Front Cover, to be replaced by Mac version

KERMIT NEWS

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DRAFT

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EDITOR'S NOTES

Christine Gianone
Columbia University, New York City

Kermit Distribution at Columbia University, and all around the world is, after 6 years, continuing to grow at a steady pace. There are currently Kermit versions available for nearly 300 machines and operating systems, and hundreds of versions are under development. Our complete distribution now requires five 2400-foot 9-track magnetic tapes (about 60 Megabytes of source code and documentation).

Kermit has been shipped to each of the 50 states in the US and to more than 60 countries around the world. Although Columbia University Center for Computing Activities has the most complete and up-to-date Kermit versions, we do not have many of the computers on-site and cannot provide Kermit to users on native media. We urge people to volunteer to distribute diskettes or submit a version to a local user group and to inform us so that we can help others bypass the tedious bootstrapping procedures.

Kermit has always been a voluntary effort, shared with prices to reflect distribution costs. Please help us to continue this valuable service.

Kermit in Print

The book *Kermit, A File Transfer Protocol*, by Frank da Cruz, Digital Press (1987), has been a success in its first year of publication, and is already into its third printing. Unlike the Kermit manuals, the Kermit book provides background, motivation, and history, plus tutorials in computers, file systems, and data communication, including hints on cable building and troubleshooting. There are numerous tables, figures, and illustrations, plus a glossary and an index. The book also includes a Kermit command reference and the complete Kermit protocol specification, with programming examples.

And be sure to look for our article, *Evaluating RS-232 Communications Packages*, in a forthcoming issue of Data Communications Magazine.

Kermit Competes

Kermit was selected as one of the 11 finalists for the First Andrew Fluegelman Award. The award is given for ‘‘a substantial, innovative contribution to the personal computer community in commercial, shareware, or public domain software’’. Established in 1986 by PCW Communications Inc., the award commemorates Fluegelman's contributions to the software field. Fluegelman developed PC Talk, ‘‘the first easy-to-use and powerful communications program for the PC’’. The annual award is made possible through a fund which was established after his death in July, 1985. The award was granted to Tom Jennings' FIDO, a bulletin board and mail system which includes the Kermit protocol.

Kermit at DECUS Symposia

Kermit: Current Status, Future Directions, was the title of the session conducted by myself at the Nashville Digital Equipment Corporation User Society (DECUS) Symposium, which was attended by approximately 500 people. The session began with some Kermit history, an overview of computer networks from which Kermit files can be obtained, and how to get these Kermit versions from Columbia by mail order. The current status of Kermit distribution and development was discussed, and details about a number of particular Kermit programs of special interest to DECUS attendees were addressed. Arrangements were made for the authors of some of the most popular Kermit versions to be given the platform as guest speakers. Frank da Cruz (who was greeted with quite a reception) discussed DEC-20 and UNIX Kermits, and some Kermit performance issues. Professor Joe Doupnik of Utah State University discussed the new release of MS-DOS Kermit (2.30), which he had been working on for nearly a year. Brian Nelson of the University of Toledo (who had previously given a ‘‘Getting Started with Kermit’’ session) discussed his PDP-11 Kermit. And Bob McQueen of Stevens Institute of Technology, talked briefly about VAX/VMS Kermit. The session concluded with a question-and-answer period, and much interest in continuing Kermit sessions at future DECUS symposia.

At press time, Frank and I are off to Tokyo at the invitation of Japan DECUS to conduct Kermit presentations and courses, November 18-20. Even though Kermit has become an international language in its own right, we will still have to speak through an interpreter.

Kermit presentations are also planned for the Spring US DECUS Symposium in Cincinnati, Ohio, May 16-20, 1987. See you there?

Software Publishers Association Conference

The Software Publishers Association conference was held in Cambridge, MA, on October 12, 1987. The SPA is an association of software producers and distributors. Chris Stephenson of the University of Toronto conducted a session titled *Software from the Ivory Tower: Are Universities Producing Products?*. The panelists included Frank da Cruz and myself from

Columbia (for Kermit software), David Fuchs of Stanford University (Manager of the TEX project), Ric Holt of the University of Toronto (developer of the Turing programming language), and Bill McKeeman, a faculty member at Harvard University.

