Sydex

TELEDISK

A Diskette Transmission Protocol

TELEDISK - A DISKETTE TRANSMISSION PROTOCOL

Version 1.05 - September, 1988

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We offer several inducements to you for registering. First of all, you receive the most up-to-date copy of the program that we have--and we do update the product on a regular basis. You also receive support for TELEDISK--which can be quite valuable at times. And finally, we include a few utilities not included in the evaluation package. Make no mistake however--we do not "cripple" our evaluation software--our sample programs are fully functional and complete.

REGISTRATION INFORMATION

The non-commercial single-user registration fee for TELEDISK is $20.00 US. The commercial and multisystem site fee is $50.00 for TELEDISK.

Send a check or company P.O. for the appropriate amount to:

SYDEX
153 North Murphy Ave.
Sunnyvale, CA 94086

Please indicate what product you are ordering and if you have a requirement for 3.5" media. We normally ship 5" 360K diskettes, but we will furnish 3" 720K media upon request.

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TELEDISK At a Glance

WHAT IT IS--

TELEDISK is a utility which will convert any diskette into a file and vice-versa. The diskette need not be a DOS diskette; certain types of "copy-protected" diskettes are also handled. The result is an exact copy of the original diskette. The file produced by TELEDISK is compressed to minimal size and is handled by most telecommunications file transfer protocols, including Kermit and XMODEM.

HOW TO USE IT--

The program file is named **TELEDISK.EXE**; no other files are needed. TELEDISK is menu-driven; to begin, use the DOS command -

TELEDISK

If the display is unreadable, use -

TELEDISK M

Follow the directions on the menus; press the **F1** key for online help. The **ESCape** key is used to terminate the current activity. If you are using a diskette-only system, you should have one or two blank, formatted diskettes to hold output file which **TELEDISK** produces. It's good practice to write-protect the source (original) diskette when you are making a file from it using **TELEDISK**.

All **TELEDISK** files have an filename extension (type) of **TD0** through **TD9**.

For detailed information, consult the rest of this document.

What Is TELEDISK And What Does It Do?

Sydex develops software and we also carry out support activities for that software. Part of any "bug hunting" operation is the task of duplicating problems. And part of duplicating problems is obtaining the necessary supporting materials.

If "supporting materials" means only one or two files, obtaining them is easy - just upload them via a modem and a communications package. If, however, the supporting material takes the form of many files in several directories, getting the information over a telephone line tends to be quite an operation. Our only viable response in such a case had been "Can you Fed Ex it to us?". Clearly, something better was warranted.

And so **TELEDISK** was born. This utility allows you to take a diskette and convert it into a file. You can then transmit this file using your favorite communications program and again use **TELEDISK** to reconstruct an *exact copy* of the diskette from that file. No muss, no fuss - and very easy to use.

Some applications immediately suggest themselves:

* "No brainer" file transmission. Just send the whole diskette without worrying about getting all the right files.

* Preservation of disk directory entries, including hidden, read-only and system files, as well as volume labels and directories.

* Transmit diskettes complete with boot sectors.

* Transfer "foreign" diskette formats - an answer to how to send a diskette from, say, a Wang word processor over the phone lines.

* If diskette image files are placed on a hard disk, they can be saved on a streamer tape backup unit.

* Now, **this** one isn't obvious... But, since **TELEDISK** makes a file from a diskette, this file can be used to obtain data from foreign formats. The layout of a **TELEDISK** output file will be presented later on in this document.

Something needs to be said about "copy protected" diskettes. It is not the intent of Sydex or **TELEDISK** to encourage copyright violation by making it easier to transmit "copy protected" diskettes. It is true that **TELEDISK** will handle a number of copy protection schemes, resulting in a faithful reproduction of the original; however, this is a necessary "side

effect" of the basic operation of **TELEDISK**. Please note that most commercial software agreements do not authorize you to redistribute copyrighted material to third parties, and that by doing so, you may be held in violation of U.S. copyright law, as well as being liable for civil damages.

TELEDISK has a number of interesting features:

* The ability to copy one or both sides of a diskette.

* The ability to copy just the diskette sectors allocated by DOS.

* Optional use of an "advanced" data compression algorithm (Lempel-Zev) to produce minimal file size.

