be checked to see if it is equal to the overlay number thus indicating that the overlay is probably in memory. If the values do match, the overlay will be written onto the tape in the appropriate spot and control will return to the PHIMON keyboard monitor. If the values do not match, the message "INSERT ERROR" will be displayed and control will return to the PHIMON keyboard monitor. If 0 or a number greater than 27 is typed, the error message "WHAT?" will be displayed.

The following PHIMON 'action' messages are displayed:

RD OVLYS — Reading Overlays
WR OVLYS — Writing Overlays

EXAMPLE:

>INSERT#12 (CR) The contents of Location 0 on page 12 will be checked to see if it is a 12. If so, the page will be written onto the overlay 12 area on the system cassette. If not, the "INSERT ERROR" message is displayed and control returned to the PHIMON keyboard monitor.

LOAD

The **LOAD** command loads a memory run file (.GO format, not ASCII or any other format) into memory from a PHIMON device. The format of the **LOAD** command is:

>LOAD#N NAME (CR)

The digit N represents one of the Phideck drives (0 thru 3) and defaults to Unit 0 if not specified. 'NAME' represents the name of the file to be loaded and a .GO file extension is automatically added. The file is loaded into memory with its memory control block which contains information about the file such as its starting address and the areas of memory occupied by the file. After loading the specified file, control returns to the keyboard monitor.

If the file specified cannot be found, the error message "NAME.GO NOT FOUND" will be displayed. If no name is typed, the error message "WHAT?" will display.

The following PHIMON 'action' messages are displayed:

RD PGM HDR —Reading Program Memory Control Block
RD PROGRAM — Reading Program into Memory

The **LOAD** command is typically used before a debugging or patching session with **DTO** or **DTH. LOAD** is used to load the object program into memory,then **DTO** or **DTH** is called, and the program can be altered and/or debugged.

See the section on **DTO** and **DTH** for more details.

EXAMPLES:

>LOAD#2 TEST (CR)
The file TEST.GO if found will be loaded from Unit 2.

>LO TEST.SP (CR)
The file TEST.GO if found will be loaded from the system device, Unit 0. Note that the .SP extension was ignored.

DTO & DTH

DEBUGGING TOOL — OCTAL OR HEX

DTX, where X stands for either 'O' meaning octal or 'H' meaning hex, allows the programmer to run his program on the computer, control its execution, and make alterations to the program by typing instructions at the keyboard. The format of the **DTX** command is:

>DTO (CR) or >DTH (CR)

—DTX FEATURES

DTX features include location examination and modification and instruction breakpoints to return control to DTX.

The breakpoint is one of DTX's most useful features. When debugging a program, it is often desirable to allow the program to run normally up to a predetermined point, at which point the programmer may examine and possibly modify the contents of the registers, or various instructions or storage locations within his program, depending on the results he finds. To accomplish this, DTX acts as a monitor to the user program.

The user decides how far he wishes the program to run and DTX inserts an instruction in the user's program which, when encountered, causes control to transfer back to DTX. DTX immediately preserves in the stack the contents of all the registers and flags. It then displays the location at which the breakpoint occurred, as well as a display of the contents of all the registers at that point. DTX will then allow examination and modification of any location in the user's program and modification of any register. The user may also move the breakpoint, and request that DTX continue running his program. This will cause DTX to restore the registers and flags, execute the restored instruction, and continue in the user's program until the new breakpoint is encountered or the program is terminated normally.

—CALLING AND USING DTX

DTX is called by typing: >DTO (CR) or >DTH (CR) in response to the PHIMON keyboard monitor prompt character. Before DTX is called, the user should have a runable version of his program in memory. The ALTER, LOAD, or READ commands can be used to place the program in memory or a system program such as an assembler or a compiler may load the program. The user can return to the PHIMON keyboard monitor by typing 'G' (causes a jump to location 0 and thus monitor return) or by typing the 'ESCAPE' key.

DTX requires three pages in the lower memory bank. When called in, it resets the memory limit storage locations that were automatically loaded at bootup to be three pages less than they were, thus reserving room for itself. If this room is to be recovered when the user is finished using DTX, he must use DTX's 'ESCAPE' command to return to the PHIMON keyboard monitor.

If the user is typing any amount of program additions directly into memory, the memory control block of the program loaded may not reflect the true extent of the program. New memory limits may need to be included when using the SAVE command.

—TYPING IN DATA OR ADDRESSES

When typing in data, no leading zeros are required, and only the last digits are considered (e.g. if 234243232 is typed for an 8-bit octal entry, only 232 is used, and for a 16-bit entry, only 243232 is used. When in DTH, only the last two or four hex digits are used.) The examples are shown assuming octal entry using DTO. Similar hex entries are allowed when using DTH.

Commands may be entered in either upper or lower case. Parentheses in the command examples are used for clarity only and are not typed.

While in **DTH**, commands A, B, C, D, & E must be entered as control characters by holding down the control key while typing the letter command. This is not necessary with **DTO** since octal numbering does not use these letters as digits.

—DTX COMMANDS

NOTE: All examples show octal entry to **DTO**. A similar hex convention is used when running **DTH**. When using **DTH** remember to press the control key when typing the commands A, B, C, D, & E.

DTX ADDRESS COMMANDS

The first set of DTX commands affects the address in memory currently being examined or modified.

(NNNNNN)O OPEN LOCATION NNNNNN FOR EXAMINATION OR MODIFICATION

Typing an octal address followed by the letter O causes DTX to produce a memory display showing the contents of 8 memory locations preceding the address and the contents of the specified memory location just opened. The open location can then be modified by the following ALTER commands. Any octal number from 1 to 6 digits in length is legal input. If more than 6 digits are entered, only the last 6 are used by DTX.

(SPACE) STEP FORWARD ONE LOCATION THROUGH MEMORY

Typing a space produces an adjusted memory contents display with the next location the open location that can be examined or modified.

(-) OR M STEP BACKWARD ONE LOCATION IN MEMORY

Typing a '-' or 'M' produces an adjusted memory contents display with the previous memory location the open location that can be examined or modified.

(NNN)L RESET CURRENT LOCATION TO 'NNN' ON CURRENT PAGE

Typing an octal number of 1 to 3 digits followed by an 'L' will cause the memory contents display to change so that location 'NNN' is now the current open location on the current page.

DTX MEMORY ALTER INSTRUCTIONS

The following instructions are used to alter the contents of the current open location. The next location in memory is then opened and the memory content display is updated.

(NNN)(SP) DEPOSIT 'NNN' INTO CURRENT MEMORY LOCATION

Typing an octal number with 1 to 3 digits followed by a 'space' causes that value to be deposited in the current location and the memory display to be updated with the next location now open. Only the last three digits are used.

A(DESIRED CHARACTER)
DEPOSIT THE ASCII CODE IN THE OPEN LOCATION

Typing 'A' followed by any character causes the ASCII code for that character to be deposited in the open location and the next memory location to be opened with an updated memory content display. For example, typing 'A' followed by 'C' will deposit 303 in the open location and update the display with the next location now open.

Z DEPOSIT A ZERO (000) IN THE CURRENT LOCATION

Typing 'Z' deposits zero (000) in the current location and updates the display with the next location now open. Typing Z's in rapid succession allows a section of memory to be zeroed quickly.

DTX REGISTER CHANGE COMMANDS

The following commands allow changing the contents of the CPU registers.

(NNN)D(R) DEPOSIT (NNN) INTO REGISTER 'R'

Typing an octal number with 1 to 3 digits, the letter 'D', followed by a letter corresponding to a register (A, B, C, D, E, H, L) causes the number to be loaded into the specified register. For register loads, only the last three digits are used. To change the Z80 index pointers, type (NNNNNN)D followed by either 'X' or 'Y'. Typing '(NNN)DF' will set the flag configuration to (NNN).

E EXCHANGE REGISTER DISPLAY AND MODIFICATION MODE TO ALTERNATE SET

Typing an 'E' exchanges the register display and entry mode to the other set. The message "MAIN" or "ALTERNATE" displayed on the screen, shows which set is active. The user must ensure that the proper set is active when continuing program execution.

ODT PROGRAM EXECUTION COMMANDS

The following commands are used to create breakpoints, to start program execution at specified points, to examine registers after a breakpoint has been encountered, or to continue from a breakpoint.

(NNNNNN)B SET UP A BREAKPOINT AT LOCATION (NNNNNN)

Typing an octal number with 1 to 6 digits followed by a 'B' causes a restart 6Ø instruction (367) to be deposited at location (NNNNNN) and the display of a breakpoint message at the top of the screen saying:
"BREAKPOINT: NNNNNN".
The previous breakpoint is removed at this time by depositing the original contents back into that location. A breakpoint must be located on an 'INSTRUCTION', not an immediate byte or an address or indeterminate results will be obtained.

B REMOVE EXISTING BREAKPOINT

Typing a 'B' without a preceding number causes the breakpoint to be removed by depositing the original contents back into the breakpoint location. The breakpoint message displayed at the top of the screen changes to: "BREAKPOINT: NONE".

(NNNNNN)G JUMP TO LOCATION (NNNNNN)

Typing an octal address with 1 to 6 digits and a 'G' will cause a jump to the user program at the address specified. Control may be lost if a breakpoint is not encountered. Pressing the 'RESET' button will restart the PHIMON keyboard monitor. Typing DTO or DTH will return the user to DTX which remains resident. Typing 'G' without any preceding digits will cause a jump to location zero and thus return to the PHIMON keyboard monitor. If a breakpoint is encountered, DTX is re-entered with the current register contents display on the screen. The top of the screen displays the message "RETURN: NNNNNN" where 'NNNNNN' is the address of the breakpoint encountered.

C JUMP TO LOCATION OF LAST ENCOUNTERED BREAKPOINT

Typing a 'C' causes a jump to the last encountered breakpoint with all registers restored or updated as modified and continues program execution. The previous breakpoint must be removed or replaced by a new one.

R ENTER REGISTER DISPLAY MODE

Typing 'R' will redisplay the register content display if a breakpoint has been encountered. It will do nothing if a breakpoint has not been encountered.

(ESCAPE) DISMISS DTX, RECOVERING USED MEMORY SPACE

Typing the 'ESCAPE' key will cause DTX to reset the memory limit storage locations to their original value and return to the PHIMON keyboard monitor. Return to the keyboard monitor without using the DTX escape will cause the memory limits to be three pages less than the maximum possible value (e.g. the space required for DTX) and system programs will not be able to use that area. This will be of importance only in systems with limited memory.

READ

The **READ** command allows the PHIMON user to read a standard Digital Group audio cassette tape in the Suding 1100 baud format. The **READ** command has three formats. The first is:

>READ (CR)

This will read a standard PROM monitor tape starting a location 1000. The message
"START CASSETTE THEN (SPACE)"
will display. Type a space when the recorder has been started.

The second format for the **READ** command is:

>READ SA (CR)

Where SA represents a full page and byte address. The Suding cassette tape load will start at location SA and read until the current block of code is read in. Control will then return to the PHIMON keyboard monitor.

The third format for the **READ** command is:

>READ SA-EA (CR)

Where 'SA' and 'EA' are full page and byte addresses. The cassette will be read into memory starting at location 'SA' and will end at location 'EA' unless the current block runs out before reaching the ending address. Control then returns to the PHIMON keyboard monitor.

If noise occurs while reading leader, the keyboard monitor will be restarted. Retype the command to re-enter the **READ** routine. The least significant digit of the page being loaded is displayed on the screen as usual. If the memory location does not load properly, a "." will be displayed.

If address limits between 340000 and 347377 are typed, the tape will destroy the PHIMON resident code.

READ STATEMENT EXAMPLES:

>READ (CR) Standard read as if done from regular PROM op system

>READ 20010 (CR)
Start loading at location 20010 and continue loading until the current block is done

>READ 20000-20100 (CR)
Start loading at location 20000 and stop loading at 20100 unless the block runs out first

RNAME

The **RNAME** command allows the user to quickly rename a file on any Phideck drive. The format of the **RNAME** command is:

>RNAME#N OLDNAM.EX, NEWNAM.EX (CR)

The digit 'N' represents one of the Phideck drives (0 thru 3) and defaults to 0 if not specified.

If the file OLDNAM.EX is not found, the message "OLDNAME.EX NOT FOUND" will be displayed. If the file NEWNAM.EX is already in the directory, the message "NEWNAM.EX ALREADY EXISTS" will be displayed.

EXAMPLES:

>RNAME#1 FROWN.GO, SMILE.GO (CR)
The file FROWN.GO on Drive 1 will be renamed to SMILE.GO.

>RN FUM.BA, FOO.BA (CR)
The file FUM.BA on the system cassette will be renamed to FOO.BA.

RUN

The **RUN** command loads a memory run file (.GO format, not ASCII or any other format) and its memory control block and automatically starts it running at the starting location specified in the memory control block. The format of the **RUN** command is:

>RUN#N NAME (CR)

The digit 'N' represents one of the Phideck drives (0 thru 3) and defaults to Unit 0 if not specified. 'NAME' represents the name of the file to be run and a .GO file extension is automatically added. The **RUN** command is equivalent to a **LOAD** followed by a **START** command.

If the file specified cannot be found, the error message "NAME.GO NOT FOUND" will be displayed. If no name is typed, the error message "WHAT?" will display.

The following PHIMON 'action' messages will be displayed:

RD PGM HDR — Reading Program Memory Control Block

RD PROGRAM — Reading Program into Memory

EXAMPLES:

>RUN#1 TEST (CR) — The file TEST.GO if found will be loaded and started automatically.

>RU PIP (CR) — The program PIP.GO if found will be loaded from the system device (DEVICE O) and automatically started.

>RUN TEST. SP — The program TEST.GO if found will be loaded from the system device and automatically started. Note that the .SP extension was ignored.

SAVE

The **SAVE** command allows the user to save the program currently in memory on a specified Phideck drive unit. The format of the **SAVE** command is:

>SAVE#N NAME XX-YY* SA (CR)

The digit 'N' represents one of the Phideck drives (0 thru 3) and defaults to Unit 0 if not specified. 'NAME' represents the file name the user is assigning. The extension .GO is automatically added to the file to show that this is a memory run file produced by the **SAVE** command. 'XX' represents the starting page number and 'YY' the ending page number of the memory area that is being stored away (e.g. pages XX to YY inclusive will be saved). 'SA' is the full page and byte address (Location 23 on page 10 enters as * 10023) of the starting point for this program. This information will be stored away with the program as a memory control block. If these items are not specified, the required information will be taken from the current memory control block (refer to the **LOAD** and **RUN** commands for more information.)

When saving a program, the directory of the specified Phideck unit will be searched for the file name specified and, if found, that program will be deleted after the new one is saved.

If the first letter of a file name is not alphabetic, if the page numbers are typed incorrectly, or if no file name is included, the error message "WHAT?" will be displayed. If insufficient space is available, the message "NO SPACE" will be displayed. If an error occurs during a **SAVE**, the program currently in memory has not been saved. The memory image, however, is still intact.

The following PHIMON 'action' messages will be displayed:

SAVING HEADER — Saving Memory Control Block
SAVING PROGRAM — Saving Program

It is possible to attempt to **SAVE** memory from pages 340 to 347. This should not be done since PHIMON's resident code is located in this area. The PHIMON resident code can be destroyed by attempting to **LOAD** or **RUN** such a program.

To incorporate error correction patches in saved programs, type>LOAD NAME (CR). Use **DTO** or **DTH** to make the desired changes. Then type SAVE NAME (CR). The old version is deleted and a new version created using the same memory limits and starting address as those for the old version.

SAVE COMMAND EXAMPLES:

>SAVE#3 CPROG 1-37* 1000 (CR)
Saves the program CPROG.GO located at page 1 thru page 37 inclusive with a starting address of 1000 (e.g. Location 0 on page 1) on Phideck cassette drive 3.

>SA TEST* 1010 (CR)
Saves the program TEST.GO located at the page limits currently in the memory control block and with a starting address of 1010 on the system cassette, Drive 0.

>SA TEST.SP (CR)
Saves the program TEST.GO using the memory limits and starting address currently in the memory control block on the system cassette, Drive 0. Note that the .SP extension included should not have been and was ignored and a .GO extension was automatically added.

START

The **START** command starts execution of a program at a specified memory location. The format of the **START** command is:

>START SA (CR)

Where 'SA' is a full page and byte address (Location 23 on page 10 enters as 10023) that program execution will start. If 'SA' is not specified, execution will start at the 'SA' of the last program that was specified in a **LOAD, RUN,** or **SAVE** command.

EXAMPLES:

>START 10000 (CR) Start program execution at Location 0, page 10.

>ST (CR) Start program execution at the starting address included in the last LOAD, RUN or SAVE command.

WRITE

The **WRITE** command allows the PHIMON user to record a standard Digital Group audio cassette in the Suding 1100 baud format. The **WRITE** command has the following format:

>WRITE SA-EA (CR)

Where 'SA' and 'EA' represent full byte and page addresses. These values will be used as the starting and ending addresses for the cassette write.

The message "START CASSETTE THEN (SPACE)" will appear. Type a space when ready to record.

The display "WRITING" will appear and control will return to the PHIMON keyboard monitor after the cassette has been written.

EXAMPLES:

>WRITE 10000-20100 (CR)
Writes a standard Suding cassette after loading the START and STOP addresses with 10000 and 20100 (e.g. memory from 10000 to 20100 will be written out).

ZERO

The **ZERO** command zeros the directory of the specified Phideck unit. It also allows zeroing the directory and leaving room for a set of PHIMON System overlays so that the cassette can be built into a system cassette. The format of the **ZERO** command is:

>ZERO#N (CR)

The digit 'N' represents one of the Phideck drives (0 thru 3) and defaults to zero if not specified. Specifying Unit Zero or defaulting to Unit Zero will zero the system cassette. This is not necessarily a desirable thing to do since few people want the system cassette zeroed unless they are trying to operate on a single drive system. Therefore, the system will display the message: "ARE YOU SURE?" and wait for a character to be typed. If 'Y' is typed, it assumes that you do want a zeroed system cassette and proceeds to do it. Typing any other character returns the user to the PHIMON keyboard monitor. A cassette zeroed in this way is a storage-only cassette and cannot be used as a potential system cassette since it does not contain room for the PHIMON system overlays.

If the user wants a zeroed cassette that can be built into a system cassette, he must use the **ZERO** command with the exclamation point option. The format for this **ZERO** command option is:

>ZERO!#N (CR)

This will zero the directory of the Phideck unit number 'N' and provide room for the system overlays. If '#N' is omitted, the system will assume that you want the system cassette zeroed and will give you the "ARE YOU SURE?" message and wait for the keyboard response described above.

The following PHIMON 'action' message is displayed:

WT ZEROED DIR — Writing Zeroed Directory

EXAMPLES:

>ZERO#2 (CR) Zeros the directory of Phideck Unit 2 as a storage-only cassette.

>ZERO!#1 (CR) Zeros the directory of Phideck Unit 1 as a potential system cassette.

>ZERO! (CR) ARE YOU SURE? YES
Zeros the directory of the system cassette (Unit 0) if the response to the question is 'Y'. The system will display "YES" and the zeroing takes place.

PART 3
PHIMON SYSTEM STRUCTURE

NOTE: Refer to the Symbol Table in the source listings for the values of the symbols mentioned in the following explanations.

PHIMON BOOTSTRAP SEQUENCE

Pressing the 'RESET' switch with the PHIMON Bootstrap PROM enabled initiates the following sequence:

1) Rewind Phideck Unit 0

2) Search for Block 10

3) Load Blocks 10-17 into pages 340-347

4) Jump to Location 347001

PHIMON starts checking for the memory limit in the downward direction. When the top of memory is found, 1K is deducted (directory area), and the upper limit is placed at Location DIRBUF.

The **HELP** PHIMON keyboard monitor option display appears on the screen with the PHIMON prompt character and the cursor in the lower left hand corner.

RESIDENT SYSTEM MEMORY MAP

350373

Unused area — probably no memory here.

Memory control block is written in here.
If real memory exists between 350000-350373,
Do not try to use it.

347377

CPU

Memory control block words.

347374

MEMORY

PHIMON RESIDENT CODE

340000

Possible memory gap

	WITHOUT DTX	WITH DTX
XXX377		
MAIN	1K directory area	3/4K DTX area
MEMORY	(Upper limit contained in DIRBUF)	Directory area if ODT is resident

MAIN MEMORY

000000

CASSETTE BLOCK ASSIGNMENTS

SYSTEM CASSETTE STRUCTURE

BLOCK NUMBERS (OCTAL)	FUNCTION
0-3	Directory
4-7	Over-run guard blocks
10-17	Resident boot code
20-23	Over-run guard blocks
24-52	PHIMON system overlays
53-57	Over-run guard blocks
60-1600	File storage area

NON-SYSTEM CASSETTE STRUCTURE

BLOCK NUMBERS (OCTAL)	FUNCTION
0-3	Directory
4-7	Over-run guard blocks
10-1600	File storage area

SYSTEM OVERLAYS

BLOCK NUMBERS (OCTAL)	OVERLAY NUMBERS	FUNCTION
10-17		PHIMON resident code Boots into pages 340-347
24	1	Directory
25	2	Debugging tool — octal & hex
26	3	SAVE
27	4	RUN and LOAD
30	5	ZERO and DELETE
31	6	BUILD
32	7	ALTER and INSERT
33	10	HELP
34	11	READ
35	12	WRITE
36-37	13	Directory SQUISH and RNAME
40-41	14-16	More DTX code
42-46	17-23	For future expansion
47-52	24-27	User defined device Handlers #4 through #7

PHIMON DIRECTORY STRUCTURE

FILE NAMES AND THE NAME BUFFER

When file names are typed in, they consist of up to six letters followed by a period and up to a two-letter extension. When they are utilized in the system, they are modified to 8 bytes with nulls filling out omitted characters and the period eliminated.

Two PHIMON executive subroutines are available for converting names from one form to another from the name buffer. See the section on PHIMON Resident Code Useful Subroutines for more information.

DIRECTORY FORMAT

The cassette directory occupies blocks 0-3 and consists of a directory header and the directory entries. The header consists of the following:

BYTE (OCTAL)	FUNCTION
0	Start of File Storage Block Number
1	Number of Directory Entries
2-13	First Directory Entry
14-25	Second Directory Entry
	Etc. to the End of Block Three

Each directory file entry consists of the following:

1ST 6 BYTES	File Name
NEXT 2 BYTES	File Extension
NEXT 2 BYTES	Length of File

PHIMON FILE FORMATS

Two File Formats are defined at the present time.

'GO' FILES

STRUCTURE:

1ST BLOCK	— Memory Control Block
REMAINING BLOCKS	— Byte-For-Byte Image of Memory Contents Saved

THE MEMORY CONTROL BLOCK CONTAINS:

BYTES	
0 & 1	The full address of the file's execution starting location
2	Page number of the start of the file
3	Page number of the end of the file
4-377	Unused

ASCII TEXT FILES

ASCII files contain one character per byte. The saved length must be an integral number of blocks. The character 'CNTRL/Z' is the end of file (EOF) indicator.

PHIMON EXECUTIVE ROUTINES

The **PHIMON EXECUTIVE SYSTEM** consists of a set of routines that allows a user to write programs that can make full use of the cassette tape storage system. Using these routines, the user's program can search directories for a file name provided, search directories for available space, read and write blocks, and add entries to a directory.

The address of each label (in PHIMON VER 1.00) can be found next to its name in the explanations below. For future versions of PHIMON new addresses will be provided.

EXECUTIVE ROUTINE CALLING SEQUENCE

1. **READIR (341257)**

   Loads the directory for the specified Phideck drive into memory.
   Calling sequence:

   Set AC to the unit number.
   Call READIR

   The directory will be loaded starting at the address contained in DIRBUF. The presently resident directory will be written out if changes had been made and the new one brought in.

2. **WRTDIR (341345)**

   Writes the current memory resident directory out to the Phideck drive.
   Calling sequence:

   Call WRTDIR

   The directory will be written out only if changes have been made. **WRTDIR** is automatically called by the system upon return to the PHIMON keyboard monitor or if a different directory is requested.

3. **LOOKUP (342143)**

   Searches a resident directory for a file name.

   Calling sequence:
   Set H & L to point to the name to be looked up.
   Call LOOKUP
   On Return:
   Both H & L and IDR are set to the block number of the desired file. D & E is the length of the file in blocks. CARRY=1 if the file is not found.

4. **ENTRY (342136)**

   Searches the resident directory for useable file space.

   Calling sequence:
   Set D & E to number of blocks required.
   Call ENTRY
   On Return:
   D & E are number of blocks available.
   CARRY=1 if there is insufficient room.
   IDW is set to the first block number of available space.

5. **CLOSE (342345)**

   Puts a file name in the resident directory.

   Calling sequence:
   Set H & L to point to the file name.
   Set D & E to length of file in blocks.
   Call CLOSE
   A previous file with the same name will be deleted first before entering the new one.

6. **DELETE (342133)**

Deletes the file with the given name from the resident directory.