The session was attended by representatives of companies like Apple, IBM, and Commodore, and some reporters from the trade press. It exposed commercial software vendors to how universities produce and ‘‘market’’ software. For many corporate representatives, this was a first look at the broad range of projects underway and how academic institutions deal with them.

Kermit Seminars and Short Courses

Columbia University’s Division of Special Programs offers noncredit seminars for the beginner to the experienced computer user in the New York City area. The Kermit series, conducted by Frank da Cruz and myself, is offered several times a year and consists of three levels of instruction. Users who are new to communications may attend the hands-on introductory session. Experienced computer users may attend a fast-paced course. Technical managers, programmers and software developers are exposed to more advanced Kermit usage, installation and support.

Classes are held in the evening, on week-ends, and in full-day sessions for the convenience of the busy professional. For course descriptions and schedules, contact:

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Long Packets and Sliding Windows

The Kermit protocol extensions described in the previous issue of the Kermit Newsletter, long packets and sliding windows, are gradually taking root in our collection of Kermit programs. Both extensions are designed to improve the performance of Kermit file transfers. Long packets may be used to increase file transfer speed over relatively clean and/or half duplex connections. Sliding windows may be used only on full duplex connections, and are ideally suited to connections with a long round-trip delay (such as satellite links). Both extensions are described at length in the Kermit book.

Long packets are now suported by the following Kermit programs: MS-DOS Kermit (version 2.29B and later); IBM 370 VM/CMS Kermit (version 3.1 and later); IBM 370 MVS/TSO Kermit (the Pascal version, 2.0 and later); C-Kermit for Unix, VAX/VMS, etc (version 4E or later); PDP-11 Kermit for RSX, RSTS, RT11, and P/OS (version 3.50 and later); Apple II DOS and ProDOS Kermit (version 3.75 and later); CDC Cyber (Lehigh version 3.0 or later).

Sliding windows, which are much harder to program, are still relatively rare, appearing to date only in the Prime PRIMOS minicomputer version, in one of the CDC Cyber versions, and in various commercial or semicommercial MS-DOS PC packages.

MS-DOS KERMIT 2.30

Version 2.30 of MS-DOS Kermit, prepared by Prof. Joe R. Doupnik of Utah State University, is now available after a long period of development, testing, and refinement. This program runs on the IBM PC and PS/2 families and compatibles, with special versions also available for the DEC Rainbow, NEC APC3, and other non-IBM compatibles, plus a generic MS-DOS version, and a special version for Intel systems running iRMX-86 or -286.

Version 2.30 corrects three serious problems in 2.29: incompatibility with certain internal modems, faulty handshake with half duplex systems during file transfer, and inability to operate as a "remote" Kermit after CTTY COM1. Version 2.30 also includes:

- Support for long packets, to improve the efficiency of file transfers with other Kermit programs that support this option (listed above).
- Improved communication I/O performance.
- Operation over Netbios-compatible networks.
- A script language and raw file upload.
- Revised and expanded key definitions, including the ability to assign Kermit "verbs" to keys.
- Error code return to DOS, for batch operation.
- Support for 8-bit and international character sets.
- Security features for server operation.
- Configurability for COM3 and COM4 expansion boards (IBM PC only).
- VT102 ANSI printer controls.
- Expanded screen rollback, macro, and key definition storage.

Special thanks to Joe for the tremendous amount of work and skill that went into this new release, to Jim Sturdevant of A.C. Nielsen Co. for the initial script implementation, and to the numerous other volunteers who contributed support for other systems, fixes, ideas, and their time for testing. MS-DOS Kermit diskettes are available from Columbia by mail order (see order form).

(As of press time, version 2.30 was being distributed

in "beta test" form as version 2.29C).