* Automatic "splitting" of files across several diskettes if necessary. This is essential for diskette-only systems.

* Menu-driven with online help screens.

* Support of low-density (180K and 360K) formats as well as high-density (1.2M and 1.44M) formats.

To use **TELEDISK**, you'll need at least 256K of memory and one diskette drive. For high-density diskette support, you'll need an PC AT-type machine or an upper-level IBM PS/2 system.

Getting Started With TELEDISK

The whole of **TELEDISK** is contained in the file TELEDISK.EXE; no other files are required. To start **TELEDISK**, simply enter

TELEDISK

at the DOS command prompt. If your computer has a color display adapter, **TELEDISK** will make use of color in its displays. If you have a monochrome display connected to a CGA or EGA, you'll probably want to suppress color selection by invoking **TELEDISK** with

TELEDISK M

After a sign-on display, you'll be presented with the following opening menu:

```
╔══════════════════════════ Teledisk Ver. 1.05══════════════════════════╗
║                      Copyright 1988, Sydex, C. P. Guzis                ║
║                          Press ESCape to exit                         ║
╚═══════════════════════════════════════════════════════════════════════╝

╔═══════════════════════════ OPERATOR MESSAGES ═════════════════════════╗
║  Select Function - ESCape to quit, F1 for help                        ║
╚═══════════════════════════════════════════════════════════════════════╝

╔═══════════════════════════════════════════════════════════════════════╗
║                                                                       ║
║                             MAIN MENU                                 ║
║                                                                       ║
║                                                                       ║
║        Select function with cursor keys.   ENTER (◄─┘) confirms       ║
║        your choice and goes to next menu.  F1 gets help, ESCape exits ║
║        to DOS.                                                        ║
║                                                                       ║
║                                                                       ║
║         Copy Disk to File     Copy File to Disk     Copy Disk to Disk ║
║                                                                       ║
║                                                                       ║
║                                                                       ║
║                                                                       ║
╚═══════════════════════════════════════════════════════════════════════╝
```

The actual display will appear to be slightly different from that which is presented here; the restrictions of a printed page do not allow entirely accurate reproduction.

Observe that the F1 key is *always* the key to press to get help. In addition, the ESCape key will generally terminate the current operation and return to the previous display.

To make a file from a diskette, use the cursor keys to position the blinking area to **Copy Disk to File** and press the **ENTER** key. To recreate a diskette from a file, use the cursor keys to position the blinking area to **Copy File to Disk** and press the **ENTER** key.

The choice **Copy Disk to Disk** is the equivalent of a **Copy Disk to File** followed by a **Copy File to Disk** using the same file; no file is actually created, however.

After selecting the function to be performed by **TELEDISK**, a sub-menu will be displayed for selection of various additional operating parameters. Each sub-menu and the operation of each function are discussed in the sections which follow.

Copying From A Diskette To A File

If the **Copy Disk to File** operation was selected, a second menu appears:

```
═══════════════════════ Teledisk Ver. 1.05═══════════════
               Copyright 1988, Sydex, C. P. Guzis
                     Press ESCape to exit

══════════════════════ OPERATOR MESSAGES ═══════════════
 Select Function - ESCape to quit, Fl for help
```

```
                        COPY DISK TO FILE

    Select choices with cursor keys.  Move between lines with up/down
    keys.  ENTER (←┘) begins execution.  Fl gets help, ESCape goes
    back to the opening menu.

    Source Diskette Drive                         A:  B:  C:  D:

    Check Diskette for Data                     Both Sides   One Side

    Read Which Sectors                          All   DOS Allocated

    Data compression method                       Normal    Advanced
```

Source Diskette Drive refers to where the diskette data is coming from. If you've added a diskette drive to your computer and it's not addressed by the drive letters A-D, consult the section titled **Accessing Other Diskette Drives.**

The drive to be used to read the source diskette is selected with the right- and left-arrow cursor keys. This drive may also be used for the resulting output file - a prompt will be issued when diskettes need to be switched.

Check Diskette for Data has meaning only if the diskette is *not* a DOS diskette and **DOS Allocated** under **Read Which Sectors** has been selected. If **Both Sides** is selected, both sides of the diskette are inspected for data. If only one side is found to contain data, then only that side is examined. If **One Side** is selected, the second surface of the diskette will not be examined. This feature is useful when a single-sided diskette has been copied to a diskette which has had both sides formatted.