Calling sequence:
Set H & L to point to filename.
Call DELETE
On Return:
CARRY=1 is FILE IS NOT FOUND.

7. **OVRLAY (341120)**

Loads a system overlay. Used to bring user-defined handlers into memory.

Calling sequence:
Set AC to overlay number to be loaded into Page 347.
Call OVRLAY
If OVERLAY is already resident the routine simply returns without loading.

8. **READ (345271)**

This is the standard Phideck READ routine. Refer to the Phideck manual for setup and calling instructions.

9. **RECORD (344000)**

This is the standard Phideck RECORD routine. Refer to the Phideck manual for setup and calling instructions.

EXECUTIVE ROUTINE UTILIZATION

TYPICAL FILE SAVE SEQUENCE

1) READ IN DIRECTORY
CALL READIR

2) SEARCH FOR AVAILABLE SPACE
CALL ENTRY

3) WRITE FILE OUT
CALL RECORD

4) ENTER FILE NAME IN DIRECTORY
CALL CLOSE

5) WRITE OUT DIRECTORY
CALL WRTDIR

TYPICAL FILE FETCH SEQUENCE

1) READ IN DIRECTORY
CALL READIR

2) LOOKUP FILE IN DIRECTORY
CALL LOOKUP

3) READ IN FILE
CALL READ

RESIDENT CODE USEABLE SUBROUTINES

The following describes some of the PHIMON resident routines that the user may find handy:

NAME HANDLING

DONAME (343103)

This routine converts a name in typed-in format to the system format and places it in the name buffer.

Calling sequence:
Set H & L to point to the 1st character of a file name to be converted from typed form to directory form.
Call DONAME.

On RETURN the name will have been placed in the name buffer.

PRNAME (342101)

Converts the name in the name buffer to standard display format and prints it. Nulls type as spaces and the extension period is added.

Calling sequence:
Call PRNAME.

MESSAGE DISPLAY ROUTINES

EDITOR (343210)

Prints a message.

Calling sequence:
Set H & L to point to the message.
Call EDITOR

A '377' clears the screen, a number below 200 prints as that many spaces, a '0' terminates the display string.

ERASE (343243)

Erases the TV screen with the next character entry at the top left of the screen.

Calling sequence:
Call ERASE

SPACE (343200)

Prints a space on the TV display.

Calling sequence:
Call SPACE

TV (343202)

Prints the character in the A register on the screen.

Calling sequence:
Load A with character.
Call TV

MLTSPC (343234)

Prints the number of spaces in the A register on the screen.

Calling sequence:
Load A with the number of spaces to be printed.
Call MLTSPC

KEYBOARD INPUT ROUTINE

KEY (343152)

Waits for the user to type a character while displaying the cursor. Returns with the character in the 'A' register.

Calling sequence:
Call KEY

DETERMINING AVAILABLE MEMORY SPACE

When PHIMON is booted in, the first unuseable memory location is deposited in the location DIRBUF (346250). The user's programs can examine this location to determine how much memory is available for use.

EXAMPLE: If the system is a standard Digital Group 18K system, DIRBUF will contain 074000 (071000 when DTX is in use). Thus memory up to 073377 is useable (070377 with DTX).

PROM DISABLE SWITCH

The PHIMON operating system does not use any of the subroutines contained in the page zero PROM after the system is booted up. Therefore, the user may find it extremely convenient to install a PROM disable switch which grounds the PROM disable bus pin.

After booting up PHIMON, the PROM can be disabled and programs can be loaded and run that utilize page zero. To restart PHIMON, it will be necessary to re-enable the PROM and press the 'RESET' button.

USER DEFINED DEVICE HANDLERS

PHIMON provides the user with four easily called overlays for user-defined handlers. Each overlay can contain an input device handler and an output device handler. These handlers can be specified in PIP file transfers or they can be called in and utilized by system and user programs.

DEVICE HANDLER STRUCTURE

The Device Handler must occupy one page and has the following dedicated locations:

BYTE
0 - OVERLAY NUMBER
1 - STATUS WORD
2 - OUTPUT DEVICE ENTRY POINT
202 - INPUT DEVICE ENTRY POINT

STATUS WORD ASSIGNMENT

0 - HANDLER OVERLAY IS UNUSED
1 - OUTPUT DEVICE HANDLER ONLY
2 - INPUT DEVICE HANDLER ONLY
3 - BOTH INPUT AND OUTPUT DEVICE HANDLERS

DEVICE HANDLER CALLING SEQUENCE

Load A with overlay number (20 + Device No.).
Call OVERLAY
The Device Handler is now in Page 347.
Set H & L to point to buffer.
Set B & C equal to byte transfer count.
Set E to 0 if output handler is to initialize device.
Call OUT or IN (OUT = 347002; IN = 347202).

On Return:
A=1 means ERROR.
B & C are number of bytes transferred (input only).

SAMPLE OUTPUT DEVICE HANDLER —PARALLEL PORT LINEPRINTER

This assumes a parallel line printer connected to output port 3. Bit 7 is the strobe bit which is set to one and returned to zero to print the character. When the printer is ready for another character, the LSB on input port 3 will go high and will be reset when the next character is strobed.

```
* LINE PRINTER HANDLER
        ORG   347000
        DB    17    Overlay #17
        DB    3     Both input and output device handlers
                    contained in this handler overlay
LOOP    IN    3
        AND   1
        JP    Z,LOOP
        LD    A,M
        OR    200
        OUT   3
        XOR   A
        OUT   3
        INC   HL
        DEC   BC
        LD    A,B
        OR    C
        JP    NZ,LOOP
        RET
```

SAMPLE INPUT DEVICE HANDLER —OPTICAL PAPER TAPE READER

This assumes an optical paper tape reader (OP80A style, hand pulled). Data is supplied to input port 4. The Data Available Strobe (sprocket hole signal) goes high when data is available and is connected to the MSB on input port 3. The handler assumes that the tape is finished when the data strobe remains high for approximately 5 seconds.

This handler is contained on the same page as the Line Printer Handler described previously.

```
        ORG   347202
PAPER   PUSH  BC    SAVE COUNT
        LD    DE,0  MAKE UPWARD COUNT
        PUSH  DE    SAVE THAT
WTHIGH  IN    3     WAIT FOR SPROCKET HOLE
        AND   200
        JP    Z,WTHIGH
        LD    D,16
        LD    BC,0
WTLOW   IN    3     WAIT FOR NO SPROCKET
                    HOLE WHILE TIMING OUT
```

```
        AND     200     END OF TAPE
        JP      Z,GOTCHR
        DEC     C
        JP      NZ,WTLOW
        DEC     B
        JP      NZ,WTLOW
        DEC     D
        JP      NZ,WTLOW
        POP     BC      TIME UP, RETURN WITH
        POP     DE      BC = BYTES READ
        RET
GOTCHR  POP     DE
        POP     BC
        IN      4
        LD      M,A
        INC     HL      INCREMENT POINTER
        INC     BC      INCREMENT BYTE COUNT
        DEC     DE      ALL DONE?
        LD      A,D
        OR      E
        RET     Z       YES, RETURN
        PUSH    BC      NO, READ NEXT
        PUSH    DE
        JP      WTHIGH
```

APPENDIX A
FILE NAME EXTENSIONS

This Appendix lists the file name extensions for use in PHIMON. This list will be updated and changed as users implement system programs.

EXTENSION	MEANING
.AL	ASSEMBLY LANGUAGE ASSEMBLED SOURCE LISTINGS
.AS	ASSEMBLY LANGUAGE SOURCE FILES
.BA	BASIC PROGRAM LISTINGS
.DA	DATA FILES
.DC	DOCUMENTATION FILES
.DI	DIRECTORY LISTINGS
.HL	HELP FILES
.GO	MEMORY RUN FILE (APPENDED TO FILE NAME BY THE **SAVE** COMMAND AND ASSUMED BY THE **LOAD** AND **RUN** COMMANDS)
.TM	TEMPORARY FILES
.TX	TEXT FILES
.WU	WRITEUP FILES

APPENDIX B
PHIMON ERROR MESSAGE SUMMARY

BUILD ERROR

Cassette not zeroed with the ! option.

DIRECTORY FULL

Directory has more than 102 entries.

ERROR M ON #N

I/O error on Phideck unit 'N'. 'M' represents the type of error:

1) CRC ERROR
2) BLOCK NOT FOUND
3) TAPE END OR JAM

INSERT ERROR

The overlay number did not match the number typed while using the **INSERT** command.

NOT ENOUGH MEMORY

During bootup initialization, occurs if not enough memory is available.

NAME .EX NOT FOUND

While using **DELETE** or **RNAME**, the specified file was not found.

NAME .EX ALREADY EXISTS

While using **RNAME**, the new name specified was already in the directory.

NAME .GO NOT FOUND

While using **LOAD** or **RUN**, the specified file was not found or the name specified was not a .GO file.

NO SPACE

No room to **SAVE** file on the specified cassette.

NOT AN IMAGE FILE

File specified in **LOAD** or **RUN** command was not an image file.

WHAT?

Syntax error.

LOAD or **RUN** command typed without file name.

While using **ALTER** or **INSERT**, overlay #0, no overlay number, or an overlay number greater than 27 was specified.

While using **SAVE**:
No name was specified.
The first character of the name was not alphabetic.
The second page specified was smaller than the first.

APPENDIX C
PERIPHERAL INTERCHANGE PROGRAM

PIP is the PHIMON System file utility program that copies files from one device to another. It also allows the creation of new files from input using the user-defined input device handlers and the dumping of files onto devices using the user-defined output device handlers.

To run **PIP** from the PHIMON keyboard monitor, type:

RUN PIP (CR)

When **PIP** is running it will first display the following option selection display:

PHIMON PIP
VER 1.00

1 COPY SPECIFIED FILES
2 COPY ALL FILES WITH QUERY
3 COPY ALL FILES
4 RETURN TO PHIMON

SELECT PIP OPTION: _

If one of the options, 1 through 3, is selected, the message "INPUT DEVICE?" will display. Specify 0 thru 3 for Phideck drives or 4 thru 7 for user-defined input device handlers.

If a user-defined input device handler was specified for the input device, the message "OUTPUT PHIDECK?" will display. Specify Phideck Unit number 0 thru 3. The message "NEW FILE NAME?" will then display. Type the desired file name for the Phideck output file and 'RETURN' and the file transfer will take place.

If a Phideck input device was chosen, the message "OUTPUT DEVICE?" will display. Specify 0 thru 3 for Phideck drives or 4 thru 7 for user-defined output device handlers.

If option 1 (COPY SPECIFIED FILES) was selected, **PIP** will display an "*" and allow the user to type file names to be copied. As many files as will fit on the specification line can be typed with each name separated by a ',' and the command line terminated with 'RETURN'. The message "MORE?" will display. Typing 'Y' will allow another file specification line to be typed. Any other response will start the copying process.

If Option 2 (COPY ALL FILES WITH QUERY) is selected, **PIP** will display the name of each input device file name followed by a question mark and wait for the user to reply with 'Y' if the file is to be copied or 'N' if it is not to be copied. When the questioning is complete, the selected files will be copied onto the output device.

If Option 3 (COPY ALL FILES) is selected, the bulk file transfer will begin immediately. Each file on the input device will be copied to the output device.

When **PIP** is copying files, the name of each of the files being copied is displayed. When the copying of a file is complete, the message "COPIED" is displayed next to the file name and the next file will be copied.

In the event of an error, one of the following messages will be displayed after the file name and **PIP** will continue with the next file:

—NOT FOUND	(INPUT FILE NOT FOUND)
—NO SPACE	(NOT ENOUGH ROOM ON OUTPUT DEVICE)
—READ ERROR	(PHIDECK I/O ERROR)
—WRITE ERROR	(PHIDECK I/O ERROR)

At any time that **PIP** is waiting for a response, typing 'ESCAPE' will return the user to the PHIMON keyboard monitor. Typing a '?' will restore the option display. (While typing file specifications, the '?' must be the first character on the line.)

If Option 4 (RETURN TO PHIMON) is selected, the system returns the user to the Phideck keyboard monitor. If the user wishes to re-enter **PIP**, typing ST (CR) will restart the **PIP** system.

APPENDIX D
PHIMON SOURCE CODE

SYMBOLIC DISASSEMBLY OF BOOTSTRAP ROUTINE (Includes TV Routines)

```
COMMAND=S
STADDR=000000
NDADDR=000377
STADDR=
000000 041 002 340 LD   HL,340002
000003 176         LD   A,(HL)
000004 376 123     CP   123
000006 030 063     JR   063       *000073*
000010 303 004 340 JP   340004
000013 323 002     OUT  002
000015 303 023 000 JP   000023
000020 303 007 340 JP   340007
000023 076 237     LD   A,237
000025 303 033 000 JP   000033
000030 303 012 340 JP   340012
000033 323 001     OUT  001
000035 303 043 000 JP   000043
000040 303 015 340 JP   340015
000043 076 337     LD   A,337
000045 323 001     OUT  001
000047 311         RET
000050 303 020 340 JP   340020
000053 323 001     OUT  001
000055 303 063 000 JP   000063
000060 303 023 340 JP   340023
000063 361         POP  AF
000064 301         POP  BC
000065 321         POP  DE
000066 311         RET
000067 000         NOP
000070 303 026 340 JP   340026
000073 040 005     JR   NZ,005      *000102*
000075 054         INC  L
000076 276         CP   (HL)
000077 312 000 340 JP   Z,340000
000102 061 000 002 LD   SP,002000
000105 021 000 340 LD   DE,340000
000110 076 360     LD   A,360
000112 323 000     OUT  000
000114 315 013 000 CALL 000013
000117 016 010     LD   C,010
000121 333 002     IN   002
000123 241         AND  C
000124 050 373     JR   Z,373       *000121*
000126 076 200     LD   A,200
000130 315 013 000 CALL 000013
000133 315 254 000 CALL 000254
000136 041 000 000 LD   HL,000000
000141 061 000 002 LD   SP,002000
000144 030 003     JR   003       *000151*
000146 303 031 340 JP   340031
000151 076 340     LD   A,340
000153 315 013 000 CALL 000013
000156 315 254 000 CALL 000254
000161 365         PUSH AF
000162 315 254 000 CALL 000254
000165 365         PUSH AF
000166 006 003     LD   B,003
000170 315 254 000 CALL 000254
000173 020 373     DJNZ 373       *000170*
```


SYMBOLIC DISASSEMBLY OF BOOTSTRAP ROUTINE (Includes TV Routines) Cont'd.

```
000175 174         LD   A,H
000176 265         OR   L
000177 040 335     JR   NZ,335      *000136*
000201 361         POP  AF
000202 271         CP   C
000203 372 136 000 JP   N,000136
000206 040 275     JR   NZ,275      *000105*
000210 361         POP  AF
000211 270         CP   B
000212 040 271     JR   NZ,271      *000105*
000214 315 254 000 CALL 000254
000217 022         LD   (DE),A
000220 023         INC  DE
000221 020 371     DJNZ 371       *000214*
000223 315 254 000 CALL 000254
000226 315 254 000 CALL 000254
000231 174         LD   A,H
000232 265         OR   L
000233 040 250     JR   NZ,250      *000105*
000235 333 002     IN   002
000237 346 017     AND  017
000241 040 242     JR   NZ,242      *000105*
000243 014         INC  C
000244 171         LD   A,C
000245 376 020     CP   020
000247 312 001 347 JP   Z,347001
000252 030 275     JR   275       *000151*
000254 325         PUSH DE
000255 305         PUSH BC
000256 026 100     LD   D,100
000260 013         DEC  BC
000261 004         INC  B
000262 020 004     DJNZ 004       *000270*
000264 102         LD   B,D
000265 025         DEC  D
000266 050 215     JR   Z,215       *000105*
000270 333 002     IN   002
000272 346 017     AND  017
000274 050 362     JR   Z,362       *000260*
000276 076 357     LD   A,357
000300 323 001     OUT  001
000302 333 002     IN   002
000304 365         PUSH AF
000305 255         XOR  L
000306 157         LD   L,A
000307 006 007     LD   B,007
000311 027         RLA
000312 255         XOR  L
000313 020 374     DJNZ 374       *000311*
000315 157         LD   L,A
000316 017         RRCA
000317 017         RRCA
000320 137         LD   E,A
000321 346 300     AND  300
000323 254         XOR  H
000324 127         LD   D,A
000325 173         LD   A,E
000326 346 077     AND  077
000330 255         XOR  L
000331 147         LD   H,A
000332 027         RLA
```

SYMBOLIC DISASSEMBLY OF BOOTSTRAP ROUTINE (Includes TV Routines) Cont'd.

```
000333 172          LD   A,D
000334 060 002      JR   NC,002       *000340*
000336 356 001      XOR  001
000340 157          LD   L,A
000341 076 337      LD   A,337
000343 303 053 000  JP   000053
000346 076 177      LD   A,177
000350 315 372 000  CALL 000372
000353 016 004      LD   C,004
000355 006 000      LD   B,000
000357 315 370 000  CALL 000370
000362 020 373      DJNZ 373          *000357*
000364 015          DEC  C
000365 040 370      JR   NZ,370       *000357*
000367 311          RET
000370 076 240      LD   A,240
000372 323 000      OUT  000
000374 257          XOR  A
000375 323 000      OUT  000
000377 311          RET
COMMAND=
```

OCTAL DUMP OF BOOTSTRAP ROUTINE

```
COMMAND=D
STADDR=000000
NDADDR=000377
STADDR=
000000  041 002 340 176 376 123 030 063
000010  303 004 340 323 002 303 023 000
000020  303 007 340 076 237 303 033 000
000030  303 012 340 323 001 303 043 000
000040  303 015 340 076 337 323 001 311
000050  303 020 340 323 001 303 063 000
000060  303 023 340 361 301 321 311 000
000070  303 026 340 040 005 054 276 312
000100  000 340 061 000 002 021 000 340
000110  076 360 323 000 315 013 000 016
000120  010 333 002 241 050 373 076 200
000130  315 013 000 315 254 000 041 000
000140  000 061 000 002 030 003 303 031
000150  340 076 340 315 013 000 315 254
000160  000 365 315 254 000 365 006 003
000170  315 254 000 020 373 174 265 040
000200  335 361 271 372 136 000 040 275
000210  361 270 040 271 315 254 000 022
000220  023 020 371 315 254 000 315 254
000230  000 174 265 040 250 333 002 346
000240  017 040 242 014 171 376 020 312
000250  001 347 030 275 325 305 026 100
000260  013 004 020 004 102 025 050 215
000270  333 002 346 017 050 362 076 357
000300  323 001 333 002 365 255 157 006
000310  007 027 255 020 374 157 017 017
000320  137 346 300 254 127 173 346 077
000330  255 147 027 172 060 002 356 001
000340  157 076 337 303 053 000 076 177
000350  315 372 000 016 004 006 000 315
000360  370 000 020 373 015 040 370 311
000370  076 240 323 000 257 323 000 311
COMMAND=
```


ROOT LOAD

```
ASSM 340000 140000

340000                    0100 *
340000                    0110 * PHI-DECK MONITOR
340000                    0120 *
340000                    0130 * DAVID BRYANT  1977
340000                    0140 *
340000                    0150        ORG  340000
340000                    0160 *
340000 030 032            0170 PHIMON JR   PHISTR RST 00 VECTOR POINT
340002 123 123            0180        DW   123123
340004                    0181 * THE FOLLOWING EIGHT JUMPS ARE SET TO
340004                    0182 * JUMP TO THE VECTOR JUMPS IN THE
340004                    0183 * AUDIO CASSETTE VERSIONS OF DGSS
340004                    0184 * SOFTWARE.  THEY MAY BE CHANGED AS
340004                    0185 * REQUIRED FOR OTHER SOFTWARE SYSTEMS.
340004                    0186 * THE EPROM SUPPLIED WITH PHIMON IS
340004                    0187 * PROGRAMMED TO JUMP TO THESE JUMPS.
340004                    0188 * IF IT IS DISABLED SOME PROVISION
340004                    0189 * MUST BE MADE TO HANDLE RST'S AND INT'S.
340004 303 002 001        0190        JP   1002   RST 10 VECTOR POINT
340007 303 005 001        0200        JP   1005   RST 20 VECTOR POINT
340012 303 010 001        0210        JP   1010   RST 30 VECTOR POINT
340015 303 013 001        0220        JP   1013   RST 40 VECTOR POINT
340020 303 016 001        0230        JP   1016   RST 50 VECTOR POINT
340023 303 021 001        0240        JP   1021   RST 60 VECTOR POINT
340026 303 024 001        0250        JP   1024   RST 70 VECTOR POINT
340031 303 035 001        0260        JP   1035   NMI    VECTOR POINT
340034 041 104 341        0270 PHISTR LD   HL,PHIMSG
340037 315 210 343        0280        CALL EDITOR
340042                    0290 *
340042                    0300 * COMMAND INTERPRETER
340042                    0310 *
340042 061 340 346        0320 COMAND LD   SP,LINBUF
340045 257                0330        XOR  A
340046 315 015 342        0340        CALL STOP
340051 315 345 341        0350        CALL WRTDIR
340054 076 377            0360 NOSTOP LD   A,377
340056 062 254 346        0370        LD   (DIRIN),A
340061 041 340 346        0380        LD   HL,LINBUF
340064 026 276            0390        LD   D,'>'
340066 315 301 340        0400        CALL LINEIN
340071 043                0410        INC  HL
340072 106                0420        LD   B,M
340073 043                0430        INC  HL
340074 116                0440        LD   C,M
340075 041 146 340        0450        LD   HL,COMTAB
340100 126                0460        LD   D,M
340101 043                0470 NXTCOM INC  HL
340102 176                0480        LD   A,M
340103 270                0490        CP   B
340104 040 021            0500        JR   NZ,NOT1ST
340106 043                0510        INC  HL
340107 176                0520        LD   A,M
340110 271                0530        CP   C
340111 040 015            0540        JR   NZ,NOT2ND
340113 043                0550        INC  HL
340114 136                0560        LD   E,M
340115 043                0570        INC  HL
340116 126                0580        LD   D,M
```

ROOT LOAD Continued

```
340117 325                0590          PUSH DE
340120 043                0600          INC  HL
340121 176                0610          LD   A,M
340122 315 120 341        0620          CALL OVRLAY
340125 341                0630          POP  HL
340126 351                0640          JP   (HL)
340127 043                0650 NOT1ST   INC  HL
340130 043                0660 NOT2ND   INC  HL
340131 043                0670          INC  HL
340132 043                0680          INC  HL
340133 025                0690          DEC  D
340134 040 343            0700          JR   NZ,NXTCOM
340136 041 056 341        0710 PRWHAT   LD   HL,WHAT
340141 315 210 343        0720          CALL EDITOR
340144 030 274            0730          JR   COMAND
340146                    0740 *
340146                    0750 * COMMAND TABLE
340146                    0760 *
340146 017                0770 COMTAB   DB   17       ENTRIES
340147                    0780 *
340147                    0790          DW   'DI'     COMMAND
 304 311
340151 001 347            0800          DW   347001   ADDRESS
340153 001                0810          DB   1        OVERLAY
340154                    0820 *
340154                    0830          DW   'DT'
 304 324
340156 001 347            0840          DW   347001
340160 002                0850          DB   2
340161                    0860 *
340161                    0870          DW   'SA'
 323 301
340163 001 347            0880          DW   347001
340165 003                0890          DB   3
340166                    0900 *
340166                    0910          DW   'LO'
 314 317
340170 001 347            0920          DW   347001
340172 004                0930          DB   4
340173                    0940 *
340173                    0950          DW   'RU'
 322 325
340175 213 347            0960          DW   347213
340177 004                0970          DB   4
340200                    0980 *
340200                    0990          DW   'ZE'
 332 305
340202 001 347            1000          DW   347001
340204 005                1010          DB   5
340205                    1020 *
340205                    1030          DW   'DE'
 304 305
340207 237 347            1040          DW   347237
340211 005                1050          DB   5
340212                    1060 *
340212                    1070          DW   'BU'
 302 325
340214 075 347            1080          DW   347075
340216 006                1090          DB   6
340217                    1100 *
340217                    1110          DW   'AL'
```