C-KERMIT 4E

Version 4E(067) of C-Kermit was released by Columbia University in September 1987. Like previous releases, this program includes support for most Unix systems, VAX/VMS, the Apple Macintosh, and the Commodore Amiga. Version 4E also includes new support for Data General AOS/VS and Apollo Aegis, contributed by Phil Julian and Jack Rouse of the SAS Institute. The Macintosh code was converted to Megamax C by Jim Noble of Planning Research Corp, so that for the first time it can be built and modified directly on the Macintosh (future releases will probably also include support for Lightspeed and MPW C on the Mac). Version 4E includes several major (and many minor) bug fixes, and some new features:

- Long packet protocol support for more efficient file transfers, plus other performance improvements.
- The Unix version now executes its initialization file always, no matter how invoked.
- File and terminal bytesize masks, to allow interaction with both 7-bit and 8-bit ASCII systems.

C-Kermit for Unix and VMS is distributed in C-language source form only. Encoded executable files (along with suitable decoding procedures) are included with the Macintosh, Amiga, and Data General versions. Future releases are expected to include improved VAX/VMS and Macintosh support.

CMS KERMIT 3.1

Version 3.1 of CMS Kermit was released in September 1986 for IBM 370-series mainframes running VM/CMS. This Kermit version includes contributions from several people; Vace Kundakci of Columbia University, John Chandler of Harvard, Bob Bolch of Triangle Universities, and Clark Frazier of the Harvard Business School.

New features include extended-length packets, advanced server functions, file attribute packets, improved performance and error recovery, support for 3705 linemode as well as connections through 7171-style protocol converters, plus many bug fixes.

NIH MVS/TSO KERMIT

A new IBM 370-series mainframe MVS/TSO Kermit from the US National Institutes of Health (NIH), was first announced in December, 1986. The program is written in ‘‘ALP’’, which is a preprocessor for 370 assembly language developed at NIH. The ALP preprocessor, also supplied, is written in PL/I. A hexadecimal-encoded object file is also provided, along with an assembler program to decode it into a binary object file; this can be linked with a tailorable module (written in straight assembler) in which site dependencies, such as the ASCII/EBCDIC translations, are specified.

Thanks to Roger Fajman at NIH for submitting this program to us. Roger participated in the design with Dale Wright, who did the programming. The new program has many advanced features over previous TSO Kermit versions, including server mode, binary file transfer, file interruption, 8th-bit prefixing, run-length encoding, alternate block check types. NIH TSO Kermit supports only 3705-style line mode connections.

PORTABLE IBM MAINFRAME KERMIT

John F. Chandler
Harvard University, Cambridge, MA

The IBM 370 architecture can run quite a variety of operating systems, and many of these systems, including CMS, GUTS, MTS, MUSIC, and TSO, have their own implementations of Kermit. Some systems, in fact, have more than one, and there are currently thirteen different Kermits listed for IBM 370’s in the Kermit distribution. A new development now promises to reduce the redundancy, namely, a generic, portable Kermit-370. The new Kermit, like most of the others now available, is descended from the original Kermit-CMS 1.0, but it differs from all the others in that the system-specific functions (such as disk I/O, file-system interaction, and terminal I/O) are segregated into a separate section of code (and a separate list of macro definitions). The generic (system-independent) sections of code are entirely re-entrant, and the same mechanism for re-entrancy is available for the system-specific code as well.

Kermit-370 offers all the capabilities supported by Kermit-CMS 3.1, plus many more. Among the capabilities are:

- Long-packet protocol with automatic adaptation of packet length to the noise environment.
- Advanced Server functions plus commands for controlling another Kermit in Server mode.
- Optional passing of invalid Kermit commands to the host operating system for execution.
- Support for 3705, 4994, 7171, Series/1, and 3708 front ends, with or without VTAM.
- Optionally separate ASCII/EBCDIC translation for packet and disk I/O
- File attribute packets.
- Throughput statistics after each single or multiple file transfer.
- Nestable TAKE files with optional command echoing and halt-on-error.

As of this writing, Kermit-370 has been fully implemented for VM/CMS and partially implemented for MVS/TSO. Sources and documentation are available to anyone wishing to port Kermit-370 to other operating systems, either as a new product or as a replacement for one of the existing implementations of Kermit. When the TSO version is ready, it should be able to replace some of the older TSO versions, in which a separate program was required for each kind of front end (3705, 3708, 7171).