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Read Which Sectors determines how the source diskette data is interpreted. If **All** is selected, no interpretation of the diskette is attempted, and all sectors on the diskette are recorded verbatim. If **DOS Allocated** is selected, an attempt will be made to recognize the diskette as having one of the standard DOS formats. If the diskette does, in fact, contain a recognizable DOS file structure, then only those sectors actually belonging to data files will be recorded.

Data Compression Method determines how much effort should be spent "squeezing" the diskette file to its smallest representation. **Normal** causes simple repeated-byte compression to be used and operates quite rapidly. **Advanced** compression make use of Lempel-Zev compression in addition to repeated-byte compression. Advanced compression is somewhat slower than normal compression, particularly on XT-class computers, but typically results in an output file size 30-40 percent smaller than that achieved with normal compression only.

After the appropriate selections have been made, the **ENTER** key is pressed and a prompt appears for the name of the file to which the diskette information will be written. If the file name supplied contains an extension, that extension will be ignored. All **TELEDISK** files are initially created with an extension of **TD0**.

If an output file is created on a diskette and the diskette has insufficient room to hold the entire initial **TD0** file, **TELEDISK** prompts for another diskette and creates a new file with a **TD1** name extension. This process continues from diskette to diskette until the **Copy Disk to File** operation is complete.

If such a *multi-volume* file is used when a **File to Disk** operation is performed, **TELEDISK** will prompt for each diskette as it is required. If all volumes were copied to a hard disk, no prompting is performed.

After the file name has been entered and **TELEDISK** has succeeded in creating the file, the operating display appears and **TELEDISK** proceeds with the copy operation.

Copying From A File To A Diskette

If **Copy File to Disk** is selected on the main menu, the following display is presented:

```
╔══════════════════ Teledisk Ver. 1.05 ══════════════════╗
║              Copyright 1988, Sydex, C. P. Guzis          ║
║                    Press ESCape to exit                  ║
╚══════════════════════════════════════════════════════════╝

╔══════════════════ OPERATOR MESSAGES ═══════════════════╗
║ Select Function - ESCape to quit, F1 for help            ║
╚══════════════════════════════════════════════════════════╝

╔══════════════════════════════════════════════════════════╗
║                                                          ║
║                   COPY FILE TO DISK                      ║
║                                                          ║
║     Select choice with cursor keys.  ENTER (←┘) begins   ║
║     execution.  F1 gets help, ESCape goes back to the opening menu. ║
║                                                          ║
║                                                          ║
║     Destination Diskette Drive          A:  B:  C:  D:   ║
║                                                          ║
║                                                          ║
║                                                          ║
║                                                          ║
║                                                          ║
╚══════════════════════════════════════════════════════════╝
```

Here, only the drive to receive the diskette copy is selected. Once **ENTER** is pressed, a prompt for the name of the source file is displayed. A file extension of **TD0** is assumed by **TELEDISK** for all files. If the **ENTER** key is pressed in lieu of a file name, the following display appears:

```
┌══════════════════════ Teledisk Ver. 1.05═══════════════════════┐
│                Copyright 1988, Sydex, C. P. Guzis               │
│                    Press ESCape to exit                         │
└════════════════════════════════════════════════════════════════┘

┌══════════════════════ OPERATOR MESSAGES ═══════════════════════┐
│        F1 - Help, F2 - New path, ENTER - Select file, ESC - Exit │
└════════════════════════════════════════════════════════════════┘

┌══════════════════════ FILE SELECTION ══════════════════════════┐
│                                                                 │
│   Select file name with cursor keys.  Press ENTER (←─┘) to      │
│   confirm your selection.  Press F2 to specify a new drive/path.│
│   ESCape exits without selecting; F1 gets help.                 │
│                                                                 │
│       Current path: C:\WORKDIR                                  │
│                                                                 │
│                                                                 │
│   ONE        TWO        THREE                                    │
│                                                                 │
│                                                                 │
│                                                                 │
│                                                                 │
│                                                                 │
└════════════════════════════════════════════════════════════════┘
```

This display shows all files with the extension **TD0** and allows selection of one by use of the cursor keys. Pressing the **ENTER** key confirms the selection and recreation of the original source diskette will begin. If the **F2** key is pressed, a prompt appears for the name of a new drive and directory for this display. If ESCape is pressed, the original **Copy File to Disk** display will be shown.