ROOT LOAD Continued

```
 301 314
340221 001 347            1120          DW   347001
340223 007                1130          DB   7
340224                    1140 *
340224                    1150          DW   'IN'
 311 316
340226 052 347            1160          DW   347052
340230 007                1170          DB   7
340231                    1180 *
340231                    1190          DW   'HE'
 310 305
340233 001 347            1200          DW   347001
340235 010                1210          DB   10
340236                    1220 *
340236                    1230          DW   'RE'
 322 305
340240 001 347            1240          DW   347001
340242 011                1250          DB   11
340243                    1260 *
340243                    1270          DW   'WR'
 327 322
340245 001 347            1280          DW   347001
340247 012                1290          DB   12
340250                    1300 *
340250                    1310          DW   'RN'
 322 316
340252 160 347            1320          DW   347160
340254 013                1330          DB   13
340255                    1340 *
340255                    1350          DW   'ST'
 323 324
340257 261 343            1360          DW   START
340261 000                1370          DB   0
340262                    1380 *
340262                    1390          DS   17
340301                    1400 *
340301                    1410 * LINE INPUT ROUTINE
340301                    1420 *
340301 105                1430 LINEIN   LD   B,L
340302 004                1440          INC  B
340303 345                1450          PUSH HL
340304 172                1460          LD   A,D
340305 167                1470          LD   M,A
340306 315 202 343        1480 NXTCHR   CALL TV
340311 054                1490          INC  L
340312 050 122            1500          JR   Z,LNLONG
340314 315 152 343        1510 CONTIN   CALL KEY
340317 376 341            1520          CP   341
340321 070 002            1530          JR   C,UC
340323 326 040            1540          SUB  40
340325 376 337            1550 UC       CP   337
340327 050 020            1560          JR   Z,RUBOUT
340331 376 225            1570          CP   225
340333 050 050            1580          JR   Z,CNTRLU
340335 376 233            1590          CP   233
340337 312 000 340        1600          JP   Z,PHIMON
340342 376 215            1610          CP   215
340344 050 055            1620          JR   Z,CARRET
340346 167                1630          LD   M,A
340347 030 335            1640          JR   NXTCHR
340351 170                1650 RUBOUT   LD   A,B
```

ROOT LOAD Continued

```
340352 275
340353 050 337
340355 055
340356 055
340357 325
340360 315 200 343
340363 021 376 002
340365 076 001
340366 315 202 343
340370 035
340371 040 370
340373 025
340374 302 366 340
341000 321
341003 030 301
341005 076 244
341007 315 202 343
341012 054
341013 050 021
341015 315 047 341
341020 341
341021 030 256
341023 170
341024 275
341025 050 265
341027 257
341030 167
341031 315 047 341
341034 341
341035 311
341036 041 065 341
341041 315 210 343
341044 341
341045 030 232
341047 315 200 343
341052 054
341053 040 372
341055 311
341056
 327 310 301 324 277

341063 033 000
341065
 314 311 316 305 240
 324 317 317 240 314
 317 316 307
341102 023 000
341104 377 014
341106
 274 320 310 311 315
 317 316 276
341116 054 000
341120
341120
341120
341120 267
341121 310
341122 041 000 347
341125 276
341126 310
341127 042 263 345
```

```
1660            CP   L
1670            JR   Z,CONTIN
1680            DEC  L
1690            DEC  L
1700            PUSH DE
1710            CALL SPACE2
1720            LD   DE,2376
1730 BCKSPA     LD   A,1
1740            CALL TV
1750            DEC  E
1760            JR   NZ,BCKSPA
1770            DEC  D
1780            JP   NZ,BCKSPA
1790            POP  DE
1800            JR   NXTCHR
1810 CNTRLU     LD   A,'$'
1820            CALL TV
1830            INC  L
1840            JR   Z,LNLONG
1850            CALL ENDLIN
1860            POP  HL
1870            JR   LINEIN
1880 CARRET     LD   A,B
1890            CP   L
1900            JR   Z,CONTIN
1910            XOR  A
1920            LD   M,A
1930            CALL ENDLIN
1940            POP  HL
1950            RET
1960 LNLONG     LD   HL,LTLMSG
1970            CALL EDITOR
1980            POP  HL
1990            JR   LINEIN
2000 ENDLIN     CALL SPACE
2010            INC  L
2020            JR   NZ,ENDLIN
2030            RET
2040 WHAT       DW   'WHAT?'

2050            DW   000033
2060 LTLMSG     DW   'LINE TOO LONG'

2070            DW   000023
2080 PHIMSG     DW   014377
2090            DW   '<PHIMON>'

2100            DW   000054
2110 *
2120 * LOAD OVERLAY ROUTINE
2130 *
2140 OVRLAY     OR   A
2150            RET  Z
2160            LD   HL,347000
2170            CP   M
2180            RET  Z
2190            LD   (PNTRR),HL
```


ROOT LOAD Continued

```
341132 306 023
341134 145
341135 157
341136 042 261 345
341141 174
341142 062 260 345
341145 137
341146 041 312 343
341151 315 343 343
341154 315 271 345
341157 303 015 342
341162
341162
341162
341162 041 340 346
341165 016 243
341167 315 237 341
341172 315 202 341
341175 175
341176 062 260 345
341201 311
341202
341202
341202 021 000 000
341205 353
341206 267
341207 365
341210 032
341211 023
341212 376 270
341214 060 017
341216 326 260
341220 070 013
341222 107
341223 361
341224 051
341225 051
341226 051
341227 365
341230 170
341231 205
341232 157
341233 030 353
341235 361
341236 311
341237
341237
341237
341237 176
341240 267
341241 310
341242 271
341243 050 003
341245 043
341246 030 367
341250 043
341251 176
341252 376 240
341254 300
341255 030 371
```

```
2200            ADD  23
2210            LD   H,L
2220            LD   L,A
2230            LD   (IDR),HL
2240            LD   A,H
2250            LD   (DECK),A
2260            LD   E,A
2270            LD   HL,OVRMSG
2280            CALL SPEDIT
2290            CALL READ
2300            JP   STOP
2310 *
2320 * SELECT DECK
2330 *
2340 DECKSL     LD   HL,LINBUF
2350            LD   C,'#'
2360            CALL SEARCH
2370            CALL GETNUM
2380            LD   A,L
2390            LD   (DECK),A
2400            RET
2410 *
2420 * GET NUMBER
2430 *
2440 GETNUM     LD   DE,0
2450            EX   DE,HL
2460            OR   A
2470            PUSH AF
2480 NXTNUM     LD   A,(DE)
2490            INC  DE
2500            CP   270
2510            JR   NC,NOTDIG
2520            SUB  260
2530            JR   C,NOTDIG
2540            LD   B,A
2550            POP  AF
2560            ADD  HL,HL
2570            ADD  HL,HL
2580            ADD  HL,HL
2590            PUSH AF
2600            LD   A,B
2610            ADD  L
2620            LD   L,A
2630            JR   NXTNUM
2640 NOTDIG     POP  AF
2650            RET
2660 *
2670 * CHARACTER SEARCH
2680 *
2690 SEARCH     LD   A,M
2700            OR   A
2710            RET  Z
2720            CP   C
2730            JR   Z,FOUND
2740            INC  HL
2750            JR   SEARCH
2760 FOUND      INC  HL
2770            LD   A,M
2780            CP   240
2790            RET  NZ
2800            JR   FOUND
```

```
341257                          2810 *
341257                          2820 * READ DIRECTORY
341257                          2830 *
341257 365                      2840 READIR PUSH AF
341260 315 345 341              2850        CALL WRTDIR
341263 361                      2860        POP  AF
341264 062 260 345              2870        LD   (DECK),A
341267 062 254 346              2880        LD   (DIRIN),A
341272 052 250 346              2890        LD   HL,(DIRBUF)
341275 042 263 345              2900        LD   (PNTRR),HL
341300 145                      2910        LD   H,L
341301 042 261 345              2920        LD   (IDR),HL
341304 135                      2930        LD   E,L
341305 041 323 343              2940        LD   HL,RDRMSG
341310 315 343 343              2950        CALL SPEDIT
341313 315 117 345              2960        CALL REWIND
341316 315 271 345              2970 READ2  CALL READ
341321 267                      2980        OR   A
341322 040 110                  2990        JR   NZ,SYSERR
341324 041 264 345              3000        LD   HL,PNTRR+1
341327 064                      3010        INC  M
341330 056 261                  3020        LD   L,261
341332 064                      3030        INC  M
341333 176                      3040        LD   A,M
341334 326 004                  3050        SUB  4
341336 040 356                  3060        JR   NZ,READ2
341340 062 255 346              3070        LD   (CHANGE),A
341343 030 050                  3080        JR   STOP
341345                          3090 *
341345                          3100 * WRITE DIRECTORY
341345                          3110 *
341345 072 255 346              3120 WRTDIR LD   A,(CHANGE)
341350 267                      3130        OR   A
341351 310                      3140        RET  Z
341352 072 254 346              3150        LD   A,(DIRIN)
341355 267                      3160        OR   A
341356 370                      3170        RET  M
341357 062 260 345              3180        LD   (DECK),A
341362 041 333 343              3190        LD   HL,WRDMSG
341365 315 343 343              3200        CALL SPEDIT
341370 052 250 346              3210        LD   HL,(DIRBUF)
341373 042 267 345              3220        LD   (PNTRW),HL
341376 145                      3230        LD   H,L
341377 042 265 345              3240        LD   (IDW),HL
342002 046 004                  3250        LD   H,4
342004 315 000 344              3260        CALL RECORD
342007 365                      3270        PUSH AF
342010 257                      3280        XOR  A
342011 062 255 346              3290        LD   (CHANGE),A
342014 361                      3300        POP  AF
342015                          3310 *
342015                          3320 * STOP PHI-DECKS
342015                          3330 *
342015 365                      3340 STOP   PUSH AF
342016 016 160                  3350        LD   C,160
342020 315 233 345              3360        CALL CMDOUT
342023 333 002                  3370 WAIT   IN   2
342025 346 010                  3380        AND  10
342027 050 372                  3390        JR   Z,WAIT
342031 361                      3400        POP  AF
342032 267                      3410        OR   A
```



```
342033 310                      3420        RET  Z
342034                          3430 *
342034                          3440 * PRINT I-O ERROR MESSAGE
342034                          3450 *
342034 306 260                  3460 SYSERR ADD  260
342036 062 070 342              3470        LD   (ERRMSG+6),A
342041 072 260 345              3480        LD   A,(DECK)
342044 306 260                  3490        ADD  260
342046 062 076 342              3500        LD   (ERRMSG+14),A
342051 041 062 342              3510        LD   HL,ERRMSG
342054 315 210 343              3520        CALL EDITOR
342057 303 042 340              3530        JP   COMAND
342062                          3540 ERRMSG DW   'ERROR 0 ON #0'
 305 322 322 317 322
 240 260 240 317 316
 240 243 260
342077 023 000                  3550        DW   000023
342101                          3560 *
342101                          3570 * FILENAME PRINT
342101                          3580 *
342101 041 240 346              3590 PRNAME LD   HL,NAME
342104 016 010                  3600        LD   C,10
342106 176                      3610 NCHAR  LD   A,M
342107 043                      3620        INC  HL
342110 267                      3630        OR   A
342111 314 200 343              3640        CALL Z,SPACE
342114 304 202 343              3650        CALL NZ,TV
342117 015                      3660        DEC  C
342120 310                      3670        RET  Z
342121 171                      3680        LD   A,C
342122 376 002                  3690        CP   2
342124 076 256                  3700        LD   A,256
342126 314 202 343              3710        CALL Z,TV
342131 030 353                  3720        JR   NCHAR
342133                          3730 *
342133                          3740 * DIRECTORY HANDLING
342133                          3750 *
342133                          3760 * DELETE FILE
342133                          3770 *
342133 257                      3780 DELETE XOR  A
342134 030 007                  3790        JR   DIRSRH
342136                          3800 *
342136                          3810 * NEW FILE ENTRY
342136                          3820 *
342136 076 377                  3830 ENTRY  LD   A,377
342140 325                      3840        PUSH DE
342141 030 002                  3850        JR   DIRSRH
342143                          3860 *
342143                          3870 * LOOKUP FILE
342143                          3880 *
342143 076 001                  3890 LOOKUP LD   A,1
342145 062 256 346              3900 DIRSRH LD   (MODE),A
342150 042 252 346              3910        LD   (TEMP),HL
342153 353                      3920        EX   DE,HL
342154 052 250 346              3930        LD   HL,(DIRBUF)
342157 353                      3940        EX   DE,HL
342160 032                      3950        LD   A,(DE)
342161 117                      3960        LD   C,A
342162 006 000                  3970        LD   B,0
342164 305                      3980        PUSH BC
342165 023                      3990        INC  DE
```

```
342166 032                4000          LD   A,(DE)
342167 117                4010          LD   C,A
342170 072 256 346        4020          LD   A,(MODE)
342173 267                4030          OR   A
342174 372 263 342        4040          JP   M,ENTRY2
342177 006 010            4050 NXTFIL   LD   B,10
342201 023                4060 NXCHAR   INC  DE
342202 032                4070          LD   A,(DE)
342203 276                4080          CP   M
342204 040 024            4090          JR   NZ,NOGOOD
342206 043                4100          INC  HL
342207 020 370            4110          DJNZ NXCHAR
342211 072 256 346        4120          LD   A,(MODE)
342214 267                4130          OR   A
342215 050 026            4140          JR   Z,DELET2
342217 023                4150          INC  DE
342220 353                4160          EX   DE,HL
342221 136                4170          LD   E,M
342222 043                4180          INC  HL
342223 126                4190          LD   D,M
342224 341                4200          POP  HL
342225 042 261 345        4210          LD   (IDR),HL
342230 257                4220          XOR  A
342231 311                4230          RET
342232 023                4240 NOGOOD   INC  DE
342233 020 375            4250          DJNZ NOGOOD
342235 315 323 342        4260          CALL ADDBLK
342240 052 252 346        4270          LD   HL,(TEMP)
342243 030 332            4280          JR   NXTFIL
342245 353                4290 DELET2   EX   DE,HL
342246 021 371 377        4300          LD   DE,377371
342251 031                4310          ADD  HL,DE
342252 167                4320          LD   M,A
342253 301                4330          POP  BC
342254 076 001            4340          LD   A,1
342256 062 255 346        4350          LD   (CHANGE),A
342261 257                4360          XOR  A
342262 311                4370          RET
342263 006 011            4380 ENTRY2   LD   B,11
342265 023                4390 LOOP     INC  DE
342266 020 375            4400          DJNZ LOOP
342270 015                4410          DEC  C
342271 050 006            4420          JR   Z,ATLAST
342273 014                4430          INC  C
342274 315 323 342        4440          CALL ADDBLK
342277 030 362            4450          JR   ENTRY2
342301 341                4460 ATLAST   POP  HL
342302 042 265 345        4470          LD   (IDW),HL
342305 032                4480          LD   A,(DE)
342306 117                4490          LD   C,A
342307 057                4500          CPL
342310 157                4510          LD   L,A
342311 023                4520          INC  DE
342312 032                4530          LD   A,(DE)
342313 107                4540          LD   B,A
342314 305                4550          PUSH BC
342315 321                4560          POP  DE
342316 057                4570          CPL
342317 147                4580          LD   H,A
342320 301                4590          POP  BC
342321 011                4600          ADD  HL,BC
```



```
342322 311                4610          RET
342323 063                4620 ADDBLK   INC  SP
342324 063                4630          INC  SP
342325 341                4640          POP  HL
342326 015                4650          DEC  C
342327 067                4660          SCF
342330 310                4670          RET  Z
342331 305                4680          PUSH BC
342332 032                4690          LD   A,(DE)
342333 117                4700          LD   C,A
342334 023                4710          INC  DE
342335 032                4720          LD   A,(DE)
342336 107                4730          LD   B,A
342337 011                4740          ADD  HL,BC
342340 301                4750          POP  BC
342341 345                4760          PUSH HL
342342 073                4770          DEC  SP
342343 073                4780          DEC  SP
342344 311                4790          RET
342345                    4800 *
342345                    4810 * ADD FILE TO DIRECTORY
342345                    4820 *
342345 325                4830 CLOSE    PUSH DE
342346 345                4840          PUSH HL
342347 315 133 342        4850          CALL DELETE
342352 052 250 346        4860          LD   HL,(DIRBUF)
342355 043                4870          INC  HL
342356 176                4880          LD   A,M
342357 376 146            4890          CP   146
342361 324 060 343        4900          CALL NC,DIROVR
342364 176                4910          LD   A,M
342365 064                4920          INC  M
342366 001 012 000        4930          LD   BC,12
342371 075                4940 ADLOOP   DEC  A
342372 050 003            4950          JR   Z,CLOSE2
342374 011                4960          ADD  HL,BC
342375 030 372            4970          JR   ADLOOP
342377 043                4980 CLOSE2   INC  HL
343000 321                4990          POP  DE
343001 006 010            5000          LD   B,10
343003 032                5010 MOVE     LD   A,(DE)
343004 167                5020          LD   M,A
343005 043                5030          INC  HL
343006 023                5040          INC  DE
343007 020 372            5050          DJNZ MOVE
343011 301                5060          POP  BC
343012 170                5070          LD   A,B
343013 057                5080          CPL
343014 107                5090          LD   B,A
343015 171                5100          LD   A,C
343016 057                5110          CPL
343017 117                5120          LD   C,A
343020 003                5130          INC  BC
343021 353                5140          EX   DE,HL
343022 032                5150          LD   A,(DE)
343023 157                5160          LD   L,A
343024 023                5170          INC  DE
343025 032                5180          LD   A,(DE)
343026 147                5190          LD   H,A
343027 011                5200          ADD  HL,BC
343030 353                5210          EX   DE,HL
```

```
343031 053                5220          DEC   HL
343032 073                5230          DEC   SP
343033 073                5240          DEC   SP
343034 301                5250          POP   BC
343035 161                5260          LD    M,C
343036 043                5270          INC   HL
343037 160                5280          LD    M,B
343040 006 011            5290          LD    B,11
343042 043                5300 EMPTY    INC   HL
343043 066 000            5310          LD    M,0
343045 020 373            5320          DJNZ  EMPTY
343047 163                5330          LD    M,E
343050 043                5340          INC   HL
343051 162                5350          LD    M,D
343052 076 001            5360          LD    A,1
343054 062 255 346        5370          LD    (CHANGE),A
343057 311                5380          RET
343060                    5390 *
343060                    5400 * SQUISH DIRECTORY
343060                    5410 *
343060 345                5420 DIROVR PUSH HL
343061 072 000 347        5430          LD    A,(347000)
343064 365                5440          PUSH AF
343065 076 013            5450          LD    A,13
343067 315 120 341        5460          CALL  OVRLAY
343072 315 001 347        5470          CALL  347001
343075 361                5480          POP   AF
343076 315 120 341        5490          CALL  OVRLAY
343101 341                5500          POP   HL
343102 311                5510          RET
343103                    5520 *
343103                    5530 * DECODE NAME ROUTINE
343103                    5540 *
343103 021 240 346        5550 DONAME LD    DE,NAME
343106 016 010            5560          LD    C,10
343110 176                5570 NEXTCH LD    A,M
343111 043                5580          INC   HL
343112 376 256            5590          CP    256
343114 050 010            5600          JR    Z,EXTNTN
343116 070 023            5610          JR    C,NULL
343120 022                5620          LD    (DE),A
343121 023                5630          INC   DE
343122 015                5640          DEC   C
343123 040 363            5650          JR    NZ,NEXTCH
343125 311                5660          RET
343126 257                5670 EXTNTN XOR   A
343127 022                5680          LD    (DE),A
343130 023                5690          INC   DE
343131 015                5700          DEC   C
343132 040 372            5710          JR    NZ,EXTNTN
343134 016 002            5720          LD    C,2
343136 021 246 346        5730          LD    DE,EX
343141 030 345            5740          JR    NEXTCH
343143 257                5750 NULL     XOR   A
343144 022                5760          LD    (DE),A
343145 023                5770          INC   DE
343146 015                5780          DEC   C
343147 040 372            5790          JR    NZ,NULL
343151 311                5800          RET
343152                    5810 *
343152                    5820 * CURSOR KEYBOARD ROUTINE
```



```
343152                    5830 *
343152 076 337            5840 KEY      LD    A,237
343154 323 000            5850          OUT   0
343156 076 001            5860          LD    A,1
343160 323 000            5870          OUT   0
343162 333 000            5880 UP       IN    0
343164 267                5890          OR    A
343165 362 162 343        5900          JP    P,UP
343170 365                5910          PUSH AF
343171 333 000            5920 UP2      IN    0
343173 027                5930          RLA
343174 070 373            5940          JR    C,UP2
343176 361                5950          POP   AF
343177 311                5960          RET
343200                    5970 *
343200                    5980 * TV ROUTINES
343200                    5990 *
343200 076 240            6000 SPACE    LD    A,240
343202 315 262 346        6010 TV       CALL TV2
343205                    6020 * NEXT INSTRUCTION BECOMES
343205                    6030 * 'JP SPACE2' (303) FOR TVC-64
343205 311                6040          RET
343206 260 346            6050          DW    SPACE2
343210 176                6060 EDITOR LD    A,M
343211 043                6070          INC   HL
343212 267                6080          OR    A
343213 310                6090          RET   Z
343214 376 200            6100          CP    200
343216 334 234 343        6110          CALL C,MLTSPC
343221 376 377            6120          CP    377
343223 314 243 343        6130          CALL Z,ERASE
343226 267                6140          OR    A
343227 304 202 343        6150          CALL NZ,TV
343232 030 354            6160          JR    EDITOR
343234 107                6170 MLTSPC LD    B,A
343235 315 200 343        6180          CALL SPACE
343240 020 373            6190          DJNZ MLTSPC+1
343242 311                6200          RET
343243 076 177            6210 ERASE    LD    A,177
343245 315 202 343        6220          CALL TV2
343250 016 004            6230          LD    C,4
343252 315 234 343        6240 SPLOOP CALL MLTSPC
343255 015                6250          DEC   C
343256 040 372            6260          JR    NZ,SPLOOP
343260 311                6270          RET
343261                    6280 *
343261                    6290 * START COMMAND
343261                    6300 *
343261 041 340 346        6310 START    LD    HL,LINBUF
343264 016 240            6320          LD    C,240
343266 315 237 341        6330          CALL SEARCH
343271 050 007            6340          JR    Z,START2
343273 315 202 341        6350          CALL GETNUM
343276 174                6360          LD    A,H
343277 037                6370          RRA
343300 147                6380          LD    H,A
343301 351                6390          JP    (HL)
343302 052 306 343        6400 START2   LD    HL,(STPALR)
343305 351                6410          JP    (HL)
343306                    6420 *
343306                    6430 * RESIDENT PROGRAM DEFINITIONS
```

ROOT LOAD - Continued

```
343306                6442 *
343306 ØØØ 3ØØ        6450 STRADR DW     ØØØØØØ START ADDRESS
343310 ØØØ            6460 FPAGE  DB     Ø      FIRST PAGE
343311 ØØØ            6470 LPAGE  DB     Ø      LAST PAGE
343312                6480 *
343312                6490 OVRMSG DW     'RD ONLY'
 322 3Ø4 242 317 326
 314 331
343321 231 ØØØ        6500        DW     ØØØ231
343323                6510 RDRMSG DW     'RL DIR'
 322 3Ø4 24Ø 3Ø4 311
 322
343331 232 ØØØ        6520        DW     ØØØ232
343333                6530 WRDMSG DW     'WR DIR'
 327 322 24Ø 3Ø4 311
 322
343341 232 ØØØ        6540        DW     ØØØ232
343343 Ø72 257 346    6550 SPEDIT LD     A,(PRMODE)
343346 267            6560        OR     A
343347 310            6570        RET    Z
343350 23Ø 236        6580        JR     EDITOR
343352                6590 *
343352                6600 * PHI-DECK LOCATIONS
343352                6610 *
343352                6620 RECORD EQU    344ØØØ
343352                6630 REWIND EQU    345117
343352                6640 CMDOUT EQU    345233
343352                6650 DECK   EQU    345262
343352                6660 IDR    EQU    345261
343352                6670 PNTRR  EQU    345263
343352                6680 IDW    EQU    345265
343352                6690 PNTRW  EQU    345267
343352                6700 BEAT   EQU    345271
343352                6710 *
343352                6720 * PHIMON STORAGE LOCATIONS
343352                6730 *
343352                6740        ORG    34624Ø
34624Ø                6750 NAME   DS     6      NAME BUFFER
346246                6760 EX     DS     2
34625Ø ØØØ ØØØ        6770 DIRBUF DW     ØØØØØØ MEMORY GUIDE WORD
346252 ØØØ ØØØ        6780 TEMP   DW     ØØØØØØ
346254 377            6790 DIRIN  DB     377    RESIDENT DIRECTORY
346255 ØØØ            6800 CHANGE DB     Ø      DIRECTORY CHANGE FLAG
346256 ØØØ            6810 MODE   DB     Ø
346257 ØØ1            6820 PRMODE DB     1      ACTION MESSAGE FLAG
34626Ø                6830 LINBUF EQU    34634Ø LINE INPUT BUFFER
34626Ø                6840 *
34626Ø                6850 * TV ROUTINES2
34626Ø                6860 *
34626Ø Ø76 247        6870 SPACE2 LD     A,247
346262 323 ØØØ        6880 TV2    OUT    Ø
346264 257            6890        XOR    A
346265 323 ØØØ        6900        OUT    Ø
346267 311            6910        RET
```

```
                      *
                      * LOCATE PC ROUTINE
                      *
346300 375 341  GETPC  POP  IY
346302      351        JP   (IY)
                      *
                      * JMP TO SUBR ROUTINE
                      *
346270 375 345  JMS    PUSH IY
   272 335 341         POP  IX
   274 335 Ø3Ø         ADD  IX,DE
   276 335 351         JP(IX)
```