VAX/VMS KERMIT

VAX/VMS Kermit Version 3.3.111, contributed by Bob McQueen at Stevens Institute of Technology, was released in April, 1987. This release is a maintenance version only and does not contain any major development work. It has been tested under VMS 4.3, 4.4, and 4.5 but will definitely not run under pre-4.0 releases of VMS (version 3.1 of VMS Kermit was the last version that would do so and is kept on the Kermit distribution tape as VMSV31.HEX).

The major change is the addition of a TRANSMIT command for raw file upload. There are also internal improvements and bug fixes involving the CONNECT command, IBM mainframe communication, etc.

3.3.111 is probably the last release of this Bliss-32 Kermit version since Stevens Institute no longer has the resources for continued development. Unless a new VMS site running Bliss with Kermit expertise arises, the emphasis for VMS Kermit will shift from Bliss to C. A new release of C-Kermit with improved support for VMS is expected soon.

APPLE II DOS/PRODOS KERMIT

Version 3.75 of Apple II Kermit was released in April, 1987. This version was developed by Ted Medin to run under both Apple DOS 3.3 and ProDos. It includes new LOG, SERVER, and SET commands, the ability to do XON/XOFF, printer control, VT52 emulation improvements, timeouts, support for various 80-column cards and for a wide variety of communication cards, and it has extended-length packet support.

The program is based on the previous release of Apple II Kermit, written in the CROSS assembler language, and comes with a cross assember written in C to assemble it. This cross assembler can be run on a Unix system (Berkeley or Ultrix, and possibly any other 2's complement Unix system).

Version 3.79, released in October 1987, adds VT-100 emulation, support for the Apple IIc and Apple IIgs, plus some other new functions.

Many Things to Many People

The following articles describe some of the ways Kermit is being used around the world. Readers are encouraged to submit their own articles describing how Kermit is being put to good, interesting or unusual uses. We would be especially interested in stories about how Kermit is used to benefit humanity (or other creatures), to foster international cooperation, or to make life easier for the disabled. For many, Kermit is used for mundane purposes like saving money. We'd like to hear about that too.

The Green Revolution

Georg Lindsey, CGNET, Palo Alto, CA

The ''green revolution'' of the 1970s has essentially doubled the world's agricultural output, allowing millions of people to eat who once would have starved. Genetic engineering has resulted in more productive, resilient, and nutritional strains of wheat, rice, corn, potatoes, chick peas, sorghum, and many other crops.

Research in these areas is coordinated from a consortium of 13 international agricultural research centers sponsored by the Food and Agriculture Organization (FAO) of the United Nations, the World Bank, and the United Nations Development Program (UNDP). Its mandate is to support research programs aimed at improving the quantity and quality of food production in developing nations.

Some 130 remote outposts are located in over 70 countries. This group of centers (known as the CGIAR) is foremost in the field, and represents the state of the art in agricultural research. Experimental data, proposals, budgets, purchase orders, funds transfers, travel schedules, etc., are communicated among the centers and stations with a variety of methods including E-mail, telex, telegraph, telephone, post, and courier.

The usage of electronic mail services (such as Dialcom) has been increasing used since 1985 when the centers began to interconnect their various computer resources -- VAX 780s, IBM PCs, IBM 4341s, HP 3000s, Apples, MACs, Tandys, etc. The use of modern electronic communication has been shown to save the CGIAR about $1 million per year by avoiding more costly methods such as telex and courier.

The ''CGNET'' now connects researchers in countries all over the world via public data networks when available. From countries such as Kenya, Zimbabwe, Mali, Nepal, and Niger where these services are not available, there is direct international dialing to an electronic mail service in London.

However, some stations are not able to initiate international calls. One example is ICRISAT (International Crops Research Institute for the Semi-Arid Tropics) Research Center in Hyderabad, India. Messages that come in via E-Mail from stations all over the world are relayed from CGNET Services International in Palo Alto, California, to a VAX-11/780 in Hyderabad via Kermit.