Copying From A Diskette To A Diskette

As mentioned earlier, this option is the logical equivalent of performing a **Disk to File** operation, followed by a **File to Disk**. However, no intermediate file is created. The menu for this function appears as follows:

```
╔══════════════════ Teledisk Ver. 1.05 ══════════════════╗
║             Copyright 1988, Sydex, C. P. Guzis          ║
║                    Press ESCape to exit                 ║
╚═════════════════════════════════════════════════════════╝

╔═══════════════════ OPERATOR MESSAGES ═══════════════════╗
║ Select Function - ESCape to quit, Fl for help           ║
╚═════════════════════════════════════════════════════════╝

╔═════════════════════════════════════════════════════════╗
║                                                         ║
║                   COPY DISK TO DISK                     ║
║                                                         ║
║   Select choices with cursor keys.  Move between lines with up/down ║
║   keys.  ENTER (◄──┘) begins execution.  Fl gets help, ESCape ║
║   goes back to the opening menu.                        ║
║                                                         ║
║      Source Diskette Drive              A:  B:  C:  D:  ║
║                                                         ║
║      Destination Diskette Drive         A:  B:  C:  D:  ║
║                                                         ║
║      Check Diskette for Data          Both Sides   One Side ║
║                                                         ║
║      Read Which Sectors                All   DOS Allocated ║
║                                                         ║
╚═════════════════════════════════════════════════════════╝
```

Source Diskette Drive specifies which drive is to contain the original for the copy operation; **Destination Diskette Drive** specifies the drive to receive the copy. The same drive may be selected for both; **TELEDISK** will prompt for the correct diskette when required.

Check Diskette for Data and **Read Which Sectors** are the same as the options of the same name described in **Copy Disk to File** earlier.

The Operating Display

After the operating function and its parameters have been selected, the following display appears:

```
========================= Teledisk Ver. 1.05=========
|| Copyright 1988, Sydex, C. P. Guzis                ||
||               Press ESCape to exit                ||
========================================================

========================= OPERATOR MESSAGES ==========
|| Reading Drive B:, Cylinder 4, Side 0              ||
========================================================
```

```
    |   |   |   |   |   |   |   |
0      10      20      30      40      50      60      70
```
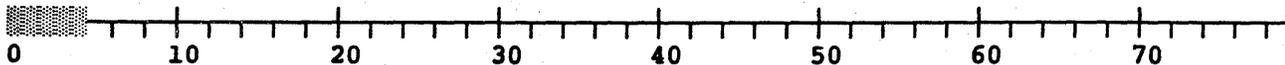
```
============ GENERAL INFO ======        ======= ANALYSIS INFO ======
||                            ||        ||                         ||
|| Double-Sided               ||        ||                         ||
|| Interleave is 1:1          ||        ||                         ||
|| Sector size is 512 bytes   ||        ||                         ||
|| Side 0 sector ID's 1 - 9   ||        ||                         ||
|| Side 1 sector ID's 1 - 9   ||        ||                         ||
||                            ||        ||                         ||
||                            ||        ||                         ||
||                            ||        ||                         ||
|| Low-density MFM disk in HD 3½" drive ||  ||                     ||
============================            ==============================
```

Notice the "thermometer" at about the middle of the display. **TELEDISK** uses a "bar" in-
dicator as the operation proceeds to give an idea of the progress of the operation. The
numbers on the "thermometer" correspond to diskette track numbers. A 360K diskette con-
tains 40 tracks; 720K, 1.2M and 1.44M all contain 80 tracks. Thus, if the thermometer bar
indicates **20** on a 1.2M diskette, the operation is about one-quarter complete.

All prompts for disk changes, as well as general progress messages are displayed in the
OPERATOR MESSAGES window. Messages requiring action are displayed in high-
intensity, blinking characters.

The **GENERAL INFO** display tells what was discovered during the course of analyzing the
diskette, or from reading the file from which a diskette is to be produced. A note is made of
the following:

*   Single- or Double-sided diskette

*   Diskette density

*   Data compression method used

*   Sector address range on each side

The **ANALYSIS INFO** display presents a running narration of operation. The display scrolls as it becomes filled and provides a track and side "tag" for each item of information displayed.