PHI-DECK CONTROL ROUTINES

ASSM 344000

```
344000            0100 * RECORD (UNTIL COUNT EXHAUSTED)
344000            0110 * DECK IS STOPPED AFTER RETURN
344000            0120 * INPUT:
344000            0130 *       DECK - DECK NUMBER LOCATED IN MEMORY
344000            0140 *       POINTW - LOCATED IN MEMORY
344000            0150 *                (FIRST DATA BYTE)
344000            0160 *       IDW - LOCATED IN MEMORY (FIRST BLOCK
344000            0170 *       COUNT - REGISTER H,L
344000            0180 * OUTPUT:
344000            0190 *       POINTW - LOCATED IN MEMORY
344000            0200 *                (LAST DATA BYTE + 1)
344000            0210 *       ERROR - REGISTER A
344000            0220 *               0 - NO ERRORS
344000            0230 *               1 - CRC ERROR IN BLOCK
344000            0240 *                   IDW - 1
344000            0250 *               2 - BLOCK IDW-1 NOT FOUND
344000            0260 *               3 - TAPE END OR JAM
344000            0270 *       IDW - LOCATED IN MEMORY
344000            0280 *             (LAST BLOCK + 1)
344000            0290 *       ALTERED
344000            0300 *            REGISTERS - A,B,C,D,E,H,L,IDR,POINTI
344000 026 001    0310 RECORD LD   D,1D   ERASE=1
344002 036 005    0320        LD   E,5D   STOPS=5
344004 345        0330        PUSH HL     COUNT
344005 325        0340 RCD20  PUSH DE     ERASE, STOPS
344006 052 265 345 0350       LD   HL,(IDW)
344011 053        0360        DEC  HL     IDR=IDW -1
344012 042 261 345 0370       LD   (IDR),HL
344015 043        0380        INC  HL
344016 175        0390        LD   A,L    IDW=0 ?
344017 264        0400        OR   H
344020 312 051 344 0410       JP   Z,RCD10 YES
344023 026 013    0420        LD   D,11D  RETRIES = 10
344025 036 001    0430        LD   E,1D   CHECK MODE
344027 315 173 346 0440       CALL ALTRD
344032 074        0450        INC  A      ERROR?
344033 075        0460        DEC  A
344034 312 066 344 0470       JP   Z,RCD13 NO
344037 321        0480 RCD12  POP  DE     ERASE, STOPS
344040 341        0490 RCD21  POP  HL     COUNT
344041 016 220    0500 RCD27  LD   C,90H  STOP
344043 107        0510        LD   B,A    SAVE ERROR
344044 315 233 345 0520       CALL CMDOUT
344047 170        0530        LD   A,B    RESTORE ERROR
344050 311        0540        RET
344051 315 117 345 0550 RCD10 CALL REWIND
344054 016 354    0560        LD   C,0ECH ERASE
344056 315 233 345 0570       CALL CMDOUT
344061 076 050    0580        LD   A,40D  4 SECONDS
344063 315 201 345 0590       CALL DELAY
344066 321        0600 RCD13  POP  DE     ERASE, STOPS
344067 325        0610        PUSH DE
344070 025        0620 RCD15  DEC  D      ERASE (ERASE - 1) BLOCKS
344071 312 111 344 0630       JP   Z,RCD14
344074 016 354    0640        LD   C,0ECH ERASE
344076 315 233 345 0650       CALL CMDOUT
344101 325        0660        PUSH DE
344102 315 332 344 0670       CALL RECRD1
```

```
344105 321                0680         POP  DE
344106 303 070 344        0690         JP   RCD15
344111 341                0700 RCD14   POP  HL      ERASE, STOPS
344112 321                0710         POP  DE      COUNT
344113 325                0720         PUSH DE
344114 345                0730         PUSH HL
344115 052 267 345        0740         LD   HL,(POINTW) POINTER
344120 025                0750 RCD19   DEC  D       COUNT HIGH = 0?
344121 024                0760         INC  D
344122 302 324 344        0770         JP   NZ,RCD16 NO
344125 035                0780         DEC  E
344126 034                0790         INC  E
344127 312 201 344        0800         JP   Z,RCD17 YES
344132 103                0810         LD   B,E     COUNT = COUNTL
344133 036 000            0820         LD   E,0D    COUNTL =0
344135 325                0830 RCD18   PUSH DE      SAVE COUNT
344136 353                0840         EX   DE,HL
344137 052 261 345        0850         LD   HL,(IDR)
344142 043                0860         INC  HL
344143 042 261 345        0870         LD   (IDR),HL
344146 353                0880         EX   DE,HL
344147 016 350            0890         LD   C,0E8H RECORD
344151 315 233 345        0900         CALL CMDOUT
344154 315 332 344        0910         CALL RECRD1
344157 333 002            0920         IN   TAPEIN ERROR?
344161 346 015            0930         AND  0DH
344163 321                0940         POP  DE      GET COUNT
344164 312 120 344        0950         JP   Z,RCD19 NO
344167 321                0960         POP  DE      DECREMENT STOPS
344170 035                0970         DEC  E       0?
344171 302 005 344        0980         JP   NZ,RCD20 NO
344174 076 003            0990         LD   A,3D    ERROR=3
344176 303 040 344        1000         JP   RCD21
344201 076 005            1010 RCD17   LD   A,5D    APPROXIMATELY 10 BLOCKS
344203 315 150 345        1020         CALL FR
344206 341                1030         POP  HL      ERASE, STOPS
344207 321                1040         POP  DE      COUNT
344210 325                1050 RCD26   PUSH DE
344211 345                1060         PUSH HL
344212 227                1070         SUB  A       COUNT=0?
344213 202                1080         ADD  D
344214 302 223 344        1090         JP   NZ,RCD22 NO
344217 203                1100         ADD  E
344220 312 037 344        1110         JP   Z,RCD12 YES
344223 052 265 345        1120 RCD22   LD   HL,(IDW)
344226 042 261 345        1130         LD   (IDR),HL
344231 026 006            1140         LD   D,6D    RETRIES = 6
344233 036 001            1150         LD   E,1D    CHECK MODE
344235 315 273 345        1160         CALL ALTRD2
344240 074                1170         INC  A       ERROR?
344241 075                1180         DEC  A
344242 321                1190         POP  DE
344243 312 252 344        1200         JP   Z,RCD24 NO
344246 024                1210         INC  D       INCREMENT ERASE
344247 303 005 344        1220         JP   RCD20
344252 026 001            1230 RCD24   LD   D,1D    ERASE=1
344254 052 265 345        1240         LD   HL,(IDW) INCREMENT IDW
344257 043                1250         INC  HL
344260 042 265 345        1260         LD   (IDW),HL
344263 353                1270         EX   DE,HL
344264 321                1280         POP  DE
```



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344265 024                1290         INC  D       COUNTH =0?
344266 025                1300         DEC  D
344267 312 307 344        1310         JP   Z,RCD25 YES
344272 025                1320         DEC  D       DECREMENT COUNTH
344273 345                1330         PUSH HL
344274 052 267 345        1340         LD   HL,(POINTW)
344277 044                1350         INC  H
344300 042 267 345        1360         LD   (POINTW),HL
344303 341                1370         POP  HL
344304 303 210 344        1380         JP   RCD26
344307 052 267 345        1390 RCD25   LD   HL,(POINTW) ADD COUNTL TO POINTE
344312 026 000            1400         LD   D,0D
344314 031                1410         ADD  HL,DE
344315 042 267 345        1420         LD   (POINTW),HL
344320 227                1430         SUB  A       ERROR = 0
344321 303 041 344        1440         JP   RCD27
344324 025                1450 RCD16   DEC  D       DECREMENT COUNTH
344325 006 000            1460         LD   B,0D    COUNT=0
344327 303 135 344        1470         JP   RCD18
344332                    1480 * RECRD1 (RECORD ONE BLOCK)
344332                    1490 *         RECORD OR ERASE COMMAND MUST BE ISSUI
344332                    1500 *           BEFORE CALLING.
344332                    1510 *         UNDERRUN AND STOP SHOULD BE CHECKE
344332                    1520 *           AFTER RETURN.
344332                    1540 *         INPUTS:
344332                    1550 *           DECK - DECK NUMBER LOCATED
344332                    1560 *                  IN MEMORY
344332                    1570 *           ID - REGISTER D,E
344332                    1580 *           COUNT - REGISTER B
344332                    1600 *                   (01=1 BYTE, 00=256 BYTES)
344332                    1610 *           POINTER - REGISTER H,L
344332                    1620 *                     (FIRST DATA BYTE)
344332                    1630 *           OUTPUT:
344332                    1640 *             POINTER - REGISTER H,L
344332                    1650 *             (LAST DATA BYTE + 1)
344332                    1660 *           ALTERED
344332                    1670 *             REGISTERS - A,B,C,D,E,H,L
344332 345                1680 RECRD1 PUSH HL      PUSH POINTER
344333 041 000 000        1690         LD   HL,0D  RESET CRC
344336 112                1700         LD   C,D,   ID HIGH
344337 315 111 345        1710         CALL ALTPUT
344342 113                1720         LD   C,E    ID LOW
344343 315 102 345        1730         CALL PUT
344346 110                1740         LD   C,B    COUNT
344347 315 102 345        1750         CALL PUT
344352 124                1760         LD   D,H    SAVE CRC2
344353 115                1770         LD   C,L    CRC1
344354 315 102 345        1780         CALL PUT
344357 112                1790         LD   C,D    CRC2
344360 315 102 345        1800         CALL PUT
344363 130                1810         LD   E,B    SAVE COUNT
344364 343                1820 RECD1   EX   (SP),HL SWITCH CRC, POINTER
344365 116                1830         LD   C,(HL) LOAD DATA
344366 043                1840         INC  HL     INCREMENT POINTER
344367 343                1850         EX   (SP),HL SWITCH CRC,POINTER
344370 315 102 345        1860         CALL PUT
344373 005                1870         DEC  B      DECREMENT COUNT
344374 302 364 344        1880         JP   NZ,RECD1 NOT ZERO
344377 124                1890         LD   D,H    SAVE CRC2
345000 115                1900         LD   C,L    CRC1
345001 315 102 345        1910         CALL PUT
```

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345004 112                1920          LD   C,D     CRC2
345005 315 102 345        1930          CALL PUT
345010 035                1940          DEC  E       DECREMENT SAVED COUNT
345011 315 102 345        1950 RECD3    CALL PUT
345014 034                1960          INC  E       INCREMENT SAVED COUNT
345015 302 011 345        1970          JP   NZ,RECD3 NOT ZERO
345020 315 102 345        1980          CALL PUT
345023 341                1990          POP  HL      POP POINTER
345024 311                2000          RET
345025                    2010 *         GET
345025                    2020 *         CRC IN H,L
345025                    2030 *         DATA RETURNED IN C
345025                    2040 *         A,C,H,L ALTERED
345025 333 002            2050 GET      IN   TAPEIN STATUS
345027 346 017            2060          AND  0FH
345031 312 025 345        2070          JP   Z,GET
345034 315 217 345        2080          CALL DIN
345037 325                2090 CRC      PUSH DE
345040 171                2100          LD   A,C
345041 255                2110          XOR  L
345042 157                2120          LD   L,A
345043 036 007            2130          LD   E,7D    7 TIMES
345045 027                2140 CRCA     RLA  A
345046 255                2150          XOR  L
345047 035                2160          DEC  E
345050 302 045 345        2170          JP   NZ,CRCA DONE?
345053 157                2180          LD   L,A     YES
345054 017                2190          RRCA A
345055 017                2200          RRCA A
345056 137                2210          LD   E,A     SAVE 1
345057 346 300            2220          AND  0C0H
345061 254                2230          XOR  H
345062 127                2240          LD   D,A     SAVE 2
345063 173                2250          LD   A,E     RESTORE 1
345064 346 077            2260          AND  3FH
345066 255                2270          XOR  L
345067 147                2280          LD   H,A     CRC HIGH DONE
345070 027                2290          RLA  A       TEST BIT 7
345071 172                2300          LD   A,D     RESTORE 2
345072 322 077 345        2310          JP   NC,CRCFIN BIT 7 WAS 1?
345075 356 001            2320          XOR  1D      YES
345077 157                2330 CRCFIN   LD   L,A     CRC LOW DONE
345100 321                2340          POP  DE
345101 311                2350          RET
345102                    2360 *         PUT
345102                    2370 *         DATA IN REGISTER C
345102                    2380 *         CRC IN H,L
345102                    2390 *         A,H,L ALTERED
345102 333 002            2400 PUT      IN   TAPEIN STATUS
345104 346 017            2410          AND  0FH
345106 312 102 345        2420          JP   Z,PUT
345111 315 250 345        2430 ALTPUT   CALL DOUT
345114 303 037 345        2440          JP   CRC
345117                    2450 *         REWIND
345117                    2460 *         REGISTER A,C ALTERED
345117                    2470 *         THIS ROUTINE WILL GUARANTEE
345117                    2480 *         DECK SELECTION
345117 016 220            2490 REWIND   LD   C,90H  STOP
345121 315 233 345        2500          CALL CMDOUT
345124 333 002            2510 REWB     IN   TAPEIN
345126 346 010            2520          AND  08H
```



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345130 312 124 345        2530          JP   Z,REWB
345133 016 200            2540          LD   C,80H  FR
345135 315 233 345        2550          CALL CMDOUT
345140 333 002            2560 REWA     IN   TAPEIN
345142 346 010            2570          AND  8D
345144 312 140 345        2580          JP   Z,REWA
345147 311                2590          RET
345150                    2600 *         FAST REVERSE, FAST FORWARD
345150                    2610 *         REGISTER A CONTAINS MULTIPLE
345150                    2620 *         OF 100 MILLI-SECONDS DELAY
345150                    2630 *         REGISTER A ALTERED
345150 305                2640 FR       PUSH BC
345151 365                2650          PUSH AF
345152 016 200            2660          LD   C,80H
345154 315 233 345        2670 FRA      CALL CMDOUT
345157 361                2680          POP  AF
345160 315 201 345        2690          CALL DELAY
345163 016 220            2700          LD   C,92H
345165 315 233 345        2710          CALL CMDOUT
345170 301                2720          POP  BC
345171 311                2730          RET
345172 305                2740 FF       PUSH BC
345173 365                2750          PUSH AF
345174 016 240            2760          LD   C,0A0H
345176 303 154 345        2770          JP   FRA
345201                    2780 *         DELAY MULTIPLE OF 100 MS IN REGISTER
345201                    2790 *         REGISTERS A,B,C ALTERED
345201 001 264 051        2800 DELAY    LD   BC,29B4H
345204 013                2810 D1       DEC  BC
345205 004                2820          INC  B
345206 005                2830          DEC  B
345207 302 204 345        2840          JP   NZ,D1
345212 075                2850          DEC  A
345213 302 201 345        2860          JP   NZ,DELAY
345216 311                2870          RET
345217                    2880 *         INPUT DATA BYTE (DATA RETURNED IN C)
345217                    2890 *         REGISTER A IS ALTERED
345217 076 357            2900 DIN      LD   A,0EFH
345221 323 001            2910          OUT  STROBE
345223 333 002            2920          IN   TAPEIN
345225 117                2930          LD   C,A
345226 076 337            2940 DINA     LD   A,0DFH
345230 323 001            2950          OUT  STROBE
345232 311                2960          RET
345233                    2970 *         OUTPUT COMMAND (DATA IN REGISTER C)
345233                    2980 *         DECK IS OR'D WITH DATA
345233                    2990 *         REGISTER A IS ALTERED
345233 072 260 345        3000 CMDOUT   LD   A,(DECK)
345236 261                3010          OR   C
345237 323 002            3020          OUT  TAPOUT
345241 076 237            3030          LD   A,9FH
345243 323 001            3040 CMDA     OUT  STROBE
345245 303 226 345        3050          JP   DINA
345250                    3060 *         OUTPUT DATA (DATA IN REGISTER C)
345250                    3070 *         REGISTER A IS ALTERED
345250 171                3080 DOUT     LD   A,C
345251 323 002            3090          OUT  TAPOUT
345253 076 137            3100          LD   A,5FH
345255 303 243 345        3110          JP   CMDA
345260                    3120 *         VARIABLE DATA AREA
345260                    3130 DECK     DS   1D      DECK NUMBER TO BE USED
```

```
345261                  3140 IDR     DS   2D      READ ID
345263                  3150 POINTR  DS   2D      READ POINTER
345265                  3160 IDW     DS   2D      WRITE ID
345267                  3170 POINTW  DS   2D      WRITE POINTER
345271                  3180 *       READ ONE BLOCK
345271                  3190 *         DECK REMAINS RUNNING AFTER RETURN
345271                  3200 *       INPUT:
345271                  3210 *         DECK - DECK NUMBER LOCATED IN MEMOR
345271                  3220 *         POINTR - LOCATED IN MEMORY
345271                  3230 *                  (FIRST BYTE)
345271                  3240 *         IDR - LOCATED IN MEMORY
345271                  3250 *         RETRYS - REGISTER D
345271                  3260 *                  (ALTRD ONLY)
345271                  3270 *         MODE - REGISTER E
345271                  3280 *                0=READ
345271                  3290 *                1=CHECK
345271                  3300 *         OUTPUT:
345271                  3310 *           DECK, POINTER, IDR UNCHANGED
345271                  3320 *           REGISTER - A,B,C,D,H,L ALTERED
345271                  3330 *           COUNT - REGISTER B
345271                  3340 *                   01=1 BYTE
345271                  3350 *                   00=256 BYTES
345271                  3360 *           ERROR - REGISTER A
345271                  3370 *                   0=NO ERRORS
345271                  3380 *                   1=CRC ERROR
345271                  3390 *                   2=BLOCK NOT FOUND
345271                  3400 *                   3=END OF TAPE OR JAM
345271                  3410 *           ENTRY POINTS:
345271                  3420 *             READ - NORMAL ENTRY
345271                  3430 *             ALTRD - DECK WILL BACKSPACE
345271                  3440 *                     FIRST, USER MUST SUPPLY RE
345271                  3450 *             ALTRD2 - NORMAL, EXCEPT USER MU
345271                  3460 *                      SUPPLY RETRIES.
345271 026 012          3470 READ    LD   D,10D   RETRIES
345273 325              3480 RD54    PUSH DE      RETRIES, MODE
345274                  3490 ALTRD2  EQU  RD54
345274 041 000 000      3500 RD5     LD   HL,0D   RESET CRC
345277 333 002          3510         IN   TAPEIN STATUS
345301 127              3520         LD   D,A
345302 016 340          3530 RD51    LD   C,0E0H READ
345304 315 233 345      3540         CALL CMDOUT
345307 172              3550         LD   A,D     STOP?
345310 346 004          3560         AND  04H
345312 312 327 345      3570         JP   Z,RD50  NO
345315 076 004          3580         LD   A,4D    .4 SECONDS
345317 315 201 345      3590         CALL DELAY
345322 026 000          3600         LD   D,0D    STATUS=0
345324 303 302 345      3610         JP   RD51
345327 006 072          3620 RD50    LD   B,3AH   8 SECOND TIMEOUT
345331 120              3630 RD57    LD   D,B
345332 333 002          3640 RD53    IN   TAPEIN STATUS
345334 346 017          3650         AND  0FH     READY?
345336 302 220 346      3660         JP   NZ,RD10 YES
345341 033              3670         DEC  DE
345342 024              3680         INC  D
345343 025              3690         DEC  D
345344 302 332 345      3700         JP   NZ,RD53
345347 005              3710         DEC  B
345350 302 331 345      3720         JP   NZ,RD57
345353 315 117 345      3730         CALL REWIND
345356 076 002          3740 RD2     LD   A,2D    ERROR=2
```



```
345360 321              3750         POP  DE      RETRIES, MODE
345361 025              3760 RD8     DEC  D
345362 302 273 345      3770         JP   NZ,RD54
345365 311              3780         RET
345366 315 025 345      3790 RD52    CALL GET     IDH
345371 101              3800         LD   B,C
345372 315 025 345      3810         CALL GET     IDL
345375 131              3820         LD   E,C
345376 315 025 345      3830         CALL GET     COUNT
346001 121              3840         LD   D,C
346002 315 025 345      3850         CALL GET     CRC1
346005 315 025 345      3860         CALL GET     CRC2
346010 227              3870         SUB  A       CRC=0?
346011 204              3880         ADD  H
346012 302 274 345      3890         JP   NZ,RD5 NO
346015 205              3900         ADD  L
346016 302 274 345      3910         JP   NZ,RD5 NO
346021                  3920 *       COMPUTE       BE  TAPEID
346021                  3930 *                     -HL  IDR
346021                  3940 *                     =XY
346021 173              3950         LD   A,E
346022 052 261 345      3960         LD   HL,(IDR)
346025 225              3970         SUB  L
346026 137              3980         LD   E,A     REGISTER E CONTAINS Y
346027 157              3990         LD   L,A
346030 170              4000         LD   A,B
346031 234              4010         SBC  H       REGISTER A CONTAINS X
346032 147              4020         LD   H,A     H=XY/8
346033 051              4030         ADD  HL,HL
346034 051              4040         ADD  HL,HL
346035 051              4050         ADD  HL,HL
346036 051              4060         ADD  HL,HL
346037 051              4070         ADD  HL,HL
346040 174              4080         LD   A,H
346041 312 070 346      4090         JP   Z,ID1
346044 362 075 346      4100         JP   P,ID2
346047 057              4110         CPL          COMPUTE FF DELAY
346050 306 002          4120         ADD  2D      ADD1+1 FOR 2'S COMP
346052 372 062 346      4130         JP   M,ID3
346055 376 004          4140         CP   4D      GREATER THAN THRESHOLD
346057 372 274 345      4150         JP   M,RD5  NO
346062 315 172 345      4160 ID3     CALL FF
346065 303 274 345      4170         JP   RD5
346070 034              4180 ID1     INC  E       Y=0?
346071 035              4190         DEC  E
346072 312 105 346      4200         JP   Z,RD6  YES
346075 306 006          4210 ID2     ADD  6D
346077 315 150 345      4220         CALL FR
346102 303 356 345      4230         JP   RD2
346105 102              4240 RD6     LD   B,D     COUNT
346106 321              4250         POP  DE      RETRIES, MODE
346107 305              4260         PUSH BC      COUNT
346110 052 263 345      4270         LD   HL,(POINTR)
346113 345              4280         PUSH HL
346114 041 000 000      4290         LD   HL,0D   RESET CRC
346117 315 025 345      4300 RD56    CALL GET
346122 034              4310         INC  E
346123 035              4320         DEC  E
346124 302 133 346      4330         JP   NZ,RD55
346127 343              4340         EX   (SP),HL SWITCH CRC,POINTER
346130 161              4350         LD   (HL),C STORE DATA
```

PHI-DECK CONTROL ROUTINES Continued

```
346131 043
346132 343
346133 005
346134 302 117 346
346137 301
346140 301
346141 315 025 345
346144 315 025 345
346147 333 002
346151 037
346152 332 173 346
346155 037
346156 037
346157 332 226 346
346162 227
346163 204
346164 302 173 346
346167 205
346170 312 205 346
346173 076 005
346175 315 150 345
346200 076 001
346202 303 361 345
346205 120
346206 025
346207 315 025 345
346212 024
346213 302 207 346
346216 227
346217 311
346220 346 004
346222 312 366 345
346225 321
346226 315 117 345
346231 076 003
346233 303 361 345
346236
346236
346236

4360            INC   HL      BUMP POINTER
4370            EX    (SP),HL SWITCH CRC, POINTER
4380 RD55       DEC   B       DECREMENT COUNT
4390            JP    NZ,RD56
4400            POP   BC      ADJUST STACK POINTER
4410            POP   BC      COUNT
4420            CALL  GET
4430            CALL  GET
4440            IN    TAPEIN STATUS
4450            RRA           OVERRUN?
4460            JP    C,ALTRD YES
4470            RRA   A
4480            RRA   A       STOP?
4490            JP    C,RD11 YES
4500            SUB   A
4510            ADD   H
4520            JP    NZ,ALTRD NO
4530            ADD   L
4540            JP    Z,RD19
4550 ALTRD      LD    A,5D    GREATER THAN 1 BLOCK
4560            CALL  FR
4570            LD    A,1D    ERROR=1
4580            JP    RD8
4590 RD19       LD    D,B     SAVE COUNT
4600            DEC   D       DECREMENT SAVED COUNT
4610 RD9        CALL  GET
4620            INC   D       INCREMENT SAVED COUNT
4630            JP    NZ,RD9
4640            SUB   A       ERROR=0
4650            RET
4660 RD10       AND   04H     STOP?
4670            JP    Z,RD52  NO
4680            POP   DE      RETRIES, MODE
4690 RD11       CALL  REWIND
4700            LD    A,3D    ERROR=3
4710            JP    RD8
4730 TAPEIN     EQU   02H
4740 TAPOUT     EQU   02H
4760 STROBE     EQU   01H
```


LINKAGE SYMBOL LIST OVERLAYS 1 through 13

ASSM 340000 140000