As Richard Miller (formerly involved in the project) points out, ‘‘It would be understatement to say that the use of international direct dial telephone between California and India is noisy. It’s horrendous. However, by reducing the packet size and twiddling a few other parameters, we have had very good success.’’ In west Africa, Kermit is used to relay point-to-point traffic to Hyderabad and to other stations -- Naimey, Niger; Ouagadougou, Upper Volta (now Burkima Faso); Bamako, Mali. As Richard observes, ‘‘You’ve never really LIVED until you try to get 1200 bps access out of Upper Volta or Niger!’’ Sometimes connections are so noisy that login cannot be accomplished within VMS’s timeout period. The appearance of error-correcting modems in recent years has alleviated this problem.

An example of the kind of information that is transferred between these stations is the results (to the research center in Mexico) of 104,000 experimental trials that are annually conducted in 74 countries. The results of the consortium’s research activity are collected by the centers and published in journals and abstracts that are sent to the national agricultural programs in each country (like the USDA in the United States), who pass the information along to the farmers. Through use of the CGNET facilities, the process of abstracting the information and getting it to the farmers was reduced from six months to six weeks. The ultimate beneficiaries are the people who are nourished by these crops.

Kermit Aids in Giotto Project

Paul de Broeck
ESOC, Darmstadt, West Germany

During the mornings of March 6 and 9, 1986, the Soviet spacecraft VEGA-1 and VEGA-2 flew by Halley’s comet at a distance of about 10,000 km. For this event, a cooperation under the name ‘‘pathfinder’’ was established between the spaceflight centre ‘‘IKI’’ in Moscow, and ESA’s Operations Centre ESOC, located in Darmstadt, West Germany. ESA’s Giotto probe was scheduled to fly by Halley’s comet some days later, at a targeting distance of some 500 km.

American physicists had an experiment on-board the VEGA (a dust particle mass spectrometer), the results of which were collected in Moscow during the VEGA encounters. For transfer of their data to ESOC, Kermit was used. The results of the experiments were collected onto an IBM PC’s hard disc. The data was then transferred using Kermit to ESOC on a 9.6 kbaud line from IKI in Moscow to ESOC in Darmstadt. This enabled American and European scientists, gathered at ESOC, to obtain their valuable data in Western Europe, and made a very quick analysis possible.

This analysis was needed in order to estimate the dust hazard in the neighbourhood of Halley, so that the scientists could agree upon a targeting distance for Giotto -- this was decided to be 550 km.

Using also the information from the camera pictures taken from the VEGA spacecraft, containing the position of Halley’s nucleus, the flight dynamics team at ESOC was able to improve considerably the orbit determination accuracy of the comet, effectively removing an error of about 300 km in the target distance.

During the night of 13 March 1986, Giotto performed its very successful fly-by with Halley’s comet, and it was found that the error remaining on the orbit of the comet was only in the order of 20 km.

It is believed that the 1 Mbyte of science data which in total crossed the ‘‘iron curtain’’ -- through Kermit -- after the VEGA encounters, considerably helped towards a safe and successful Giotto fly-by.

ESOC (European Space Operations Centre) is one part of the European Space Agency (ESA). ESOC staff are responsible for controlling and sometimes operating satellites after launch by the Ariane rocket. The computers that have access to satellites naturally do not have any access to networks. Thanks to Richard J. Waite of ESOC for contributing this article.

Kermit at the Center for Population and Family Health

Norman Weatherby, Ph.D.
Center for Population and Family Health
Columbia University, New York City

The Center for Population and Family Health (CPFH) in the Faculty of Medicine of Columbia University has been using Kermit since 1982 in the United States, Haiti, and Africa. Our goals are to improve family planning services and maternal and child health in urban slums and rural areas through operations research, service delivery, and technical assistance.