When the selected copy operation is complete, a prompt is displayed in the **OPERATOR MESSAGES** window. Pressing any key at this point will cause the opening menu to be displayed.

Accessing Other Disk Drives

TELEDISK obtains the number of diskette drives from the information furnished by the computer's ROM BIOS. How the ROM BIOS gets this information depends on the machine type. On XT-type machines, the number of drives is set by two DIP switch positions on the motherboard. On AT-class machines, the number of drives is set via the SETUP program and stored in battery-backed RAM.

A computer may have an added diskette drive that is not visible to the ROM BIOS, but is accessed by a special device driver (most commonly DRIVER.SYS). In this case the ROM BIOS will return too small a number for the total drive count.

TELEDISK may be informed of the total number of drives on a computer by having this number specified on the command line. For example, a command of the form:

         TELEDISK 3

informs **TELEDISK** that three diskette drives are present. Rather than refer to them as *A:*, *B:* and *C:*, **TELEDISK** refers to these drives by their *physical* unit numbers, or *0, 1*, and *2*.

CAUTION! When specifying the number of drives *do not allow the source and destination of a copy operation to share the same unit!* **TELEDISK** has no certain way of determining which drive letter (A:, B:, etc.) corresponds to a physical unit (0, 1, etc). *If you are uncertain about your operating procedure, write-protect your source diskette!*

The monochrome display option may be specified along with the number of drives by simply placing the "M" for monochrome and the number of drives together:

TELEDISK 4M

or alternately,

TELEDISK M4

Structure Of The TELEDISK *TDn* Files

The first file of a **TELEDISK** series has, as its file name extension, **TD0**. A subsequent file will have the extension **TD1**, and so on.

Every **TELEDISK** data file has a header of the following form:

File Identification, 2 bytes, with a value of 'TD' if normal data compression was used to write it, or 'td' if advanced data compression was used.

Volume Sequence, 1 byte, the first volume is volume 0.

Check Signature, 1 byte. This is a unique signature common to all files in a sequence. That is, the headers for a **TD0**, **TD1**, **TD2** sequence would all have this same check signature byte.

Version number, 1 byte. Version of **TELEDISK** used to create this file. A decimal value of 10 would signify version 1.0, 11 would signify version 1.1 and so on...

Source Density, 1 byte. Recording density of source drive; 0 = 250K bps, 1 = 300K bps, 2 = 500K bps. If this was a single-density FM diskette, this number is biased by 128.

Drive Type, 1 byte. Type of source drive. 1 = 360K, 2 = 1.2M, 3 = 720K, 4 = 1.44M. Note that the actual media size is not recorded; thus type 3 may be either 5.25" or 3.5" media.

Track Density, 1 byte. Track density of source drive in relation to source media. 0 = source density matches media density. 1 = double density media in quad density drive. 2 = quad density media in double density drive.

DOS Mode, 1 byte. Nonzero if source diskette was analyzed according to DOS allocation.

Media surfaces, 1 byte. 1 = single-sided media, 2 = double-sided media.

Header CRC, 2 bytes. A 16 bit CRC for this header.

After the header, the diskette structure information and sector data follows. If advanced data compression was used to produce this file, the information appears in 6,144 byte blocks of 12 bit Lempel-Zev code. Each block is preceded by a 2 byte CRC and a 2 byte code packet count (one packet = 12 bits).

The information for each track (or surface) is prefixed by a header of the following format:

Sector count, 1 byte. How many sectors are contained on the current track. If this is the end of the data file, this field is set to 255.

Physical cylinder, 1 byte. The *physical* position of the source drive head when this track was read.

Physical side, 1 byte. The *actual* surface (0 or 1) of the diskette on which this track occurred.

CRC check byte, 1 byte. A CRC checksum of the preceding 3 bytes.

After each track header, there follows a list of sector headers. Each sector header is of the following format:

Cylinder, 1 byte. The cylinder number of this sector as it appeared in the ID address field.

Side, 1 byte. The side code of this sector as it appeared in the ID address field.

Sector number, 1 byte. The sector number of this sector as it appeared in the ID address field.

Sector length code, 1 byte. The length code (0 = 128 bytes, 1 = 256 bytes, etc.) of this sector as it appeared in the ID address field.