```
340000                  0100 PHIMON EQU  340000
340000                  0110 COMAND EQU  340042
340000                  0120 NOSTOP EQU  340054
340000                  0130 PRWHAT EQU  340136
340000                  0140 OVRLAY EQU  341120
340000                  0150 DECKSL EQU  341162
340000                  0160 GETNUM EQU  341202
340000                  0170 SEARCH EQU  341237
340000                  0180 READIR EQU  341257
340000                  0190 WRTDIR EQU  341345
340000                  0200 STOP   EQU  342015
340000                  0210 SYSERR EQU  342034
340000                  0220 PRNAME EQU  342101
340000                  0230 DELETE EQU  342133
340000                  0240 ENTRY  EQU  342136
340000                  0250 LOOKUP EQU  342143
340000                  0260 CLOSE  EQU  342345
340000                  0270 DONAME EQU  343103
340000                  0280 KEY    EQU  343152
340000                  0290 SPACE  EQU  343200
340000                  0300 TV     EQU  343202
340000                  0310 EDITOR EQU  343210
340000                  0320 MLTSPC EQU  343234
340000                  0330 ERASE  EQU  343243
340000                  0340 STRADR EQU  343306
340000                  0350 FPAGE  EQU  343310
340000                  0360 LPAGE  EQU  343311
340000                  0370 SPEDIT EQU  343343
340000                  0380 RECORD EQU  344000
340000                  0390 CMDOUT EQU  345233
340000                  0400 DECK   EQU  345260
340000                  0410 IDR    EQU  345261
340000                  0420 PNTRR  EQU  345263
340000                  0430 IDW    EQU  345265
340000                  0440 PNTRW  EQU  345267
340000                  0450 READ   EQU  345271
340000                  0460 NAME   EQU  346240
340000                  0470 EX     EQU  346246
340000                  0480 DIRBUF EQU  346250
340000                  0490 TEMP   EQU  346252
340000                  0500 LINBUF EQU  346340
```

OVERLAY 1

```
ASSML 347000 147000

347000                          0100 * OVERLAY NUMBER 1
347000                          0110 *
347000                          0120 * COMMANDS:
347000                          0130 *
347000                          0140 *   DIRECTORY
347000                          0150 *
347000                          0160         ORG  347000
347000                          0170 *
347000 001                      0180         DB   1
347001 315 162 341              0190 DIRECT  CALL DECKSL
347004 315 257 341              0200         CALL READIR
347007 041 000 000              0210         LD   HL,0
347012 042 252 346              0220         LD   (TEMP),HL
347015 041 340 346              0230         LD   HL,LINBUF
347020 016 256                  0240         LD   C,'.'
347022 315 237 341              0250         CALL SEARCH
347025 176                      0260         LD   A,M
347026 057                      0270         CPL
347027 074                      0280         INC  A
347030 137                      0290         LD   E,A
347031 043                      0300         INC  HL
347032 176                      0310         LD   A,M
347033 057                      0320         CPL
347034 127                      0330         LD   D,A
347035 052 250 346              0340         LD   HL,(DIRBUF)
347040 043                      0350         INC  HL
347041 116                      0360         LD   C,M
347042 006 034                  0370 SCRNFL  LD   B,34
347044 305                      0380         PUSH BC
347045 315 243 343              0390         CALL ERASE
347050 043                      0400 NXTENT  INC  HL
347051 325                      0410         PUSH DE
347052 016 010                  0420         LD   C,10
347054 021 240 346              0430         LD   DE,NAME
347057 176                      0440 NXTMOV  LD   A,M
347060 022                      0450         LD   (DE),A
347061 043                      0460         INC  HL
347062 023                      0470         INC  DE
347063 015                      0480         DEC  C
347064 040 371                  0490         JR   NZ,NXTMOV
347066 321                      0500         POP  DE
347067 345                      0510         PUSH HL
347070 072 240 346              0520         LD   A,(NAME)
347073 267                      0530         OR   A
347074 050 061                  0540         JR   Z,DIREMP
347076 257                      0550         XOR  A
347077 273                      0560         CP   E
347100 050 010                  0570         JR   Z,GOODEX
347102 052 246 346              0580         LD   HL,(EX)
347105 031                      0590         ADD  HL,DE
347106 174                      0600         LD   A,H
347107 265                      0610         OR   L
347110 040 032                  0620         JR   NZ,BADENT
347112 315 101 342              0630 GOODEX  CALL PRNAME
347115 341                      0640         POP  HL
347116 325                      0650         PUSH DE
347117 136                      0660         LD   E,M
347120 043                      0670         INC  HL
```


OVERLAY 1 Continued

```
347121 126                      0680         LD   D,M
347122 353                      0690         EX   DE,HL
347123 325                      0700         PUSH DE
347124 315 263 347              0710         CALL PRNUMB
347127 315 200 343              0720         CALL SPACE
347132 341                      0730         POP  HL
347133 321                      0740         POP  DE
347134 301                      0750         POP  BC
347135 005                      0760         DEC  B
347136 050 011                  0770         JR   Z,NEWSCR
347140 015                      0780 TONEXT  DEC  C
347141 305                      0790         PUSH BC
347142 030 304                  0800         JR   NXTENT
347144 341                      0810 BADENT  POP  HL
347145 043                      0820         INC  HL
347146 301                      0830         POP  BC
347147 030 367                  0840         JR   TONEXT
347151 015                      0850 NEWSCR  DEC  C
347152 315 361 347              0860         CALL ANYMOR
347155 030 263                  0870         JR   SCRNFL
347157 325                      0880 DIREMP  PUSH DE
347160 136                      0890         LD   E,M
347161 043                      0900         INC  HL
347162 126                      0910         LD   D,M
347163 052 252 346              0920         LD   HL,(TEMP)
347166 031                      0930         ADD  HL,DE
347167 042 252 346              0940         LD   (TEMP),HL
347172 321                      0950         POP  DE
347173 341                      0960         POP  HL
347174 043                      0970         INC  HL
347175 301                      0980         POP  BC
347176 015                      0990         DEC  C
347177 305                      1000         PUSH BC
347200 040 246                  1010         JR   NZ,NXTENT
347202 170                      1020         LD   A,B
347203 376 034                  1030         CP   34
347205 312 227 347              1040         JP   Z,SKPERS
347210 170                      1050         LD   A,B
347211 037                      1060         RRA
347212 060 005                  1070         JR   NC,ONLINE
347214 076 020                  1080         LD   A,20
347216 315 234 343              1090         CALL MLTSPC
347221 315 361 347              1100 ONLINE  CALL ANYMOR
347224 315 243 343              1110         CALL ERASE
347227 052 252 346              1120 SKPERS  LD   HL,(TEMP)
347232 315 263 347              1130         CALL PRNUMB
347235 041 324 347              1140         LD   HL,FMBLKS
347240 315 210 343              1150         CALL EDITOR
347243 315 136 342              1160         CALL ENTRY
347246 353                      1170         EX   DE,HL
347247 315 263 347              1180         CALL PRNUMB
347252 041 343 347              1190         LD   HL,FRBLKS
347255 315 210 343              1200         CALL EDITOR
347260 303 042 340              1210         JP   COMAND
347263 016 006                  1220 PRNUMB  LD   C,6
347265 257                      1230         XOR  A
347266 107                      1240         LD   B,A
347267 005                      1250         DEC  B
347270 030 004                  1260         JR   SIGROT
347272 051                      1270 NXTDIG  ADD  HL,HL
347273 027                      1280         RLA
```

OVERLAY 1 Continued

```
347274 051                1290          ADD   HL,HL
347275 027                1300          RLA
347276 051                1310 SIGROT   ADD   HL,HL
347277 027                1320          RLA
347300 267                1330          OR    A
347301 314 316 347        1340          CALL  Z,LEAD
347304 107                1350          LD    B,A
347305 306 260            1360          ADD   260
347307 315 202 343        1370          CALL  TV
347312 015                1380          DEC   C
347313 040 355            1390          JR    NZ,NXTDIG
347315 311                1400          RET
347316 270                1410 LEAD     CP    B
347317 310                1420          RET   Z
347320 370                1430          RET   M
347321 326 020            1440          SUB   20
347323 311                1450          RET
347324                    1460 EMBLKS   DW    ' EMPTY BLOCKS'
 240 305 315 320 324
 331 240 302 314 317
 303 313 323
347341 015 000            1470          DW    000015
347343                    1480 FRBLKS   DW    ' FREE BLOCKS'
 240 306 322 305 305
 240 302 314 317 303
 313 323
347357 056 000            1490          DW    000056
347361 333 000            1500 ANYMOR   IN    0
347363 267                1510          OR    A
347364 362 361 347        1520          JP    P,ANYMOR
347367 376 240            1530          CP    240
347371 312 152 343        1540          JP    Z,KEY
347374 341                1550          POP   HL
347375 303 054 340        1560          JP    NOSTOP
```


OVERLAY 3

ASSML 347000

```
347000                    0100 * OVERLAY NUMBER 3
347000                    0110 *
347000                    0120 * COMMANDS:
347000                    0130 *
347000                    0140 *    SAVE
347000                    0150 *
347000                    0160          ORG   347000
347000                    0170 *
347000 003                0180          DB    3
347001 041 340 346        0190 SAVE     LD    HL,LINBUF
347004 016 240            0200          LD    C,240
347006 315 237 341        0210          CALL  SEARCH
347011 312 136 340        0220          JP    Z,PRWHAT
347014 176                0230          LD    A,M
347015 376 300            0240          CP    300
347017 332 136 340        0250          JP    C,PRWHAT
347022 345                0260          PUSH  HL
347023 315 103 343        0270          CALL  DONAME
347026 016 240            0280          LD    C,240
347030 341                0290          POP   HL
347031 315 237 341        0300          CALL  SEARCH
347034 176                0310          LD    A,M
347035 326 260            0320          SUB   260
347037 346 370            0330          AND   370
347041 302 075 347        0340          JP    NZ,SAVE1
347044 315 202 341        0350          CALL  GETNUM
347047 175                0360          LD    A,L
347050 062 310 343        0370          LD    (FPAGE),A
347053 041 340 346        0380          LD    HL,LINBUF
347056 016 255            0390          LD    C,'-'
347060 315 237 341        0400          CALL  SEARCH
347063 314 256 347        0410          CALL  Z,ONLY1
347066 304 202 341        0420          CALL  NZ,GETNUM
347071 175                0430          LD    A,L
347072 062 311 343        0440          LD    (LPAGE),A
347075 041 340 346        0450 SAVE1    LD    HL,LINBUF
347100 016 252            0460          LD    C,'*'
347102 315 237 341        0470          CALL  SEARCH
347105 312 121 347        0480          JP    Z,SAVE2
347110 315 202 341        0490          CALL  GETNUM
347113 174                0500          LD    A,H
347114 037                0510          RRA
347115 147                0520          LD    H,A
347116 042 306 343        0530          LD    (STRADR),HL
347121 052 310 343        0540 SAVE2    LD    HL,(FPAGE)
347124 345                0550          PUSH  HL
347125 174                0560          LD    A,H
347126 225                0570          SUB   L
347127 332 136 340        0580          JP    C,PRWHAT
347132 306 002            0590          ADD   2
347134 137                0600          LD    E,A
347135 026 000            0610          LD    D,0
347137 325                0620          PUSH  DE
347140 315 162 341        0630          CALL  DECKSL
347143 315 257 341        0640          CALL  READIR
347146 321                0650          POP   DE
347147 325                0660          PUSH  DE
347150 315 136 342        0670          CALL  ENTRY
```

OVERLAY 3 Continued

```
347153 332 263 347
347156 041 306 343
347161 042 267 345
347164 041 306 347
347167 315 343 343
347172 041 000 001
347175 315 000 344
347200 267
347201 302 034 342
347204 321
347205 341
347206 325
347207 145
347210 056 000
347212 042 267 345
347215 143
347216 053
347217 345
347220 041 325 347
347223 315 343 343
347226 341
347227 315 000 344
347232 267
347233 302 034 342
347236 321
347237 041 307 317
347242 042 246 346
347245 041 240 346
347250 315 345 342
347253 303 042 340
347256 072 310 343
347261 157
347262 311
347263 041 274 347
347266 315 210 343
347271 303 042 340
347274
 316 317 240 323 320
 301 303 305
347304 030 000
347306
 323 301 326 311 316
 307 240 310 305 301
 304 305 322
347323 023 000
347325
 323 301 326 311 316
 307 240 320 322 317
 307 322 301 315
347343 022 000
```

```
0680          JP    C,NOSPAC
0690          LD    HL,STRADR
0700          LD    (PNTRW),HL
0710          LD    HL,SVMSG1
0720          CALL  SPEDIT
0730          LD    HL,1000
0740          CALL  RECORD
0750          OR    A
0760          JP    NZ,SYSERR
0770          POP   DE
0780          POP   HL
0790          PUSH  DE
0800          LD    H,L
0810          LD    L,0
0820          LD    (PNTRW),HL
0830          LD    H,E
0840          DEC   HL
0850          PUSH  HL
0860          LD    HL,SVMSG2
0870          CALL  SPEDIT
0880          POP   HL
0890          CALL  RECORD
0900          OR    A
0910          JP    NZ,SYSERR
0920          POP   DE
0930          LD    HL,317307
0940          LD    (EX),HL
0950          LD    HL,NAME
0960          CALL  CLOSE
0970          JP    COMAND
0980 ONLY1    LD    A,(FPAGE)
0990          LD    L,A
1000          RET
1010 NOSPAC   LD    HL,SPCMSG
1020          CALL  EDITOR
1030          JP    COMAND
1040 SPCMSG   DW    'NO SPACE'

1050          DW    000030
1060 SVMSG1   DW    'SAVING HEADER'

1070          DW    000023
1080 SVMSG2   DW    'SAVING PROGRAM'

1090          DW    000022
```

OVERLAY 4

ASSML 347000

```
347000
347000
347000
347000
347000
347000
347000
347000
347000
347000 004
347001 041 340 346
347004 016 240
347006 315 237 341
347011 312 136 340
347014 315 103 343
347017 315 162 341
347022 315 257 341
347025 041 307 317
347030 042 246 346
347033 041 240 346
347036 315 143 342
347041 332 223 347
347044 033
347045 325
347046 041 374 347
347051 042 263 345
347054 036 000
347056 041 310 347
347061 315 343 343
347064 315 271 345
347067 267
347070 302 034 342
347073 052 374 347
347076 042 306 343
347101 052 376 347
347104 042 310 343
347107 174
347110 225
347111 074
347112 321
347113 223
347114 302 237 347
347117 325
347120 145
347121 157
347122 042 263 345
347125 041 324 347
347130 315 343 343
347133 052 261 345
347136 043
347137 042 261 345
347142 000
347143 137
347144 315 271 345
347147 273
347150 302 034 342
347153 041 264 345
347156 064
```

```
0100 * OVERLAY NUMBER 4
0110 *
0120 * COMMANDS:
0130 *
0140 *    LOAD
0150 *    RUN
0160 *
0170          ORG   347000
0180 *
0190          DB    4
0200 LOAD     LD    HL,LINBUF
0210          LD    C,240
0220          CALL  SEARCH
0230          JP    Z,PRWHAT
0240          CALL  DONAME
0250          CALL  DECKSL
0260          CALL  READIR
0270          LD    HL,317307
0280          LD    (EX),HL
0290          LD    HL,NAME
0300          CALL  LOOKUP
0310          JP    C,NOTFND
0320          DEC   DE
0330          PUSH  DE
0340          LD    HL,347374
0350          LD    (PNTRR),HL
0360          LD    E,0
0370          LD    HL,LDMSG1
0380          CALL  SPEDIT
0390          CALL  READ
0400          OR    A
0410          JP    NZ,SYSERR
0420          LD    HL,(347374)
0430          LD    (STRADR),HL
0440          LD    HL,(347376)
0450          LD    (FPAGE),HL
0460          LD    A,H
0470          SUB   L
0480          INC   A
0490          POP   DE
0500          SUB   E
0510          JP    NZ,NOTIMG
0520          PUSH  DE
0530          LD    H,L
0540          LD    L,A
0550          LD    (PNTRR),HL
0560          LD    HL,LDMSG2
0570          CALL  SPEDIT
0580 REDAGN   LD    HL,(IDR)
0590          INC   HL
0600          LD    (IDR),HL
0610          NOP
0620          LD    E,A
0630          CALL  READ
0640          CP    E
0650          JP    NZ,SYSERR
0660          LD    HL,PNTRR+1
0670          INC   M
```

OVERLAY 4 Continued

```
347157 321
347160 035
347161 325
347162 302 133 347
347165 321
347166 072 250 347
347171 267
347172 312 042 340
347175 257
347176 062 250 347
347201 315 015 342
347204 315 243 343
347207 052 306 343
347212 351
347213
347213
347213
347213 076 001
347215 062 250 347
347220 303 001 347
347223 315 101 342
347226 041 251 347
347231 315 210 343
347234 303 042 340
347237 041 265 347
347242 315 210 343
347245 303 042 340
347250 000
347251
 240 316 317 324 240
 306 317 325 316 304

347263 015 000
347265
 316 317 324 240 301
 316 240 311 315 301
 307 305 240 306 311
 314 305
347306 017 000
347310
 322 304 240 320 307
 315 240 310 304 322

347322 026 000
347324
 322 304 240 320 322
 317 307 322 301 315

347336 026 000
```

```
0680          POP   DE
0690          DEC   E
0700          PUSH  DE
0710          JP    NZ,REDAGN
0720          POP   DE
0730          LD    A,(TOSTRT)
0740          OR    A
0750          JP    Z,COMAND
0760          XOR   A
0770          LD    (TOSTRT),A
0780          CALL  STOP
0790          CALL  ERASE
0800          LD    HL,(STRADR)
0810          JP    (HL)
0820 *
0830 * RUN ENTRY
0840 *
0850 RUN      LD    A,1
0860          LD    (TOSTRT),A
0870          JP    LOAD
0880 NOTFND   CALL  PRNAME
0890          LD    HL,NTFMSG
0900          CALL  EDITOR
0910          JP    COMAND
0920 NOTIMG   LD    HL,IMGMSG
0930          CALL  EDITOR
0940          JP    COMAND
0950 TOSTRT   DB    0
0960 NTFMSG   DW    ' NOT FOUND'

0970          DW    000015
0980 IMGMSG   DW    'NOT AN IMAGE FILE'

0990          DW    000017
1000 LDMSG1   DW    'RD PGM HDR'

1010          DW    000026
1020 LDMSG2   DW    'RD PROGRAM'

1030          DW    000026
```

OVERLAY 5

ASSML 347000

```
347000
347000
347000
347000
347000
347000
347000
347000
347000
347000 005
347001 315 162 341
347004 267
347005 314 130 347
347010 041 340 346
347013 016 241
347015 315 237 341
347020 021 000 000
347023 172
347024 312 034 347
347027 021 000 374
347032 076 050
347034 306 010
347036 052 250 346
347041 167
347042 043
347043 066 001
347045 057
347046 074
347047 306 200
347051 016 011
347053 043
347054 066 000
347056 015
347057 302 053 347
347062 167
347063 043
347064 066 003
347066 041 000 000
347071 042 265 345
347074 052 250 346
347077 042 267 345
347102 325
347103 041 220 347
347106 315 343 343
347111 321
347112 041 000 010
347115 031
347116 315 000 344
347121 267
347122 302 034 342
347125 303 042 340
347130 041 170 347
347133 315 210 343
347136 315 152 343
347141 366 040
347143 376 371
347145 312 161 347
347150 041 207 347
```

```
0100 * OVERLAY NUMBER 5
0110 *
0120 * COMMANDS:
0130 *
0140 *    ZERO
0150 *    DELETE
0160 *
0170          ORG   347000
0180 *
0190          DB    5
0200 ZERO     CALL  DECKSL
0210          OR    A
0220          CALL  Z,ARESUR
0230          LD    HL,LINBUF
0240          LD    C,'1'
0250          CALL  SEARCH
0260          LD    DE,0
0270          LD    A,D
0280          JP    Z,ZERO2
0290          LD    DE,374000
0300          LD    A,50
0310 ZERO2    ADD   10
0320          LD    HL,(DIRBUF)
0330          LD    M,A
0340          INC   HL
0350          LD    M,1
0360          CPL
0370          INC   A
0380          ADD   200
0390          LD    C,11
0400 ZLOOP    INC   HL
0410          LD    M,0
0420          DEC   C
0430          JP    NZ,ZLOOP
0440          LD    M,A
0450          INC   HL
0460          LD    M,3
0470          LD    HL,0
0480          LD    (IDW),HL
0490          LD    HL,(DIRBUF)
0500          LD    (PNTRW),HL
0510          PUSH  DE
0520          LD    HL,ZERMSG
0530          CALL  SPEDIT
0540          POP   DE
0550          LD    HL,10000
0560          ADD   HL,DE
0570          CALL  RECORD
0580          OR    A
0590          JP    NZ,SYSERR
0600          JP    COMAND
0610 ARESUR   LD    HL,SURMSG
0620          CALL  EDITOR
0630          CALL  KEY
0640          OR    40
0650          CP    371
0660          JP    Z,YES
0670          LD    HL,NOMSG
```

OVERLAY 5 Continued

```
347153 315 210 343          0680          CALL EDITOR
347156 303 042 340          0690          JP   COMAND
347161 041 213 347          0700 YES      LD   HL,YESMSG
347164 315 210 343          0710          CALL EDITOR
347167 311                  0720          RET
347170                      0730 SURMSG   DW   'ARE YOU SURE?'
 301 322 305 240 331
 317 325 240 323 325
 322 305 277
347205 023 000              0740          DW   000023
347207                      0750 NOMSG    DW   'NO'
 316 317
347211 036 000              0760          DW   000036
347213                      0770 YESMSG   DW   'YES'
 331 305 323
347216 035 000              0780          DW   000035
347220                      0790 ZERMSG   DW   'WT ZEROED DIR'
 327 324 240 332 305
 322 317 305 304 240
 304 311 322
347235 023 000              0800          DW   000023
347237                      0810 *
347237                      0820 * DELETE COMMAND
347237                      0830 *
347237 315 162 341          0840 DEL      CALL DECKSL
347242 315 257 341          0850          CALL READIR
347245 041 340 346          0860          LD   HL,LINBUF
347250 016 240              0870          LD   C,240
347252 315 237 341          0880 DELNXT   CALL SEARCH
347255 312 042 340          0890          JP   Z,COMAND
347260 315 103 343          0900          CALL DONAME
347263 345                  0910          PUSH HL
347264 041 240 346          0920          LD   HL,NAME
347267 315 133 342          0930          CALL DELETE
347272 334 304 347          0940          CALL C,DELERR
347275 341                  0950          POP  HL
347276 016 254              0960          LD   C,','
347300 053                  0970          DEC  HL
347301 303 252 347          0980          JP   DELNXT
347304 315 101 342          0990 DELERR   CALL PRNAME
347307 041 316 347          1000          LD   HL,DFLMSG
347312 315 210 343          1010          CALL EDITOR
347315 311                  1020          RET
347316                      1030 DELMSG   DW   ' NOT FOUND'
 240 316 317 324 240
 306 317 325 316 304

347330 015 000              1040          DW   000015
```


OVERLAY 6

ASSML 347000

```
347000                      0100 * OVERLAY NUMBER 6
347000                      0110 *
347000                      0120 * COMMANDS:
347000                      0130 *
347000                      0140 *    BUILD
347000                      0150 *
347000                      0160          ORG  347000
347000                      0170 *
347000                      0180 * PHIMON "WAKE-UP" ROUTINE
347000                      0190 *
347000 006                  0200          DB   6
347001 061 340 346          0210 WAKEUP   LD   SP,LINBUF
347004 041 000 340          0220          LD   HL,340000
347007 175                  0230          LD   A,L
347010 053                  0240 WAKE2    DEC  HL
347011 167                  0250          LD   M,A
347012 276                  0260          CP   M
347013 040 373              0270          JR   NZ,WAKE2
347015 021 001 374          0280          LD   DE,374001
347020 031                  0290          ADD  HL,DE
347021 060 017              0300          JR   NC,MEMERR
347023 042 250 346          0310          LD   (DIRBUF),HL
347026 315 243 343          0320          CALL ERASE
347031 041 001 347          0330          LD   HL,347001
347034 345                  0340          PUSH HL
347035 076 010              0350          LD   A,10
347037 303 120 341          0360          JP   OVRLAY
347042 041 051 347          0370 MEMERR   LD   HL,MEMMSG
347045 315 210 343          0380          CALL EDITOR
347050 166                  0390          HLT
347051 377 150              0400 MEMMSG   DW   150377
347053                      0410          DW   'NOT ENOUGH MEMORY'
 316 317 324 240 305
 316 317 325 307 310
 240 315 305 315 317
 322 331
347074 000                  0420          DB   0
347075                      0430 *
347075                      0440 *    BUILD
347075                      0450 *
347075 315 162 341          0460 BUILD    CALL DECKSL
347100 315 257 341          0470          CALL READIR
347103 052 250 346          0480          LD   HL,(DIRBUF)
347106 176                  0490          LD   A,M
347107 376 060              0500          CP   60
347111 302 311 347          0510          JP   NZ,BLDERR
347114 043                  0520          INC  HL
347115 176                  0530          LD   A,M
347116 365                  0540          PUSH AF
347117 041 004 000          0550          LD   HL,4
347122 042 265 345          0560          LD   (IDW),HL
347125 041 000 334          0570          LD   HL,334000
347130 042 267 345          0580          LD   (PNTRW),HL
347133 041 337 347          0590          LD   HL,BLMSG0
347136 315 343 343          0600          CALL SPEDIT
347141 041 000 014          0610          LD   HL,14000
347144 315 000 344          0620          CALL RECORD
347147 315 015 342          0630          CALL STOP
```

OVERLAY 6 Continued