Before Kermit was available, a major bottleneck in all programs assisted by the CPFH was our inability to quickly and accurately transfer information between computers. We conduct many market research surveys in Africa to get baseline estimates of contraceptive use, immunization, and oral rehydration. It used to take months to keypunch, edit, and read decks of cards into Columbia University's IBM mainframe. By the time the data was analyzed, the programs were in full operation. This delay meant that health care providers did not have access to vital information about the population that they were serving. They did not know, for example, how many mothers desired to begin using family planning. Without such information, it was difficult to plan and carry out the programs.

Now that microcomputers are installed in most of the programs in Haiti and Africa, we quickly enter and edit research data and bring floppy disks to our New York offices. Kermit is used to upload this data to the mainframe for analysis, and the results are available before the health care programs are underway. Followup data that serves to evaluate the effectiveness of CPFH-assisted programs is also quickly entered, edited, transferred, and analyzed so that we know the results soon after the programs have ended. Thus, Kermit has all but eliminated our problems with the speed of information transfer. We are able to design health care programs that match the needs of the populations that they serve, and we quickly know results of our work.

More recently, CPFH-assisted programs have begun to use microcomputer-based statistical packages (such as SPSS-PC). This has reduced our dependence on mainframe computers for analysis. We now use mainframes primarily for communications with other researchers through BITNET and for archival storage of data. We continue to heavily use Kermit to transfer messages, documents, and large datasets between microcomputers and mainframes. For example, we are currently planning to use Kermit to communicate with colleagues at Johns Hopkins University in our AIDS research efforts. No postal or document delivery service is faster than the speed that we can achieve through telecommunications.

In summary, Kermit has had a major and beneficial impact on the operations of domestic and international programs that are assisted by the CPFH. This in turn has helped to improve the health of women and children throughout the world.

Kermit in Antarctica

Frank da Cruz
Columbia University, New York City

Kermit is the primary communication software used between US research stations in Antarctica -- Palmer, Siple, and South Pole Stations -- and a relay VAX/VMS system in Florida, which in turn is accessed via Kermit by the principle investigators of the various NSF-sponsored projects at the University of Maryland, NOAA GMCC in Boulder, AT&T Bell Laboratories, and Stanford University.

According to Eric Siefka of ITT Antarctic Services in Paramus, NJ, the Antarctic stations are linked with the Florida relay via NASA's ATS3 satellite, which is 18 years old and provides a relatively noisy connection, especially during aurora borealis or other atmospheric disturbance.

Research involves studies of the atmospheric layers -- ionosphere, magnetosphere, ozone layer, etc -- their interactions, their effects on the earth and its inhabitants (filtering of cosmic rays, telecommunications applications, etc), and the effects of pollutants and other artifacts of civilization. And daily meteorological data is sent to the National Weather Service for forecasting.

Atmospheric data is collected using riometers (relative ionospheric opacity meters), multichannel recorders, and other instruments, as well as from ice core samples. The data is reduced on a PDP-11/73 and transferred once a day to Florida using PDP-11 and VAX/VMS Kermits. IBM PC Kermit is used to transfer PC-resident databases of inventory, supplies, logistics, and cargo. During the 9-month Antarctic winter night, when supply ships can't get in or out and research staffs are otherwise cut off, the Antarctic crew takes inventory and sends back the new counts so they can be supplied with the necessary scientific equipment, food, fuel, and other supplies when the ice breaks in the Spring. Meanwhile, scientific and inventory management programs are developed or refined in the US and transferred to the Antarctic stations.

The Antarctic researchers have found Kermit more effective than other protocols, particularly over the long-distance, noisy links they must use. The user-settable parameters, particularly the timeout intervals, allow automatic recovery of long file transfers even after 60-90 seconds of total signal loss. Kermit is used whenever link conditions are noisy or data must be transferred without error.

Summary of Recent Releases

Here is a concise list of Kermit releases since the last Newsletter in August 1986. The notation (A:XYZ) means the version is available on tape A, as files whose names start with XYZ. When more than one release of a program has occurred since August 1986, only the latest one is mentioned.