Syndrome flags, 1 byte. Flags indicating various conditions of the sector data field, namely,

1 - This sector number occurred more than once on this track.

2 - A data CRC error occurred when this sector was read.

4 - A deleted data control mark was present for this sector.

16 - A DOS sector copy was requested; this sector was not allocated. In this case, no sector data follows this header.

32 - This sector's data field is missing; no sector data follows this header.

64 - No ID address field was present for this sector, but there is a data field. The sector information in the header represents fabricated information.

Sector CRC, 2 bytes. A CRC checksum of the sector header information as well as the sector data which follows.

If present, (see the syndrome flags above) the data for the current sector follows the header. Note that this data is also included in the CRC checksum in the header.

Problems And Limitations

TELEDISK has been tested on several different classes of PC compatibles and should provide satisfactory operation. However, there are some known potential problem areas:

PC Compatibility - TELEDISK depends on a standard PC environment for operation. TELEDISK will *not* function with PC incompatibles such as the Tandy 2000, Heath/Zenith Z-100 or AT&T 7300. TELEDISK supports Monochrome, CGA, EGA and VGA display adapters.

High-Density Formats - TELEDISK requires an PC-AT class of machine to make use of the high density (1.2M and 1.44M) diskette formats. The IBM PS/2 models 50 through 80 satisfy this criterion also. PC-XT-type machines with high-density controllers will operate in low-density mode only.

Other formats - When directed to copy DOS allocated sectors, **TELEDISK** examines the first sector of the diskette. If a boot sector with a valid Disk Parameter Block is present, the parameters contained within the boot sector are used. If no valid boot sector is found, the second sector of the diskette is read to find a valid File Allocation Table (FAT). If none is found, a non-DOS copy is performed.

Copy Protection - **TELEDISK** makes an "intelligent" guess when confronted with unusual track configurations. Copy protection schemes using the "super-sector" method will not be reproduced accurately by **TELEDISK**; the PC disk controller makes this impossible.

Revision Record

Version 1.0 - April 1988, Initial release.
Version 1.01 - May 1988, Cleaned up help screens, added single- density (FM) mode.
Version 1.02 - May 1988, Check sector 0 for DPB, faster track scan algorithm.
Version 1.04 - August 1988, Corrected PC-AT BIOS reset problem.
Version 1.05 - September 1988, Fixed problem of 360K created on a 1.2M drive, but reconstructed on a 360K drive.

Other Sydex Products

CON>FORMAT -- Concurrent "background" diskette formatter. Features "pop-up" operation and "hot key" activation. You've got to see it to believe. Supports all current DOS formats. $15.00 ($50.00 site) registration fee.

22DISK -- Transfer files, format, examine and erase files on "foreign" CP/M diskettes on your PC. Includes tips on supporting 8" and 5.25" single-density diskettes. Contains definitions for over 200 different formats. $15.00 ($40.00 site) registration fee.

22NICE -- A CP/M 2.2 emulation package. Supports the NEC V-series chips or performs emulation by software for both the 8080 and Z80 processors. Includes terminal emulation and diskette handling for common CP/M systems. Includes 22DISK. $30.00 ($75.00 site) registration fee.

ANADISK -- The compleat diskette utility. Nothing like it anywhere else; scan, edit, repair and copy just about any kind of diskette. $15.00 ($50.00 site) registration fee.

COPYQM -- Mass diskette duplicator. Format, copy and verify multiple diskettes from a single master. Implements "no keyboard" interaction mode and drive "round robin" servicing. Supports all standard DOS formats. $15.00 ($50.00 site) registration fee.

FORMATQM -- Mass diskette formatter - format a box of diskettes at a single sitting. Implements "no keyboard" interaction mode and drive "round robin" servicing. Supports all standard DOS formats. $10.00 ($40.00 site) registration fee.

RETAIL SOFTWARE

SIM-CGA 4.2 -- Color Graphics Adapter simulation on monochrome (Hercules-compatible) graphics-equipped machines. Available from better software retailers and distributed by CSS, ABCO and American Software Distributors.

SIM-EMS -- Simulate Lotus/Intel/Microsoft Expanded Memory on PC-AT class machines. Conforms to EMS 4.0 specification. Distributed by CSS and ABCO.

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