```
347152 072 260 345          0640        LD   A,(DECK)
347155 267                  0650        OR   A
347156 312 042 340          0660        JP   Z,COMAND
347161 257                  0670        XOR  A
347162 062 260 345          0680        LD   (DECK),A
347165 041 024 000          0690        LD   HL,24
347170 042 261 345          0700        LD   (IDR),HL
347173 041 000 001          0710        LD   HL,1000
347176 042 263 345          0720        LD   (PNTRR),HL
347201 137                  0730        LD   E,A
347202 041 351 347          0740        LD   HL,BLMSG1
347205 315 343 343          0750        CALL SPEDIT
347210 315 271 345          0760 MOREAD CALL READ
347213 267                  0770        OR   A
347214 302 034 342          0780        JP   NZ,SYSERR
347217 041 264 345          0790        LD   HL,PNTRR+1
347222 064                  0800        INC  M
347223 041 261 345          0810        LD   HL,IDR
347226 064                  0820        INC  M
347227 176                  0830        LD   A,M
347230 326 053              0840        SUB  53
347232 302 210 347          0850        JP   NZ,MOREAD
347235 315 015 342          0860        CALL STOP
347240 315 162 341          0870        CALL DECKSL
347243 041 000 375          0880        LD   HL,375000
347246 042 267 345          0890        LD   (PNTRW),HL
347251 041 020 000          0900        LD   HL,20
347254 042 265 345          0910        LD   (IDW),HL
347257 041 363 347          0920        LD   HL,BLMSG2
347262 315 343 343          0930        CALL SPEDIT
347265 041 000 036          0940        LD   HL,36000
347270 361                  0950        POP  AF
347271 075                  0960        DEC  A
347272 302 300 347          0970        JP   NZ,NOXTRA
347275 041 000 043          0980        LD   HL,43000
347300 315 000 344          0990 NOXTRA CALL RECORD
347303 315 015 342          1000        CALL STOP
347306 303 042 340          1010        JP   COMAND
347311 041 322 347          1020 BLDERR LD   HL,BLDMSG
347314 315 210 343          1030        CALL EDITOR
347317 303 042 340          1040        JP   COMAND
347322                      1050 BLDMSG DW   'BUILD ERROR'
 302 325 311 314 304
 240 305 322 322 317
 322
347335 025 000              1060        DW   000025
347337                      1070 BLMSG0 DW   'WR OPSYS'
 327 322 240 317 320
 323 331 323
347347 030 000              1080        DW   000030
347351                      1090 BLMSG1 DW   'RD OVLYS'
 322 304 240 317 326
 314 331 323
347361 030 000              1100        DW   000030
347363                      1110 BLMSG2 DW   'WR OVLYS'
 327 322 240 317 326
 314 331 323
347373 030 000              1120        DW   000030
```


OVERLAY 7

```
ASSML 347000

347000                      0100 * OVERLAY NUMBER 7
347000                      0110 *
347000                      0120 * COMMANDS:
347000                      0130 *
347000                      0140 *    ALTER
347000                      0150 *    INSERT
347000                      0160 *
347000                      0170        ORG  347000
347000                      0180 *
347000 007                  0190        DB   7
347001 315 206 347          0200 ALTER  CALL SETUP
347004 147                  0210        LD   H,A
347005 056 000              0220        LD   L,0
347007 042 263 345          0230        LD   (PNTRR),HL
347012 306 023              0240        ADD  23
347014 145                  0250        LD   H,L
347015 157                  0260        LD   L,A
347016 042 261 345          0270        LD   (IDR),HL
347021 134                  0280        LD   E,H
347022 041 041 347          0290        LD   HL,ALTMSG
347025 315 343 343          0300        CALL SPEDIT
347030 315 271 345          0310        CALL READ
347033 315 015 342          0320        CALL STOP
347036 303 042 340          0330        JP   COMAND
347041                      0340 ALTMSG DW   'RD OVLY'
 322 304 240 317 326
 314 331
347050 031 000              0350        DW   000031
347052                      0360 *
347052                      0370 * INSERT COMMAND
347052                      0380 *
347052 315 206 347          0390 INSERT CALL SETUP
347055 365                  0400        PUSH AF
347056 147                  0410        LD   H,A
347057 056 000              0420        LD   L,0
347061 276                  0430        CP   M
347062 302 231 347          0440        JP   NZ,INSERR
347065 376 027              0450        CP   27
347067 312 141 347          0460        JP   Z,DONERD
347072 044                  0470        INC  H
347073 042 263 345          0480        LD   (PNTRR),HL
347076 306 024              0490        ADD  24
347100 145                  0500        LD   H,L
347101 157                  0510        LD   L,A
347102 042 261 345          0520        LD   (IDR),HL
347105 134                  0530        LD   E,H
347106 041 260 347          0540        LD   HL,INMSG0
347111 315 343 343          0550        CALL SPEDIT
347114 315 271 345          0560 READMR CALL READ
347117 267                  0570        OR   A
347120 302 034 342          0580        JP   NZ,SYSERR
347123 041 264 345          0590        LD   HL,PNTRR+1
347126 064                  0600        INC  M
347127 041 261 345          0610        LD   HL,IDR
347132 064                  0620        INC  M
347133 176                  0630        LD   A,M
347134 376 053              0640        CP   53
347136 302 114 347          0650        JP   NZ,READMR
```

OVERLAY 7 Continued

```
347141 361                  0660 DONERD POP  AF
347142 147                  0670        LD   H,A
347143 056 000              0680        LD   L,0
347145 042 267 345          0690        LD   (PNTRW),HL
347150 306 023              0700        ADD  23
347152 145                  0710        LD   H,L
347153 157                  0720        LD   L,A
347154 042 265 345          0730        LD   (IDW),HL
347157 057                  0740        CPL
347160 074                  0750        INC  A
347161 306 053              0760        ADD  53
347163 154                  0770        LD   L,H
347164 147                  0780        LD   H,A
347165 345                  0790        PUSH HL
347166 041 272 347          0800        LD   HL,INMSG1
347171 315 343 343          0810        CALL SPEDIT
347174 341                  0820        POP  HL
347175 315 000 344          0830        CALL RECORD
347200 315 015 342          0840        CALL STOP
347203 303 042 340          0850        JP   COMAND
347206 315 162 341          0860 SETUP  CALL DECKSL
347211 267                  0870        OR   A
347212 312 136 340          0880        JP   Z,PRWHAT
347215 376 030              0890        CP   30
347217 322 136 340          0900        JP   NC,PRWHAT
347222 365                  0910        PUSH AF
347223 257                  0920        XOR  A
347224 062 260 345          0930        LD   (DECK),A
347227 361                  0940        POP  AF
347230 311                  0950        RET
347231 041 242 347          0960 INSERR LD   HL,INSMSG
347234 315 210 343          0970        CALL EDITOR
347237 303 042 340          0980        JP   COMAND
347242                      0990 INSMSG DW   'INSERT ERROR'
 311 316 323 305 322
 324 240 305 322 322
 317 322
347256 024 000              1000        DW   000024
347260                      1010 INMSG0 DW   'RD OVLYS'
 322 304 240 317 326
 314 331 323
347270 030 000              1020        DW   000030
347272                      1030 INMSG1 DW   'WR OVLYS'
 327 322 240 317 326
 314 331 323
347302 030 000              1040        DW   000030
```


OVERLAY 11 Continued

ASSML 347000

```
347000                      0100 * OVERLAY NUMBER 11
347000                      0110 *
347000                      0120 * COMMANDS:
347000                      0130 *
347000                      0140 *    READ
347000                      0150 *
347000                      0160        ORG  347000
347000                      0170 *
347000 011                  0180        DB   11
347001 257                  0190 READSD XOR  A
347002 207                  0200        ADD  A
347003 342 013 347          0210        JP   PO,READ2
347006 076 064              0220        LD   A,64
347010 062 254 347          0230        LD   (DELAY+1),A
347013 041 340 346          0240 READ2  LD   HL,LINBUF
347016 016 240              0250        LD   C,240
347020 315 237 341          0260        CALL SEARCH
347023 312 066 347          0270        JP   Z,READRG
347026 315 202 341          0280        CALL GETNUM
347031 174                  0290        LD   A,H
347032 037                  0300        RRA
347033 147                  0310        LD   H,A
347034 042 272 347          0320        LD   (STADDR),HL
347037 041 340 346          0330        LD   HL,LINBUF
347042 016 255              0340        LD   C,'-'
347044 315 237 341          0350        CALL SEARCH
347047 312 074 347          0360        JP   Z,NOEND
347052 315 202 341          0370        CALL GETNUM
347055 174                  0380        LD   A,H
347056 037                  0390        RRA
347057 147                  0400        LD   H,A
347060 042 274 347          0410        LD   (ENDADR),HL
347063 303 102 347          0420        JP   GOREAD
347066 041 000 001          0430 READRG LD   HL,1000
347071 042 272 347          0440        LD   (STADDR),HL
347074 041 000 000          0450 NOEND  LD   HL,0
347077 042 274 347          0460        LD   (ENDADR),HL
347102 041 276 347          0470 GOREAD LD   HL,CRMSG
347105 315 210 343          0480        CALL EDITOR
347110 315 152 343          0490        CALL KEY
347113 333 001              0500 SKLEAD IN   1
347115 346 001              0510        AND  1
347117 302 113 347          0520        JP   NZ,SKLEAD
347122 052 272 347          0530        LD   HL,(STADDR)
347125 006 000              0540 MORE   LD   B,0
347127 004                  0550 TIMOUT INC  B
347130 312 000 340          0560        JP   Z,PHIMON
347133 333 001              0570        IN   1
347135 346 001              0580        AND  1
347137 302 127 347          0590        JP   NZ,TIMOUT
347142 315 213 347          0600        CALL BYTERD
347145 162                  0610        LD   M,D
347146 176                  0620        LD   A,M
347147 272                  0630        CP   D
347150 303 160 347          0640        JP   READOK
347153 076 256              0650        LD   A,'.'
347155 303 165 347          0660        JP   TVWRIT
347160 174                  0670 READOK LD   A,H
```

OVERLAY 11 Continued

```
347161 346 007          0680          AND  7
347163 306 260          0690          ADD  260
347165 315 202 343      0700 TVWRIT   CALL TV
347170 353              0710          EX   DE,HL
347171 052 274 347      0720          LD   HL,(ENDADR)
347174 175              0730          LD   A,L
347175 223              0740          SUB  E
347176 302 206 347      0750          JP   NZ,MOREPG
347201 174              0760          LD   A,H
347202 272              0770          CP   D
347203 312 266 347      0780          JP   Z,ENDRD
347206 353              0790 MOREPG   EX   DE,HL
347207 043              0800          INC  HL
347210 303 125 347      0810          JP   MORE
347213                  0820 *
347213                  0830 * BYTE READ SUBROUTINE
347213                  0840 *
347213 021 010 000      0850 BYTERD   LD   DE,10
347216 333 001          0860 WTSTRT   IN   1
347220 346 001          0870          AND  1
347222 302 216 347      0880          JP   NZ,WTSTRT
347225 016 003          0890          LD   C,3
347227 315 253 347      0900          CALL DELAY
347232 333 001          0910 NXTBIT   IN   1
347234 346 001          0920          AND  1
347236 202              0930          ADD  D
347237 017              0940          RRCA
347240 127              0950          LD   D,A
347241 016 002          0960          LD   C,2
347243 315 253 347      0970          CALL DELAY
347246 035              0980          DEC  E
347247 302 232 347      0990          JP   NZ,NXTBIT
347252 311              1000          RET
347253 006 114          1010 DELAY    LD   B,114
347255 005              1020 LOOP     DEC  B
347256 302 255 347      1030          JP   NZ,LOOP
347261 015              1040          DEC  C
347262 302 253 347      1050          JP   NZ,DELAY
347265 311              1060          RET
347266 257              1070 ENDRD    XOR  A
347267 303 000 340      1080          JP   PHIMON
347272 000 000          1090 STADDR   DW   000000
347274 000 000          1100 ENDADR   DW   000000
347276                  1110 CRMSG    DW   'START CASSETTE THEN (SPACE)'
 323 324 301 322 324
 240 303 301 323 323
 305 324 324 305 240
 324 310 305 316 240
 250 323 320 301 303
 305 251
347331 005 000          1120          DW   000005
```

OVERLAY 12

ASSML 347000

```
347000                  0100 * OVERLAY NUMBER 12
347000                  0110 *
347000                  0120 * COMMANDS:
347000                  0130 *
347000                  0140 *    WRITE
347000                  0150 *
347000                  0160          ORG  347000
347000                  0170 *
347000 012              0180          DB   12
347001 257              0190 WRITE    XOR  A
347002 207              0200          ADD  A
347003 342 013 347      0210          JP   PO,WRITE2
347006 076 064          0220          LD   A,64
347010 062 224 347      0230          LD   (DELAY+1),A
347013 041 340 346      0240 WRITE2   LD   HL,LINBUF
347016 016 240          0250          LD   C,240
347020 315 237 341      0260          CALL SEARCH
347023 312 136 340      0270          JP   Z,PRWHAT
347026 315 202 341      0280          CALL GETNUM
347031 174              0290          LD   A,H
347032 037              0300          RRA
347033 147              0310          LD   H,A
347034 042 236 347      0320          LD   (STADDR),HL
347037 041 340 346      0330          LD   HL,LINBUF
347042 016 255          0340          LD   C,'-'
347044 315 237 341      0350          CALL SEARCH
347047 312 136 340      0360          JP   Z,PRWHAT
347052 315 202 341      0370          CALL GETNUM
347055 174              0380          LD   A,H
347056 037              0390          RRA
347057 147              0400          LD   H,A
347060 042 240 347      0410          LD   (ENDADR),HL
347063 076 001          0420 WRITE3   LD   A,1
347065 323 001          0430          OUT  1
347067 041 253 347      0440          LD   HL,CWRMSG
347072 315 210 343      0450          CALL EDITOR
347075 315 152 343      0460          CALL KEY
347100 041 242 347      0470          LD   HL,WRTMSG
347103 315 210 343      0480          CALL EDITOR
347106 315 150 347      0490          CALL LEADER
347111 052 236 347      0500          LD   HL,(STADDR)
347114 315 164 347      0510 MORE     CALL WRBYTE
347117 353              0520          EX   DE,HL
347120 052 240 347      0530          LD   HL,(ENDADR)
347123 175              0540          LD   A,L
347124 273              0550          CP   E
347125 302 135 347      0560          JP   NZ,MOREWR
347130 174              0570          LD   A,H
347131 272              0580          CP   D
347132 312 142 347      0590          JP   Z,ENDWRT
347135 353              0600 MOREWR   EX   DE,HL
347136 043              0610          INC  HL
347137 303 114 347      0620          JP   MORE
347142 315 150 347      0630 ENDWRT   CALL LEADER
347145 303 042 340      0640          JP   COMAND
347150 016 000          0650 LEADER   LD   C,0
347152 026 060          0660          LD   D,60
347154 315 223 347      0670 LEADLP   CALL DELAY
```

OVERLAY 12 Continued

```
347157 025
347160 302 154 347
347163 311
347164
347164
347164
347164 036 011
347166 257
347167 176
347170 027
347171 365
347172 346 001
347174 323 001
347176 361
347177 016 002
347201 315 223 347
347204 037
347205 035
347206 302 171 347
347211 076 001
347213 323 001
347215 016 004
347217 315 223 347
347222 311
347223 006 114
347225 005
347226 302 225 347
347231 015
347232 302 223 347
347235 311
347236 000 000
347240 000 000
347242
 327 322 311 324 311
 316 307
347251 031 000
347253
 323 324 301 322 324
 240 303 301 323 323
 305 324 324 305 240
 324 310 305 316 240
 250 323 320 301 303
 305 251
347306 005 000
```

```
0680          DEC   D
0690          JP    NZ,LEADLP
0700          RET
0710 *
0720 * BYTE WRITE SUBROUTINE
0730 *
0740 WRBYTE   LD    E,11
0750          XOR   A
0760          LD    A,M
0770          RLA
0780 NXTBIT   PUSH  AF
0790          AND   1
0800          OUT   1
0810          POP   AF
0820          LD    C,2
0830          CALL  DELAY
0840          RRA
0850          DEC   E
0860          JP    NZ,NXTBIT
0870          LD    A,1
0880          OUT   1
0890          LD    C,4
0900          CALL  DELAY
0910          RET
0920 DELAY    LD    B,114
0930 LOOP     DEC   B
0940          JP    NZ,LOOP
0950          DEC   C
0960          JP    NZ,DELAY
0970          RET
0980 STADDR   DW    000000
0990 ENDADR   DW    000000
1000 WRTMSG   DW    'WRITING'

1010          DW    000031
1020 CWRMSG   DW    'START CASSETTE THEN (SPACE)'

1030          DW    000005
```

OVERLAY 13

ASSML 347000

```
347000
347000
347000
347000
347000
347000
347000
347000
347000 013
347001 052 250 346
347004 043
347005 345
347006 116
347007 043
347010 124
347011 135
347012 006 000
347014 176
347015 267
347016 312 042 347
347021 305
347022 016 012
347024 176
347025 022
347026 043
347027 023
347030 015
347031 302 024 347
347034 301
347035 015
347036 004
347037 303 014 347
347042 325
347043 021 000 000
347046 325
347047 176
347050 267
347051 302 073 347
347054 021 010 000
347057 031
347060 136
347061 043
347062 126
347063 043
347064 343
347065 031
347066 343
347067 015
347070 302 047 347
347073 321
347074 343
347075 066 000
347077 325
347100 021 010 000
347103 031
347104 321
347105 163
347106 043
```

```
0100 * OVERLAY NUMBER 13
0110 *
0120 * COMMANDS:
0130 *
0140 *    RNAME
0150 *
0160 * DIRECTORY SQUISH ROUTINE
0170 *
0180          DB    13
0190 SQUISH   LD    HL,(DIRBUF)
0200          INC   HL
0210          PUSH  HL
0220          LD    C,M
0230          INC   HL
0240          LD    D,H
0250          LD    E,L
0260          LD    B,0
0270 SQNEXT   LD    A,M
0280          OR    A
0290          JP    Z,ADDEMP
0300          PUSH  BC
0310          LD    C,12
0320 SQLOOP   LD    A,M
0330          LD    (DE),A
0340          INC   HL
0350          INC   DE
0360          DEC   C
0370          JP    NZ,SQLOOP
0380          POP   BC
0390          DEC   C
0400          INC   B
0410          JP    SQNEXT
0420 ADDEMP   PUSH  DE
0430          LD    DE,0
0440          PUSH  DE
0450 EMLOOP   LD    A,M
0460          OR    A
0470          JP    NZ,FINISH
0480          LD    DE,10
0490          ADD   HL,DE
0500          LD    E,M
0510          INC   HL
0520          LD    D,M
0530          INC   HL
0540          EX    (SP),HL
0550          ADD   HL,DE
0560          EX    (SP),HL
0570          DEC   C
0580          JP    NZ,EMLOOP
0590 FINISH   POP   DE
0600          EX    (SP),HL
0610          LD    M,0
0620          PUSH  DE
0630          LD    DE,10
0640          ADD   HL,DE
0650          POP   DE
0660          LD    M,E
0670          INC   HL
```

OVERLAY 13 Continued

```
347107 162                0680         LD   M,D
347110 043                0690         INC  HL
347111 321                0700         POP  DE
347112 353                0710         EX   DE,HL
347113 004                0720         INC  B
347114 014                0730         INC  C
347115 015                0740         DEC  C
347116 302 014 347        0750         JP   NZ,SQNEXT
347121 341                0760         POP  HL
347122 170                0770         LD   A,B
347123 167                0780         LD   M,A
347124 376 146            0790         CP   146
347126 330                0800         RET  C
347127 041 140 347        0810         LD   HL,DIRERR
347132 315 210 343        0820         CALL EDITOR
347135 303 042 340        0830         JP   COMAND
347140                    0840 DIRERR  DW   'DIRECTORY FULL'
 304 311 322 305 303
 324 317 322 331 240
 306 325 314 314
347156 024 000            0850         DW   000024
347160                    0860 *
347160                    0870 * RNAME COMMAND
347160                    0880 *
347160                    0890 CHANGE  EQU  346255
347160 041 340 346        0900 RNAME   LD   HL,LINBUF
347163 016 240            0910         LD   C,240
347165 315 237 341        0920         CALL SEARCH
347170 312 136 340        0930         JP   Z,PRWHAT
347173 345                0940         PUSH HL
347174 315 103 343        0950         CALL DONAME
347177 315 162 341        0960         CALL DECKSL
347202 315 257 341        0970         CALL READIR
347205 041 240 346        0980         LD   HL,NAME
347210 315 133 342        0990         CALL DELETE
347213 332 315 347        1000         JP   C,NOTFND
347216 343                1010         EX   (SP),HL
347217 257                1020         XOR  A
347220 062 255 346        1030         LD   (CHANGE),A
347223 016 254            1040         LD   C,','
347225 315 237 341        1050         CALL SEARCH
347230 312 136 340        1060         JP   Z,PRWHAT
347233 315 103 343        1070         CALL DONAME
347236 041 240 346        1080         LD   HL,NAME
347241 345                1090         PUSH HL
347242 176                1100         LD   A,M
347243 267                1110         OR   A
347244 312 136 340        1120         JP   Z,PRWHAT
347247 315 143 342        1130         CALL LOOKUP
347252 322 301 347        1140         JP   NC,ALRXST
347255 341                1150         POP  HL
347256 321                1160         POP  DE
347257 006 010            1170         LD   B,10
347261 176                1180 RNLOOP  LD   A,M
347262 022                1190         LD   (DE),A
347263 043                1200         INC  HL
347264 023                1210         INC  DE
347265 005                1220         DEC  B
347266 302 261 347        1230         JP   NZ,RNLOOP
347271 076 001            1240         LD   A,1
347273 062 255 346        1250         LD   (CHANGE),A
```


OVERLAY 13 Continued

```
347276 303 042 340        1260         JP   COMAND
347301 315 101 342        1270 ALRXST  CALL PRNAME
347304 041 331 347        1280         LD   HL,XSTMSG
347307 315 210 343        1290         CALL EDITOR
347312 303 042 340        1300         JP   COMAND
347315 315 101 342        1310 NOTFND  CALL PRNAME
347320 041 352 347        1320         LD   HL,FNDMSG
347323 315 210 343        1330         CALL EDITOR
347326 303 042 340        1340         JP   COMAND
347331                    1350 XSTMSG  DW   ' ALREADY EXISTS'
 240 301 314 322 305
 301 304 331 240 305
 330 311 323 324 323

347350 010 000            1360         DW   000010
347352                    1370 FNDMSG  DW   ' NOT FOUND'
 240 316 317 324 240
 306 317 325 316 304

347364 015 000            1380         DW   000015
```

LINKAGE SYMBOL LIST FOR DEBUGGING TOOL

ASSM 340000

```
340000                    0100 PHIMON  EQU  340000
340000                    0110 STOP    EQU  342015
340000                    0120 SYSERR  EQU  342034
340000                    0130 KEY     EQU  343152
340000                    0140 SPACE   EQU  343200
340000                    0150 TV      EQU  343202
340000                    0160 EDITOR  EQU  343210
340000                    0170 MLTSPC  EQU  343234
340000                    0180 IDR     EQU  345261
340000                    0190 PNTRR   EQU  345263
340000                    0200 READ    EQU  345271
340000                    0210 NAME    EQU  346240
340000                    0220 EX      EQU  346246
340000                    0230 DIRBUF  EQU  346250
340000                    0240 TEMP    EQU  346252
340000                    0250 LINBUF  EQU  346340
```

OVERLAY 2

ASSML 347000