August-September 1986:

- Atari ST series GEM Kermit v1.02, in C, from Bernhard Nebel, Technische Universitaet Berlin (A:AST).
- HP-1000 Kermit v1.98 for RTE-6 and RTE-A, written in SPL, contributed by Paul Schumann of E-Systems Inc, Greenville, TX (D:HPM). Also available on native media from Interex, the international HP user group.
- Sperry 1100 Kermit v2.5, assembler, from Paul Stevens at the University of Wisconsin (D:UN).
- Microsoft Windows Kermit v1.0, in Microsoft C, from Bill Hall, Old Bridge, NJ. This is a "bare bones" Kermit that can run in MS Windows mouse-and-window environment, concurrent with other programs, on the IBM PC family or any other PC that runs MS Windows (A:WIN).
- IBM System/370-series mainframe Kermit 3.1 for VM/CMS, in assembler. Supports both linemode and full screen connections. Described on page 3. (B:CMS).
- Honeywell 6000 Kermit for DTSS, in "Virtual PL/I", from Dartmouth College (D:DTS).

October-December 1986:

- Tandy/Radio Shack TRS-80 Model 4 Kermit v5.2 for TRSDOS, in assember, from Gregg Wonderly, Oklahoma State University (A:M4).
- HP9845 Kermit v1.00, in BASIC, from Martin J. Rootes, Sheffield City Polytechnic, UK (C:HP9).
- Gould/SEL MPX/32 Kermit v2.3, in Fortran 77, from Simulation Associates Inc (D:GM2).

January-March 1987:

- DEC Rainbow Kermit, a special version with VT220 emulation, hot keys, pop-up menus, 20 rollback screens, etc, by Dave Knoell, Basic American Food Company, Vacaville, CA (B:MSVRB2).
- Microdata PICK/REALITY Kermit v0.2C, in DATA/BASIC, from Joe Fisher, Austin, TX (D:PIC).
- CIE 680/XX REGULUS Kermit, in C, from David S. Lawyer, Univ. of California at Irvine (C:CIE).
- MODCOMP Classic MAX IV Kermit vA.0 in Fortran, from Bob Borgeson, Setpoint Inc, Brecksville, OH (D:MOD).
- Computervision Kermit v1.21, in Fortran S, from Val Jawks, Brigham Young University, Provo, UT (D:CV).
- Texas Instruments Explorer Kermit 1.0, in Lisp, from Brian Carb and Steve Ford of UNISYS Corp, Bluebell, PA, a joint effort between TI and Sperry Corp (C:EXP).
- Motorola 6809 Kermit, for FLEX-09 or SK*DOS, in C, from Jur van der Burg, Alphen aan den Rijn, Netherlands (C:FL).
- Apollo Aegis Kermit in Pascal, separate versions from Marconi Space Systems (2.7) and Control Data Corp (2.8), in Pascal (C:APO and C:AP2).
- Perkin-Elmer/Concurrent/Interdata 3200 OS32 Kermit v1.0, in Fortran, from C.J. Miller, Louisiana State University (D:PE2).
- Tandy/Radio Shack TRS-80 Model II TRSDOS Kermit, from Serge Kruk, Systemes Temps Reel, St.-Laurent, PQ, Canada (A:TR2).
- Data General Eclipse RDOS Kermit in BASIC from Remi Castonguay (D:RD2).

April-June 1987:

- DEC VAX/VMS Kermit v3.3.111, in Bliss, from Bob McQueen, Stevens Institute of Technology, described on page 4 (B:VMS).
- Commodore 64/128 Kermit v2.0(57), from Ray Moody, Purdue University. Includes VT52 and VT100 emulation, plus support for the 80-column screen of the Commodore 128 (A:C64).
- Intel Development System ISIS Kermit, in PL/M, from William Boyd, Hughes Aircraft, Fullerton, CA (C:MD).
- IBM System/370-series mainframe MVS/TSO Kermit 1.0, the original primitive TSO version in assembler, modified to support the 3708 front end by G.S. Mendelson, Sungard Central Computer Facility, Philadelphia, PA (B:TS3).
- CDC Cyber NOS 2.4 Kermit, written in Compass, from A. Ballard and P. Jarvis, Imperial College, London, UK. Includes sliding windows (D:NOS).