```
347000                          0100 * OVERLAY NUMBER 2
347000                          0110 *
347000                          0120 * COMMANDS:
347000                          0130 *
347000                          0140 *    DTO
347000                          0150 *    DTH
347000                          0160 *
347000                          0170        ORG  347000
347000                          0180 *
347000 002                      0190        DB   2
347001 052 250 346              0200 DTX    LD   HL,(DIRBUF)
347004 021 000 004              0210        LD   DE,4000
347007 031                      0220        ADD  HL,DE
347010 176                      0230        LD   A,M
347011 376 014                  0240        CP   14
347013 312 124 347              0250        JP   Z,NOLOAD
347016 026 375                  0260        LD   D,375
347020 031                      0270        ADD  HL,DE
347021 345                      0280        PUSH HL
347022 042 263 345              0290        LD   (PNTRR),HL
347025 031                      0300        ADD  HL,DE
347026 045                      0310        DEC  H
347027 345                      0320        PUSH HL
347030 041 037 000              0330        LD   HL,37
347033 042 261 345              0340        LD   (IDR),HL
347036 315 271 345              0350 DTREAD CALL READ
347041 267                      0360        OR   A
347042 302 034 342              0370        JP   NZ,SYSERR
347045 041 264 345              0380        LD   HL,PNTRR+1
347050 064                      0390        INC  M
347051 041 261 345              0400        LD   HL,IDR
347054 064                      0410        INC  M
347055 176                      0420        LD   A,M
347056 326 042                  0430        SUB  42
347060 302 036 347              0440        JP   NZ,DTREAD
347063 315 015 342              0450        CALL STOP
347066 341                      0460        POP  HL
347067 042 250 346              0470        LD   (DIRBUF),HL
347072 341                      0480        POP  HL
347073 104                      0490        LD   B,H
347074 176                      0500 RELOOP LD   A,M
347075 376 230                  0510        CP   230
347077 314 144 347              0520        CALL Z,RELOC
347102 376 231                  0530        CP   231
347104 314 144 347              0540        CALL Z,RELOC
347107 376 232                  0550        CP   232
347111 314 144 347              0560        CALL Z,RELOC
347114 043                      0570        INC  HL
347115 170                      0580        LD   A,B
347116 074                      0590        INC  A
347117 074                      0600        INC  A
347120 224                      0610        SUB  H
347121 322 074 347              0620        JP   NC,RELOOP
347124 072 343 346              0630 NOLOAD LD   A,(LINBUF+3)
347127 346 001                  0640        AND  1
347131 062 324 347              0650        LD   (RDXMOD),A
347134 052 250 346              0660        LD   HL,(DIRBUF)
347137 021 001 004              0670        LD   DE,4001
```

OVERLAY 2 Continued

```
347142 031                      0680        ADD  HL,DE
347143 351                      0690        JP   (HL)
347144 326 230                  0700 RELOC  SUB  230
347146 200                      0710        ADD  B
347147 167                      0720        LD   M,A
347150 311                      0730        RET
347151                          0740 *
347151                          0750 * SOME DTX SUBROUTINES
347151                          0760 *
347151 365                      0770 PRNUMB PUSH AF
347152 072 324 347              0780        LD   A,(RDXMOD)
347155 057                      0790        CPL
347156 306 003                  0800        ADD  3
347160 315 234 343              0810        CALL MLTSPC
347163 072 324 347              0820        LD   A,(RDXMOD)
347166 267                      0830        OR   A
347167 312 216 347              0840        JP   Z,HXNUMB
347172 361                      0850        POP  AF
347173 315 201 347              0860        CALL PRDIG
347176 315 201 347              0870        CALL PRDIG
347201 027                      0880 PRDIG  RLA
347202 027                      0890        RLA
347203 027                      0900        RLA
347204 365                      0910        PUSH AF
347205 346 007                  0920        AND  7
347207 306 260                  0930        ADD  260
347211 315 202 343              0940        CALL TV
347214 361                      0950        POP  AF
347215 311                      0960        RET
347216 361                      0970 HXNUMB POP  AF
347217 027                      0980        RLA
347220 315 223 347              0990        CALL PRHXDG
347223 027                      1000 PRHXDG RLA
347224 027                      1010        RLA
347225 027                      1020        RLA
347226 027                      1030        RLA
347227 365                      1040        PUSH AF
347230 346 017                  1050        AND  17
347232 376 012                  1060        CP   12
347234 332 241 347              1070        JP   C,NTALPH
347237 306 007                  1080        ADD  7
347241 306 260                  1090 NTALPH ADD  260
347243 315 202 343              1100        CALL TV
347246 361                      1110        POP  AF
347247 311                      1120        RET
347250                          1130 *
347250 175                      1140 CHKNON LD   A,L
347251 244                      1150        AND  H
347252 074                      1160        INC  A
347253 312 267 347              1170        JP   Z,NONE
347256 174                      1180 PRTDBL LD   A,H
347257 315 151 347              1190        CALL PRNUMB
347262 175                      1200        LD   A,L
347263 315 151 347              1210        CALL PRNUMB
347266 311                      1220        RET
347267 041 313 347              1230 NONE   LD   HL,NONMSG
347272 315 210 343              1240        CALL EDITOR
347275 311                      1250        RET
347276                          1260 *
347276 315 256 347              1270 DMPLOC CALL PRTDBL
347301 076 257                  1280        LD   A,'/'
```

OVERLAY 2 Continued

```
347303 315 202 343          1290          CALL TV
347306 176                  1300          LD   A,M
347307 315 151 347          1310          CALL PRNUMB
347312 311                  1320          RET
347313                      1330 NONMSG   DW   ' NONE   '
 240 316 317 316 305
 240 240 240
347323 000                  1340          DB   0
347324 000                  1350 RDXMOD   DB   0
347325 323 200              1360 FLGTAB   DW   200323
347327 332 100              1370          DW   100332
347331 310 020              1380          DW   020310
347333 320 004              1390          DW   004320
347335 316 002              1400          DW   002316
347337 303 001              1410          DW   001303
347341 000                  1420          DB   0
347342                      1430 REGTAB   DW   'FACBEDLH'
 306 301 303 302 305
 304 314 310
```


OVERLAYS 14-16

ASSML 230000

```
230000                      0100 * OVERLAYS 14-16
230000                      0110 *
230000                      0120 * DTX RELOCATED CODE
230000                      0130 *
230000                      0140          ORG  230000
230000 014                  0150          DB   14
230001 257                  0160 DTX2     XOR  A
230002 062 213 231          0170          LD   (DSPMOD),A
230005 062 214 231          0180          LD   (MODBRK),A
230010 041 377 377          0190          LD   HL,377377
230013 042 371 232          0200          LD   (RETADR),HL
230016 315 154 231          0210 CLEAR    CALL PRMSGS
230021 041 000 000          0220 IN       LD   HL,0
230024 072 324 347          0230          LD   A,(RDXMOD)
230027 267                  0240          OR   A
230030 312 100 230          0250          JP   Z,HEXIN
230033 041 000 000          0260          LD   HL,0
230036 114                  0270          LD   C,H
230037 365                  0280          PUSH AF
230040 315 152 343          0290 DIGUP    CALL KEY
230043 107                  0300          LD   B,A
230044 315 202 343          0310          CALL TV
230047 170                  0320          LD   A,B
230050 376 270              0330          CP   270
230052 322 153 230          0340          JP   NC,NOTDIG
230055 326 260              0350          SUB  260
230057 332 153 230          0360          JP   C,NOTDIG
230062 107                  0370          LD   B,A
230063 361                  0380          POP  AF
230064 051                  0390          ADD  HL,HL
230065 051                  0400          ADD  HL,HL
230066 051                  0410          ADD  HL,HL
230067 365                  0420          PUSH AF
230070 170                  0430          LD   A,B
230071 205                  0440          ADD  L
230072 157                  0450          LD   L,A
230073 016 001              0460          LD   C,1
230075 303 040 230          0470          JP   DIGUP
230100 315 152 343          0480 HEXIN    CALL KEY
230103 376 341              0490          CP   341
230105 332 112 230          0500          JP   C,UC
230110 326 040              0510          SUB  40
230112 107                  0520 UC       LD   B,A
230113 315 202 343          0530          CALL TV
230116 170                  0540          LD   A,B
230117 376 307              0550          CP   307
230121 322 157 230          0560          JP   NC,NTHDIG
230124 376 272              0570          CP   272
230126 332 133 230          0580          JP   C,NONALF
230131 326 007              0590          SUB  7
230133 326 260              0600 NONALF   SUB  260
230135 332 157 230          0610          JP   C,NTHDIG
230140 051                  0620          ADD  HL,HL
230141 051                  0630          ADD  HL,HL
230142 051                  0640          ADD  HL,HL
230143 051                  0650          ADD  HL,HL
230144 205                  0660          ADD  L
230145 157                  0670          LD   L,A
```

```
230146 016 001          0680          LD   C,1
230150 303 100 230      0690          JP   HEXIN
230153 361              0700 NOTDIG   POP  AF
230154 174              0710          LD   A,H
230155 037              0720          RRA
230156 147              0730          LD   H,A
230157 353              0740 NTHDIG   EX   DE,HL
230160 041 001 232      0750          LD   HL,DTXTAB
230163 170              0760          LD   A,B
230164 106              0770          LD   B,M
230165 366 340          0780          OR   340
230167 043              0790 DTXNXT   INC  HL
230170 276              0800          CP   M
230171 043              0810          INC  HL
230172 312 270 230      0820          JP   Z,FOUND
230175 005              0830          DEC  B
230176 302 167 230      0840          JP   NZ,DTXNXT
230201 072 213 231      0850 END      LD   A,(DSPMOD)
230204 267              0860          OR   A
230205 312 016 230      0870          JP   Z,CLEAR
230210 372 313 230      0880          JP   M,REGSTR
230213 052 365 232      0890 DUMP1    LD   HL,(LOCATN)
230216 042 365 232      0900 DUMP2    LD   (LOCATN),HL
230221 021 370 377      0910          LD   DE,377370
230224 031              0920          ADD  HL,DF
230225 345              0930          PUSH HL
230226 315 154 231      0940          CALL PRMSGS
230231 341              0950          POP  HL
230232 016 011          0960          LD   C,11
230234 315 276 347      0970 NXTDMP   CALL DMPLOC
230237 015              0980          DEC  C
230240 312 254 230      0990          JP   Z,ENDUMP
230243 043              1000          INC  HL
230244 076 023          1010          LD   A,23
230246 315 234 343      1020          CALL MLTSPC
230251 303 234 230      1030          JP   NXTDMP
230254 076 275          1040 ENDUMP   LD   A,'='
230256 315 202 343      1050          CALL TV
230261 074              1060          INC  A
230262 062 213 231      1070          LD   (DSPMOD),A
230265 303 021 230      1080          JP   IN
230270 156              1090 FOUND    LD   L,M
230271 257              1100          XOR  A
230272 351              1110          JP   (HL)
230273 343              1120 ENCBRK   EX   (SP),HL
230274 053              1130          DEC  HL
230275 042 371 232      1140          LD   (RETADR),HL
230300 325              1150          PUSH DE
230301 305              1160          PUSH BC
230302 365              1170          PUSH AF
230303 257              1180          XOR  A
230304 062 215 231      1190          LD   (REGSET),A
230307 074              1200          INC  A
230310 062 214 231      1210          LD   (MODBRK),A
230313 315 154 231      1220 REGSTR   CALL PRMSGS
230316 041 244 231      1230          LD   HL,SETMSG
230321 315 210 343      1240          CALL EDITOR
230324 072 215 231      1250          LD   A,(REGSET)
230327 267              1260          OR   A
230330 312 344 230      1270          JP   Z,MAINST
230333 041 256 231      1280          LD   HL,ALTMSG
```



```
230336 315 210 343      1290          CALL EDITOR
230341 303 352 230      1300          JP   FINSET
230344 041 271 231      1310 MAINST   LD   HL,MANMSG
230347 315 210 343      1320          CALL EDITOR
230352 041 277 231      1330 FINSET   LD   HL,FLGMSG
230355 315 210 343      1340          CALL EDITOR
230360 147              1350          LD   H,A
230361 157              1360          LD   L,A
230362 075              1370          DEC  A
230363 062 213 231      1380          LD   (DSPMOD),A
230366 071              1390          ADD  HL,SP
230367 021 325 347      1400          LD   DE,FLGTAB
230372 303 001 231      1410          JP   FLAGUP
230375                  1420 *
230375                  1430          ORG  231000
231000 015              1440          DB   15
231001 032              1450 FLAGUP   LD   A,(DE)
231002 023              1460          INC  DE
231003 267              1470          OR   A
231004 050 025          1480          JR   Z,REG2
231006 315 202 343      1490          CALL TV
231011 032              1500          LD   A,(DE)
231012 023              1510          INC  DE
231013 246              1520          AND  M
231014 076 260          1530          LD   A,260
231016 050 001          1540          JR   Z,FLAG0
231020 074              1550          INC  A
231021 315 202 343      1560 FLAG0    CALL TV
231024 076 002          1570          LD   A,2
231026 315 234 343      1580          CALL MLTSPC
231031 030 346          1590          JR   FLAGUP
231033 345              1600 REG2     PUSH HL
231034 041 310 231      1610          LD   HL,REGMSG
231037 315 210 343      1620          CALL EDITOR
231042 341              1630          POP  HL
231043 043              1640          INC  HL
231044 176              1650          LD   A,M
231045 315 151 347      1660          CALL PRNUMB
231050 016 003          1670          LD   C,3
231052 043              1680 REGUP    INC  HL
231053 126              1690          LD   D,M
231054 043              1700          INC  HL
231055 176              1710          LD   A,M
231056 315 151 347      1720          CALL PRNUMB
231061 172              1730          LD   A,D
231062 315 151 347      1740          CALL PRNUMB
231065 015              1750          DEC  C
231066 302 252 231      1760          JP   NZ,REGUP
231071 345              1770          PUSH HL
231072 041 343 231      1780          LD   HL,STKMSG
231075 315 210 343      1790          CALL EDITOR
231100 341              1800          POP  HL
231101 043              1810          INC  HL
231102 315 256 347      1820          CALL PRTDBL
231105 076 002          1830          LD   A,2
231107 315 234 343      1840          CALL MLTSPC
231112 335 345          1850          PUSH IX
231114 341              1860          POP  HL
231115 315 256 347      1870          CALL PRTDBL
231120 076 002          1880          LD   A,2
231122 315 234 343      1890          CALL MLTSPC
```

```
231125 375 345
231127 341
231130 315 256 347
231133 076 044
231135 315 234 343
231140 303 021 230
231143 072 214 231
231146 267
231147 300
231150 341
231151 303 201 230
231154 041 216 231
231157 315 210 343
231162 052 367 232
231165 315 250 347
231170 041 233 231
231173 315 210 343
231176 052 371 232
231201 315 250 347
231204 076 061
231206 315 234 343
231211 311
231212 000
231213 000
231214 000
231215 000
231216 377
231217
 302 322 305 301 313
 320 317 311 316 324
 272
231232 000
231233 015
231234
 322 305 324 325 322
 316 272
231243 000
231244
 322 305 307 240 323
 305 324 272 240
231255 000
231256
 301 314 324 305 322
 316 301 324 305
231267 056 000
231271
 315 301 311 316
231275 063 000
231277
 306 314 301 307 323
 272 240 240
231307 000
231310 040
231311
 322 305 307 311 323
 324 305 322 323 272

231323 030 301
231325 003 302
231327 003 303
231331 003 304
```

```
1900          PUSH IY
1910          POP  HL
1920          CALL PRTDBL
1930          LD   A,44
1940          CALL MLTSPC
1950          JP   IN
1960 CHKMOD   LD   A,(MODBRK)
1970          OR   A
1980          RET  NZ
1990          POP  HL
2000          JP   END
2010 PRMSGS   LD   HL,BRKMSG
2020          CALL EDITOR
2030          LD   HL,(ADRBRK)
2040          CALL CHKNON
2050          LD   HL,RETMSG
2060          CALL EDITOR
2070          LD   HL,(RETADR)
2080          CALL CHKNON
2090          LD   A,61
2100          CALL MLTSPC
2110          RET
2120 DATA     DB   0
2130 DSPMOD   DB   0
2140 MODBRK   DB   0
2150 REGSET   DB   0
2160 BRKMSG   DB   377
2170          DW   'BREAKPOINT:'

2180          DB   0
2190 RETMSG   DB   15
2200          DW   'RETURN:'

2210          DB   0
2220 SETMSG   DW   'REG SET: '

2230          DB   0
2240 ALTMSG   DW   'ALTERNATE'

2250          DW   000056
2260 MANMSG   DW   'MAIN'

2270          DW   000063
2280 FLGMSG   DW   'FLAGS:  '

2290          DB   0
2300 REGMSG   DB   40
2310          DW   'REGISTERS:'

2320          DW   301030
2330          DW   302003
2340          DW   303003
2350          DW   304003
```



```
231333 003 305
231335 003 310
231337 003 314
231341 005 000
231343 044
231344
 323 324 301 303 313
 240 320 324 322
231355 002
231356
 330 240 311 316 304
 305 330
231365 003
231366
 331 240 311 316 304
 305 330
231375 004 000
231377
231377
232000 016
232001 015
232002 357 040

232004 341 044
232006 372 047
232010 340 052
232012 355 100
232014 354 107
232016 343 116
232020 347 125
232022 342 142
232024 362 220
232026 344 226
232030 373 321
232032 345 335
232034
232040 353
232041 303 216 230
232044 315 152 343
232047 137
232050 016 001
232052 072 213 231
232055 267
232056 312 016 230
232061 372 313 230
232064 052 365 232
232067 015
232070 302 074 232
232073 163
232074 043
232075 303 216 230
232100 052 365 232
232103 053
232104 303 216 230
232107 052 365 232
232112 153
232113 303 216 230
232116 315 143 231
232121 052 371 232
232124 353
232125 353
```

```
2360          DW   305003
2370          DW   310003
2380          DW   314003
2390          DW   000005
2400 STKMSG   DB   44
2410          DW   'STACK PTR'

2420          DB   2
2430          DW   'X INDEX'

2440          DB   3
2450          DW   'Y INDEX'

2460          DW   000004
2470 *
2480          ORG  232000
2490          DB   16
2500 DTXTAB   DB   15
2510          DW   040357

2520          DW   044341
2530          DW   047372
2540          DW   052340
2550          DW   100355
2560          DW   107354
2570          DW   116343
2580          DW   125347
2590          DW   142342
2600          DW   220362
2610          DW   226344
2620          DW   321373
2630          DW   335345
2640          ORG  232040
2650 OPEN     EX   DE,HL
2660          JP   DUMP2
2670 ASCII    CALL KEY
2680 ZERO     LD   E,A
2690          LD   C,1
2700 SPCBAR   LD   A,(DSPMOD)
2710          OR   A
2720          JP   Z,CLEAR
2730          JP   M,REGSTR
2740          LD   HL,(LOCATN)
2750          DEC  C
2760          JP   NZ,SKIPIN
2770          LD   M,E
2780 SKIPIN   INC  HL
2790          JP   DUMP2
2800 MINUS    LD   HL,(LOCATN)
2810          DEC  HL
2820          JP   DUMP2
2830 LOW      LD   HL,(LOCATN)
2840          LD   L,E
2850          JP   DUMP2
2860 CONTIN   CALL CHKMOD
2870          LD   HL,(RETADR)
2880          EX   DE,HL
2890 GO       EX   DE,HL
```

OVERLAYS 14-16 Continued

```
232126 072 214 231          2900          LD   A,(MODBRK)
232131 267                  2910          OR   A
232132 312 217 232          2920          JP   Z,NOPOPS
232135 361                  2930          POP  AF
232136 301                  2940          POP  BC
232137 321                  2950          POP  DE
232140 343                  2960          EX   (SP),HL
232141 311                  2970          RET
232142 315 201 232          2980 BREAK    CALL ERSBRK
232145 015                  2990          DEC  C
232146 302 201 230          3000          JP   NZ,END
232151 032                  3010          LD   A,(DE)
232152 062 212 231          3020          LD   (DATA),A
232155 353                  3030          EX   DE,HL
232156 066 367              3040          LD   M,367
232160 042 367 232          3050          LD   (ADRBRK),HL
232163 041 023 340          3060          LD   HL,340023
232166 066 303              3070          LD   M,303
232170 043                  3080          INC  HL
232171 066 312              3090          LD   M,312
232173 043                  3100          INC  HL
232174 066 356              3110          LD   M,356
232176 303 201 230          3120          JP   END
232201 052 367 232          3130 ERSBRK   LD   HL,(ADRBRK)
232204 072 212 231          3140          LD   A,(DATA)
232207 167                  3150          LD   M,A
232210 041 377 377          3160          LD   HL,377377
232213 042 367 232          3170          LD   (ADRBRK),HL
232216 311                  3180          RET
232217 351                  3190 NOPOPS   JP   (HL)
232220 315 143 231          3200 REGCOM   CALL CHKMOD
232223 303 313 230          3210          JP   REGSTR
232226 315 143 231          3220 DEPSIT   CALL CHKMOD
232231 041 000 000          3230          LD   HL,0
232234 071                  3240          ADD  HL,SP
232235 325                  3250          PUSH DE
232236 353                  3260          EX   DE,HL
232237 315 152 343          3270          CALL KEY
232242 346 337              3280          AND  337
232244 016 010              3290          LD   C,10
232246 041 342 347          3300          LD   HL,REGTAB
232251 276                  3310 DEPSUP   CP   M
232252 312 313 232          3320          JP   Z,DEPOS2
232255 043                  3330          INC  HL
232256 023                  3340          INC  DE
232257 015                  3350          DEC  C
232260 302 251 232          3360          JP   NZ,DEPSUP
232263 376 330              3370          CP   'X'
232265 302 275 232          3380          JP   NZ,NOTIX
232270 335 341              3390          POP  IX
232272 303 201 230          3400          JP   END
232275 376 331              3410 NOTIX    CP   'Y'
232277 302 307 232          3420          JP   NZ,NOTIY
232302 375 341              3430          POP  IY
232304 303 201 230          3440          JP   END
232307 301                  3450 NOTIY    POP  BC
232310 303 201 230          3460          JP   END
232313 301                  3470 DEPOS2   POP  BC
232314 171                  3480          LD   A,C
232315 022                  3490          LD   (DE),A
232316 303 201 230          3500          JP   END
```


OVERLAYS 14-16 Continued

```
232321 052 250 346          3510 ESCAPE   LD   HL,(DIRBUF)
232324 044                  3520          INC  H
232325 044                  3530          INC  H
232326 044                  3540          INC  H
232327 042 250 346          3550          LD   (DIRBUF),HL
232332 303 000 340          3560          JP   PHIMON
232335 315 143 231          3570 EXXCHG   CALL CHKMOD
232340 361                  3580          POP  AF
232341 301                  3590          POP  BC
232342 321                  3600          POP  DE
232343 341                  3610          POP  HL
232344 010                  3620          EX   AF,AF'
232345 331                  3630          EXX
232346 345                  3640          PUSH HL
232347 325                  3650          PUSH DE
232350 305                  3660          PUSH BC
232351 365                  3670          PUSH AF
232352 072 215 231          3680          LD   A,(REGSET)
232355 356 001              3690          XOR  1
232357 062 215 231          3700          LD   (REGSET),A
232362 303 201 230          3710          JP   END
232365 000 000              3720 LOCATN   DW   000000
232367 377 377              3730 ADRBRK   DW   377377
232371 377 377              3740 RETADR   DW   377377
```

LINKAGE SYMBOL LIST FOR P.I.P.(Peripheral Interchange Program)

ASSM 340000

```
340000                      0100 PHIMON   EQU  340000
340000                      0110 OVRLAY   EQU  341120
340000                      0120 SEARCH   EQU  341237
340000                      0130 READIR   EQU  341257
340000                      0140 WRTDIR   EQU  341345
340000                      0150 STOP     EQU  342015
340000                      0160 PRNAME   EQU  342101
340000                      0170 ENTRY    EQU  342136
340000                      0180 LOOKUP   EQU  342143
340000                      0190 CLOSE    EQU  342345
340000                      0200 DONAME   EQU  343103
340000                      0210 KEY      EQU  343152
340000                      0220 TV       EQU  343202
340000                      0230 EDITOR   EQU  343210
340000                      0240 MLTSPC   EQU  343234
340000                      0250 ERASE    EQU  343243
340000                      0260 RECORD   EQU  344000
340000                      0270 DECK     EQU  345260
340000                      0280 IDR      EQU  345261
340000                      0290 PNTRR    EQU  345263
340000                      0300 IDW      EQU  345265
340000                      0310 PNTRW    EQU  345267
340000                      0320 READ     EQU  345271
340000                      0330 NAME     EQU  346240
340000                      0340 DIRBUF   EQU  346250
340000                      0350 LINBUF   EQU  346340
```