- Lilith Workstation Medos Kermit v1.0, in Modula-2, from Matthias Aebi, University of Zuerich, Switzerland (C:M2).
- Acorn BBC Micro Kermit v1.45 from Alan Phillips, Lancaster University, UK (C:BBC).
- Sinclair QL Kermit v1.10, in C, from Robert Coughlan, Liverpool University, UK, and enhanced by Jonathan Marten, Farnborough, Hampshire, UK (C:QLK), and another Sinclair QL Kermit, in BCPL, from David Harper, Liverpool University (C:QL2).
- HP86/87 Kermit v1.01, in BASIC, from Martin Rootes, Sheffield City Polytechnic, UK (C:HP8).
- ICP PC Quattro Kermit for Concurrent CP/M-86, from Chris Lock, Nottingham University, UK (C:CN8).
- Tripos Kermit, in BCPL, from G. Selwyn of Metacomco Ltd, UK (C:TRI).
- Acorn Cambridge Workstation PANOS Kermit, in C, from Acorn Computers Ltd, UK (C:AC).
- ICL 2900 VME Kermit v1.01, in S3, from Bath University, UK (D:VME).
- Harris H100 VOS Kermit v1.04, from Skipp Russell, Washington University (D:H10).
- Texas Instruments 990 DX10 Kermit v1.0, in Pascal, from Paul Madaus, Johnson Controls, Milwaukee, WI (D:TI9).
- Motorola 68000 OS-9 Kermit v.1.0.00, in assembler, from Roberto Bagnara, Bologna University, Italy (C:K6). One implementation of a new portable 68000 Kermit.

July-November 1987:

- Intel RMX-86 and RMX-286 Kermit v2.29C from Jack Bryans at California State University at Long Beach, an adaptation of MS-DOS Kermit to RMX (A:MSTRM).
- CP/M-80 Kermit 4.08, from Bertil Schou, Loughborough University, UK, for a wide variety of CP/M-80 systems, in LASM (A:CPX).
- CDC Cyber NOS Kermit v3.3, in Fortran 5, from Steve Roseman, Lehigh University (D:CD3).
- DEC PDP-11 Kermit v3.58 for RSX11M, RSX11M+, RSTS/E, RT11, TSX+, IAS, P/OS, Pro/RT, etc, from Brian Nelson, University of Toledo (B:K11).
- C-Kermit 4E(067), for Unix, VAX/VMS, DG AOS, the Apple Macintosh, the Commodore Amiga, Apollo, etc, from Frank da Cruz, Columbia University, described on page 3 (B:XK).
- IBM System/370-series mainframe MVS/TSO Kermit 1.1A, in assembler/ALP, from Roger Fajman, US National Institutes of Health. Many advanced features, but supports linemode TTY connections only. Described on page 3 (B:TSN).
- IBM System/370-series mainframe MVS/TSO Kermit 2.3, in Pascal, from Fritz Buetikofer, University of Bern, Switzerland. Many advanced features, but supports linemode only (B:TS2).
- Convergent Technologies NGEN CTOS Kermit v1.02, in C (based on C-Kermit 4.2), from Joel Dunn, University of North Carolina at Chapel Hill. May also run on Burroughs B-20 systems (C:CT).
- Apple II DOS and ProDOS Kermit v3.79, from Ted Medin, described on page 4 (A:APP).
- Turbo Pascal Kermit v2.8 for the IBM PC family, from Victor Lee, Queens University, Kingston, Ontario. Includes Tektronix emulation and some support for the Kaypro II and Apple II (A:QK).
- HP264x Kermit v1.2, in assembler, from John Chandler, Harvard University (C:HP2).
- MS-DOS Kermit v2.30 for the IBM PC and PS/2 families, compatibles, the DEC Rainbow, NEC APC3, and many other DOS machines, from Joe R. Doupnik, Utah State University. Described on page 2 (A:MS).

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Editor: Christine Gianone

The Kermit file transfer protocol is named after Kermit the Frog, star of the television series The Muppet Show, used by permission of Henson Associates, Inc.

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