```
ASSML 001000 123000

001000                          0100 * PERIPHERAL
001000                          0110 * INTERCHANGE
001000                          0120 * PROGRAM
001000                          0130 *
001000                          0140 * FOR PHIMON
001000                          0150 *
001000                          0160 * DAVID BRYANT  1977
001000                          0170 *
001000                          0180 LINEIN EQU  340301
001000                          0190 *
001000                          0200       ORG  001000
001000                          0210 *
001000 061 340 346              0220 PIP    LD   SP,346340
001003 041 051 001              0230       LD   HL,PIPMSG
001006 315 210 343              0240       CALL EDITOR
001011 315 152 343              0250 SELECT CALL KEY
001014 376 265                  0260       CP   265
001016 322 011 001              0270       JP   NC,SELECT
001021 326 261                  0280       SUB  261
001023 332 011 001              0290       JP   C,SELECT
001026 041 041 001              0300       LD   HL,COMTAB
001031 207                      0310       ADD  A
001032 205                      0320       ADD  L
001033 157                      0330       LD   L,A
001034 136                      0340       LD   E,M
001035 043                      0350       INC  HL
001036 126                      0360       LD   D,M
001037 353                      0370       EX   DE,HL
001040 351                      0380       JP   (HL)
001041 000 002                  0390 COMTAB DW   FLCOPY
001043 141 002                  0400       DW   CPYWQ
001045 146 002                  0410       DW   CPYALL
001047 000 340                  0420       DW   PHIMON
001051 377 012                  0430 PIPMSG DW   012377
001053                          0440       DW   'PHIMON PIP'
 320 310 311 315 317
 316 240 320 311 320

001065 027                      0450       DB   27
001066                          0460       DW   'VER 1.00'
 326 305 322 240 261
 256 260 260
001076 116                      0470       DB   116
001077                          0480       DW   '1 COPY SPECIFIED FILES'
 261 240 303 317 320
 331 240 323 320 305
 303 311 306 311 305
 304 240 306 311 314
 305 323
001125 012                      0490       DB   12
001126                          0500       DW   '2 COPY ALL FILES WITH QUERY'
 262 240 303 317 320
 331 240 301 314 314
 240 306 311 314 305
 323 240 327 311 324
 310 240 321 325 305
 322 331
001161 005                      0510       DB   5
```



```
001162                          0520       DW   '3 COPY ALL FILES'
 263 240 303 317 320
 331 240 301 314 314
 240 306 311 314 305
 323
001202 020                      0530       DB   20
001203                          0540       DW   '4 RETURN TO PHIMON'
 264 240 322 305 324
 325 322 316 240 324
 317 240 320 310 311
 315 317 316
001225 116                      0550       DB   116
001226                          0560       DW   'SELECT PIP OPTION: '
 323 305 314 305 303
 324 240 320 311 320
 240 317 320 324 311
 317 316 272 240
001251 000                      0570       DB   0
001252                          0580 *
001252                          0590 * FILE SPECIFICATION
001252                          0600 *
001252                          0610       ORG  002000
002000                          0620 *
002000 315 212 004              0630 FLCOPY CALL DEVNOS
002003 315 037 005              0640       CALL SETBUF
002006 041 113 002              0650       LD   HL,FSPMSG
002011 315 210 343              0660       CALL EDITOR
002014 026 252                  0670 MOREIN LD   D,'*'
002016 041 340 346              0680       LD   HL,LINBUF
002021 315 301 340              0690       CALL LINEIN
002024 043                      0700       INC  HL
002025 176                      0710       LD   A,M
002026 376 277                  0720       CP   '?'
002030 312 000 001              0730       JP   Z,PIP
002033 315 103 343              0740 GTLOOP CALL DONAME
002036 345                      0750       PUSH HL
002037 072 240 346              0760       LD   A,(NAME)
002042 267                      0770       OR   A
002043 304 063 005              0780       CALL NZ,PUTNAM
002046 341                      0790       POP  HL
002047 053                      0800       DEC  HL
002050 016 254                  0810       LD   C,','
002052 315 237 341              0820       CALL SEARCH
002055 302 033 002              0830       JP   NZ,GTLOOP
002060 041 133 002              0840       LD   HL,MORMSG
002063 315 210 343              0850       CALL EDITOR
002066 315 152 343              0860       CALL KEY
002071 346 337                  0870       AND  337
002073 376 331                  0880       CP   'Y'
002075 302 322 002              0890       JP   NZ,COPY
002100 315 202 343              0900       CALL TV
002103 076 032                  0910       LD   A,32
002105 315 234 343              0920       CALL MLTSPC
002110 303 014 002              0930       JP   MOREIN
002113                          0940 FSPMSG DW   'SPECIFY FILES:'
 323 320 305 303 311
 306 331 240 306 311
 314 305 323 272
002131 022 000                  0950       DW   000022
002133                          0960 MORMSG DW   'MORE?'
 315 317 322 305 277
```

```
002140 000                  0970          DB   0
002141                      0980 *
002141                      0990 * COPY ALL FILES WITH QUERY
002141                      1000 *
002141 076 001              1010 CPYWQ    LD   A,1
002143 303 147 002          1020          JP   CPYALL+1
002146                      1030 *
002146                      1040 * COPY ALL FILES
002146                      1050 *
002146 257                  1060 CPYALL   XOR  A
002147 062 041 006          1070          LD   (QRMODE),A
002152 315 212 004          1080          CALL DEVNOS
002155 072 036 006          1090          LD   A,(INDEV)
002160 315 257 341          1100          CALL READIR
002163 315 037 005          1110          CALL SETBUF
002166 052 250 346          1120          LD   HL,(DIRBUF)
002171 043                  1130          INC  HL
002172 106                  1140          LD   B,M
002173 016 020              1150 SCRNUP   LD   C,20
002175 305                  1160          PUSH BC
002176 315 243 343          1170          CALL ERASE
002201 301                  1180          POP  BC
002202 305                  1190 MASSUP   PUSH BC
002203 043                  1200          INC  HL
002204 016 010              1210          LD   C,10
002206 021 240 346          1220          LD   DE,NAME
002211 176                  1230 MSMOVE   LD   A,M
002212 022                  1240          LD   (DE),A
002213 043                  1250          INC  HL
002214 023                  1260          INC  DE
002215 015                  1270          DEC  C
002216 302 211 002          1280          JP   NZ,MSMOVE
002221 043                  1290          INC  HL
002222 072 240 346          1300          LD   A,(NAME)
002225 267                  1310          OR   A
002226 312 315 002          1320          JP   Z,EMPTY
002231 345                  1330          PUSH HL
002232 072 041 006          1340          LD   A,(QRMODE)
002235 267                  1350          OR   A
002236 314 063 005          1360          CALL Z,PUTNAM
002241 312 303 002          1370          JP   Z,NOQERY
002244 315 101 342          1380          CALL PRNAME
002247 076 277              1390          LD   A,'?'
002251 315 202 343          1400          CALL TV
002254 315 115 005          1410          CALL KEYCHK
002257 346 337              1420          AND  337
002261 376 331              1430          CP   'Y'
002263 314 202 343          1440          CALL Z,TV
002266 314 063 005          1450          CALL Z,PUTNAM
002271 076 316              1460          LD   A,'N'
002273 304 202 343          1470          CALL NZ,TV
002276 076 025              1480          LD   A,25
002300 315 234 343          1490          CALL MLTSPC
002303 341                  1500 NOQERY   POP  HL
002304 301                  1510          POP  BC
002305 005                  1520          DEC  B
002306 015                  1530          DEC  C
002307 302 202 002          1540          JP   NZ,MASSUP
002312 303 173 002          1550          JP   SCRNUP
002315 301                  1560 EMPTY    POP  BC
```



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002316 005                  1570          DEC  B
002317 302 202 002          1580          JP   NZ,MASSUP
002322                      1590 *
002322                      1600 * PIP FILE COPY ROUTINE
002322                      1610 *
002322 315 243 343          1620 COPY     CALL ERASE
002325 052 026 006          1630          LD   HL,(NBPNTR)
002330 066 000              1640          LD   M,0
002332 315 037 005          1650          CALL SETBUF
002335 041 000 007          1660          LD   HL,LENBUF
002340 042 030 006          1670          LD   (LBPNTR),HL
002343 041 377 377          1680          LD   HL,377377
002346 072 037 006          1690          LD   A,(OUTDEV)
002351 376 004              1700          CP   4
002353 322 365 002          1710          JP   NC,SKPENT
002356 315 257 341          1720          CALL READIR
002361 315 136 342          1730          CALL ENTRY
002364 353                  1740          EX   DE,HL
002365 042 034 006          1750 SKPENT   LD   (FREE),HL
002370 072 036 006          1760          LD   A,(INDEV)
002373 315 257 341          1770          CALL READIR
002376 016 020              1780 NXTSCR   LD   C,20
003000 305                  1790          PUSH BC
003001 315 243 343          1800          CALL ERASE
003004 301                  1810          POP  BC
003005 305                  1820 NXTFIL   PUSH BC
003006 315 046 005          1830          CALL GETNAM
003011 072 240 346          1840          LD   A,(NAME)
003014 267                  1850          OR   A
003015 312 351 003          1860          JP   Z,FINISH
003020 315 101 342          1870          CALL PRNAME
003023 041 240 346          1880          LD   HL,NAME
003026 315 143 342          1890          CALL LOOKUP
003031 325                  1900          PUSH DE
003032 332 042 004          1910          JP   C,NOTFND
003035 172                  1920          LD   A,D
003036 057                  1930          CPL
003037 127                  1940          LD   D,A
003040 173                  1950          LD   A,E
003041 057                  1960          CPL
003042 137                  1970          LD   E,A
003043 023                  1980          INC  DE
003044 052 034 006          1990          LD   HL,(FREE)
003047 031                  2000          ADD  HL,DE
003050 322 064 004          2010          JP   NC,NOSPAC
003053 042 034 006          2020          LD   (FREE),HL
003056 052 265 345          2030          LD   HL,(IDW)
003061 042 032 006          2040          LD   (RECBLK),HL
003064 257                  2050          XOR  A
003065 062 040 006          2060          LD   (CNTBLK),A
003070 062 042 006          2070          LD   (INITFG),A
003073 041 000 014          2080          LD   HL,BUFFER
003076 042 263 345          2090          LD   (PNTRR),HL
003101 072 036 006          2100 NXTBLK   LD   A,(INDEV)
003104 062 260 345          2110          LD   (DECK),A
003107 036 000              2120          LD   E,0
003111 315 271 345          2130          CALL READ
003114 267                  2140          OR   A
003115 302 105 004          2150          JP   NZ,RERROR
003120 041 040 006          2160          LD   HL,CNTBLK
003123 064                  2170          INC  M
```

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003124 052 261 345          2180         LD   HL,(IDR)
003127 043                  2190         INC  HL
003130 042 261 345          2200         LD   (IDR),HL
003133 052 263 345          2210         LD   HL,(PNTRR)
003136 044                  2220         INC  H
003137 042 263 345          2230         LD   (PNTRR),HL
003142 072 251 346          2240         LD   A,(DIRBUF+1)
003145 224                  2250         SUB  H
003146 314 234 003          2260         CALL Z,BUFOUT
003151 321                  2270         POP  DE
003152 033                  2280         DEC  DE
003153 325                  2290         PUSH DE
003154 172                  2300         LD   A,D
003155 263                  2310         OR   E
003156 302 101 003          2320         JP   NZ,NXTBLK
003161 315 234 003          2330         CALL BUFOUT
003164 321                  2340         POP  DE
003165 041 223 003          2350         LD   HL,COPMSG
003170 315 210 343          2360         CALL EDITOR
003173 041 240 346          2370         LD   HL,NAME
003176 315 143 342          2380         CALL LOOKUP
003201 052 030 006          2390 DNFILE  LD   HL,(LBPNTR)
003204 163                  2400         LD   M,E
003205 043                  2410         INC  HL
003206 162                  2420         LD   M,D
003207 043                  2430         INC  HL
003210 042 030 006          2440         LD   (LBPNTR),HL
003213 301                  2450         POP  BC
003214 015                  2460         DEC  C
003215 312 376 002          2470         JP   Z,NXTSCR
003220 303 005 003          2480         JP   NXTFIL
003223                      2490 COPMSG  DW   '-COPIED'
 255 303 317 320 311
 305 304
003232 020 000              2500         DW   000020
003234                      2510 *
003234                      2520 * BUFFER OUTPUT ROUTINE
003234                      2530 *
003234 315 015 342          2540 BUFOUT  CALL STOP
003237 052 261 345          2550         LD   HL,(IDR)
003242 345                  2560         PUSH HL
003243 072 037 006          2570         LD   A,(OUTDEV)
003246 376 004              2580         CP   4
003250 322 322 003          2590         JP   NC,USROUT
003253 062 260 345          2600         LD   (DECK),A
003256 041 000 014          2610         LD   HL,BUFFER
003261 042 267 345          2620         LD   (PNTRW),HL
003264 072 040 006          2630         LD   A,(CNTBLK)
003267 147                  2640         LD   H,A
003270 056 000              2650         LD   L,0
003272 315 000 344          2660         CALL RECORD
003275 267                  2670         OR   A
003276 302 130 004          2680         JP   NZ,WERROR
003301 062 040 006          2690         LD   (CNTBLK),A
003304 041 000 014          2700         LD   HL,BUFFER
003307 042 263 345          2710         LD   (PNTRR),HL
003312 315 015 342          2720         CALL STOP
003315 341                  2730         POP  HL
003316 042 261 345          2740         LD   (IDR),HL
003321 311                  2750         RET
003322 072 040 006          2760 USROUT  LD   A,(CNTBLK)
```



```
003325 107                  2770         LD   B,A
003326 016 000              2780         LD   C,0
003330 072 042 006          2790         LD   A,(INITFG)
003333 137                  2800         LD   E,A
003334 315 002 347          2810         CALL 347002
003337 267                  2820         OR   A
003340 302 130 004          2830         JP   NZ,WERROR
003343 074                  2840         INC  A
003344 062 042 006          2850         LD   (INITFG),A
003347 341                  2860         POP  HL
003350 311                  2870         RET
003351                      2880 *
003351                      2890 * UPDATE OUTPUT'S DIRECT.
003351                      2900 *
003351 072 037 006          2910 FINISH  LD   A,(OUTDEV)
003354 376 004              2920         CP   4
003356 322 000 001          2930         JP   NC,PIP
003361 315 257 341          2940         CALL READIR
003364 315 037 005          2950         CALL SETBUF
003367 041 000 007          2960         LD   HL,LENBUF
003372 042 030 006          2970         LD   (LBPNTR),HL
003375 315 046 005          2980 FNSHUP  CALL GETNAM
004000 072 240 346          2990         LD   A,(NAME)
004003 267                  3000         OR   A
004004 312 034 004          3010         JP   Z,DONE
004007 052 030 006          3020         LD   HL,(LBPNTR)
004012 136                  3030         LD   E,M
004013 043                  3040         INC  HL
004014 126                  3050         LD   D,M
004015 043                  3060         INC  HL
004016 042 030 006          3070         LD   (LBPNTR),HL
004021 041 240 346          3080         LD   HL,NAME
004024 172                  3090         LD   A,D
004025 263                  3100         OR   E
004026 304 345 342          3110         CALL NZ,CLOSE
004031 303 375 003          3120         JP   FNSHUP
004034 315 345 341          3130 DONE    CALL WRTDIR
004037 303 000 001          3140         JP   PIP
004042                      3150 *
004042                      3160 * ERROR HANDLERS
004042                      3170 *
004042 041 050 004          3180 NOTFND  LD   HL,NFDMSG
004045 303 162 004          3190         JP   ERRHN2
004050                      3200 NFDMSG  DW   '-NOT FOUND'
 255 316 317 324 240
 306 317 325 316 304

004062 015 000              3210         DW   000015
004064 041 072 004          3220 NOSPAC  LD   HL,SPCMSG
004067 303 162 004          3230         JP   ERRHN2
004072                      3240 SPCMSG  DW   '-NO SPACE'
 255 316 317 240 323
 320 301 303 305
004103 016 000              3250         DW   000016
004105 041 113 004          3260 RERROR  LD   HL,RERMSG
004110 303 135 004          3270         JP   ERRHAN
004113                      3280 RERMSG  DW   '-READ ERROR'
 255 322 305 301 304
 240 305 322 322 317
 322
004126 014 000              3290         DW   000014
```

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004130 321                  3300 WERROR POP  DE
004131 321                  3310        POP  DE
004132 041 174 004          3320        LD   HL,WERMSG
004135 345                  3330 ERRHAN PUSH HL
004136 052 032 006          3340        LD   HL,(RECBLK)
004141 042 265 345          3350        LD   (IDW),HL
004144 041 240 346          3360        LD   HL,NAME
004147 315 143 342          3370        CALL LOOKUP
004152 052 034 006          3380        LD   HL,(FREE)
004155 031                  3390        ADD  HL,DE
004156 042 034 006          3400        LD   (FREE),HL
004161 341                  3410        POP  HL
004162 315 210 343          3420 ERRHN2 CALL EDITOR
004165 321                  3430        POP  DE
004166 021 000 000          3440        LD   DE,0
004171 303 201 003          3450        JP   DNFILE
004174                      3460 WERMSG DW   '-WRITE ERROR'
 255 327 322 311 324
 305 240 305 322 322
 317 322
004210 013 000              3470        DW   000013
004212 041 314 004          3480 DEVNOS LD   HL,DV1MSG
004215 315 210 343          3490        CALL EDITOR
004220 016 010              3500        LD   C,10
004222 315 013 005          3510        CALL RDEVNM
004225 062 036 006          3520        LD   (INDEV),A
004230 076 021              3530        LD   A,21
004232 315 234 343          3540        CALL MLTSPC
004235 072 036 006          3550        LD   A,(INDEV)
004240 376 004              3560        CP   4
004242 322 134 005          3570        JP   NC,USERIN
004245 041 334 004          3580        LD   HL,DV2MSG
004250 315 210 343          3590        CALL EDITOR
004253 016 010              3600        LD   C,10
004255 315 013 005          3610        CALL RDEVNM
004260 062 037 006          3620        LD   (OUTDEV),A
004263 076 060              3630        LD   A,60
004265 315 234 343          3640        CALL MLTSPC
004270 072 037 006          3650        LD   A,(OUTDEV)
004273 376 004              3660        CP   4
004275 330                  3670        RET  C
004276 306 020              3680        ADD  20
004300 315 120 341          3690        CALL OVRLAY
004303 072 001 347          3700        LD   A,(347001)
004306 346 001              3710        AND  1
004310 312 354 004          3720        JP   Z,BADUSR
004313 311                  3730        RET
004314 377                  3740 DV1MSG DB   377
004315                      3750        DW   'INPUT DEVICE? '
 311 316 320 325 324
 240 304 305 326 311
 303 305 277 240
004333 000                  3760        DB   0
004334                      3770 DV2MSG DW   'OUTPUT DEVICE? '
 317 325 324 320 325
 324 240 304 305 326
 311 303 305 277 240
004353 000                  3780        DB   0
004354 041 362 004          3790 BADUSR LD   HL,BDVMSG
004357 303 015 006          3800        JP   FTLERR
```



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004362                      3810 BDVMSG DW   'INCORRECT DEVICE HANDLER'
 311 316 303 317 322
 322 305 303 324 240
 304 305 326 311 303
 305 240 310 301 316
 304 314 305 322
005012 000                  3820        DB   0
005013 315 115 005          3830 RDEVNM CALL KEYCHK
005016 326 260              3840        SUB  260
005020 107                  3850        LD   B,A
005021 332 013 005          3860        JP   C,RDEVNM
005024 271                  3870        CP   C
005025 322 013 005          3880        JP   NC,RDEVNM
005030 306 260              3890        ADD  260
005032 315 202 343          3900        CALL TV
005035 170                  3910        LD   A,B
005036 311                  3920        RET
005037                      3930 *
005037                      3940 * NAME BUFFER ROUTINES
005037                      3950 *
005037 041 000 010          3960 SETBUF LD   HL,NAMBUF
005042 042 026 006          3970        LD   (NBPNTR),HL
005045 311                  3980        RET
005046 052 026 006          3990 GETNAM LD   HL,(NBPNTR)
005051 021 240 346          4000        LD   DE,NAME
005054 315 102 005          4010        CALL MOVNAM
005057 042 026 006          4020        LD   (NBPNTR),HL
005062 311                  4030        RET
005063 052 026 006          4040 PUTNAM LD   HL,(NBPNTR)
005066 021 240 346          4050        LD   DE,NAME
005071 353                  4060        EX   DE,HL
005072 315 102 005          4070        CALL MOVNAM
005075 353                  4080        EX   DE,HL
005076 042 026 006          4090        LD   (NBPNTR),HL
005101 311                  4100        RET
005102 016 010              4110 MOVNAM LD   C,10
005104 176                  4120        LD   A,M
005105 022                  4130        LD   (DE),A
005106 043                  4140        INC  HL
005107 023                  4150        INC  DE
005110 015                  4160        DEC  C
005111 302 104 005          4170        JP   NZ,MOVNAM+2
005114 311                  4180        RET
005115 315 152 343          4190 KEYCHK CALL KEY
005120 376 233              4200        CP   233
005122 312 000 340          4210        JP   Z,PHIMON
005125 376 277              4220        CP   '?'
005127 300                  4230        RET  NZ
005130 341                  4240        POP  HL
005131 303 000 001          4250        JP   PIP
005134                      4260 *
005134                      4270 * USER HANDLER INPUT
005134                      4280 *
005134 306 020              4290 USERIN ADD  20
005136 315 120 341          4300        CALL OVRLAY
005141 072 001 347          4310        LD   A,(347001)
005144 346 002              4320        AND  2
005146 312 354 004          4330        JP   Z,BADUSR
005151 041 334 005          4340        LD   HL,DV3MSG
005154 315 210 343          4350        CALL EDITOR
005157 016 004              4360        LD   C,4
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005161 315 013 005          4370        CALL RDEVNM
005164 062 037 006          4380        LD   (OUTDEV),A
005167 076 016              4390        LD   A,16
005171 315 234 343          4400        CALL MLTSPC
005174 072 037 006          4410        LD   A,(OUTDEV)
005177 315 257 341          4420        CALL READIR
005202 041 356 005          4430        LD   HL,NFNMSG
005205 315 210 343          4440        CALL EDITOR
005210 041 340 346          4450        LD   HL,LINBUF
005213 026 252              4460        LD   D,'*'
005215 315 301 340          4470        CALL LINEIN
005220 043                  4480        INC  HL
005221 176                  4490        LD   A,M
005222 376 277              4500        CP   '?'
005224 312 000 001          4510        JP   Z,PIP
005227 315 103 343          4520        CALL DONAME
005232 315 101 342          4530        CALL PRNAME
005235 041 000 014          4540        LD   HL,BUFFER
005240 072 251 346          4550        LD   A,(DIRBUF+1)
005243 224                  4560        SUB  H
005244 107                  4570        LD   B,A
005245 016 000              4580        LD   C,0
005247 315 202 347          4590        CALL 347202
005252 267                  4600        OR   A
005253 302 376 005          4610        JP   NZ,INERR
005256 013                  4620        DEC  BC
005257 004                  4630        INC  B
005260 117                  4640        LD   C,A
005261 130                  4650        LD   E,B
005262 121                  4660        LD   D,C
005263 325                  4670        PUSH DE
005264 305                  4680        PUSH BC
005265 315 136 342          4690        CALL ENTRY
005270 332 004 006          4700        JP   C,NOSPC2
005273 041 000 014          4710        LD   HL,BUFFER
005276 042 267 345          4720        LD   (PNTRW),HL
005301 341                  4730        POP  HL
005302 315 700 344          4740        CALL RECORD
005305 267                  4750        OR   A
005306 302 012 006          4760        JP   NZ,CUTERR
005311 041 240 346          4770        LD   HL,NAME
005314 321                  4780        POP  DE
005315 315 345 342          4790        CALL CLOSE
005320 041 223 003          4800        LD   HL,COPMSG
005323 315 210 343          4810        CALL EDITOR
005326 315 345 341          4820        CALL WRTDIR
005331 303 000 001          4830        JP   PIP
005334                      4840 DV3MSG DW   'OUTPUT PHI-DECK? '
 317 325 324 320 325
 324 240 320 310 311
 255 304 305 303 313
 277 240
005355 000                  4850        DB   0
005356                      4860 NFNMSG DW   'NEW FILE NAME?'
 316 305 327 240 306
 311 314 305 240 316
 301 315 305 277
005374 022 000              4870        DW   000022
005376 041 113 004          4880 INERR  LD   HL,RERMSG
006001 303 015 006          4890        JP   FTLERR
006004 041 072 004          4900 NOSPC2 LD   HL,SPCMSG
```



```
006007 303 015 006          4910        JP   FTLERR
006012 041 174 004          4920 OUTERR LD   HL,WERMSG
006015 315 210 343          4930 FTLERR CALL EDITOR
006020 315 152 343          4940        CALL KEY
006023 303 000 001          4950        JP   PIP
006026                      4960 *
006026                      4970 * PIP STORAGE
006026                      4980 *
006026 000 000              4990 NBPNTR DW   000000
006030 000 000              5000 LBPNTR DW   000000
006032 000 000              5010 RECBLK DW   000000
006034 000 000              5020 FREE   DW   000000
006036 000                  5030 INDEV  DB   0
006037 000                  5040 OUTDEV DB   0
006040 000                  5050 CNTBLK DB   0
006041 000                  5060 QRMODE DB   0
006042 000                  5070 INITFG DB   0
006043                      5080        ORG  007000
007000                      5090 LENBUF DS   001000
010000                      5100 NAMBUF DS   004000
014000                      5110 BUFFER EQU  $
```

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