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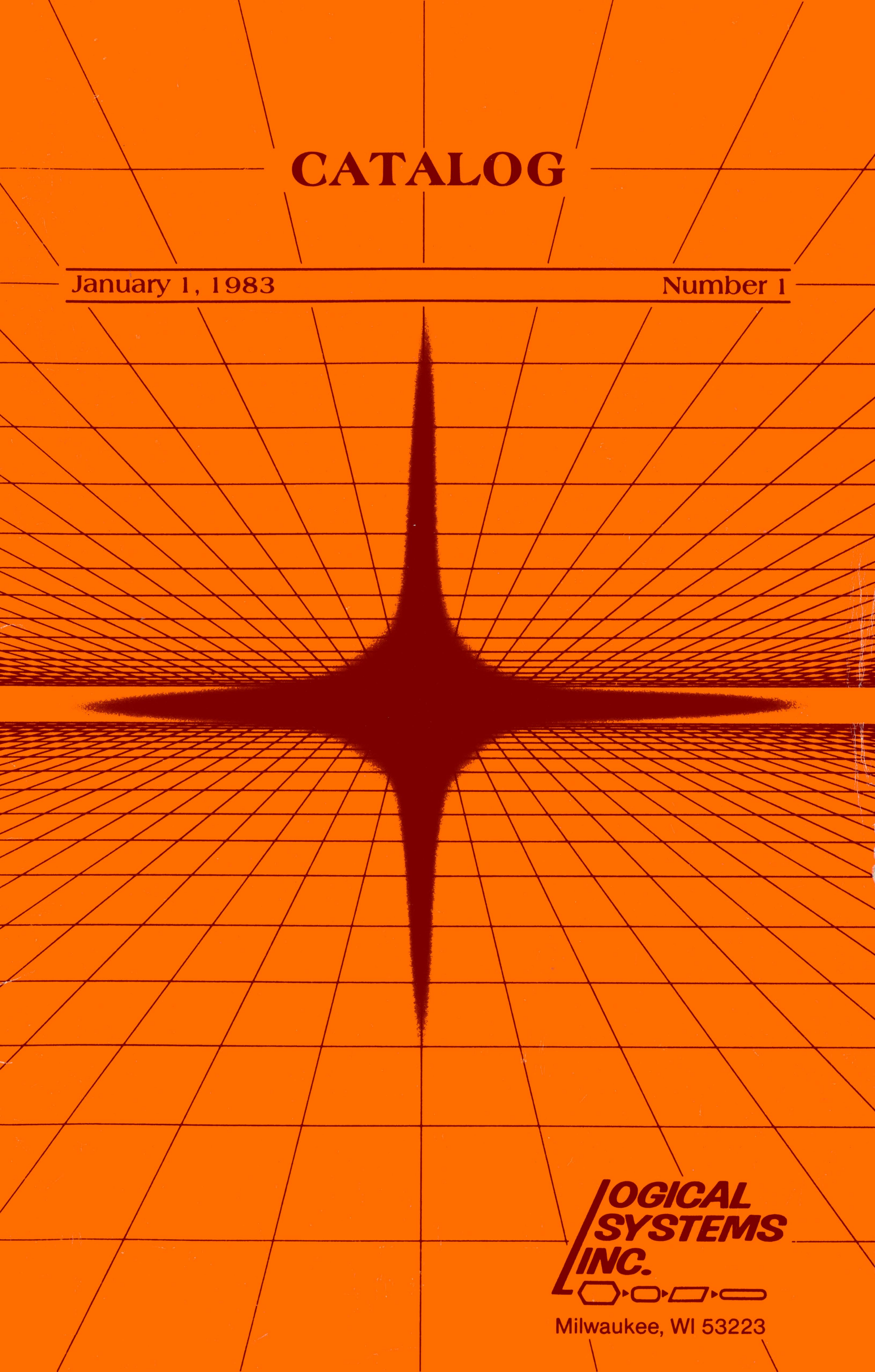

LOGICAL
SYSTEMS
INC.

Milwaukee, WI 53223

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OPERATING SYSTEMS

The LDOS Operating System

LDOS is a new generation of operating system for the TRS-80 computers. It is a totally device independent system, capable of device linking, routing, setting, and filtering. LDOS will support up to eight logical disk drives, including 35 to 80 track 5" floppies, 8" floppies, single/double density, single/double sided, and hard disks up to 13 megabytes as a single drive. Hard drives may be partitioned to represent up to six logical drives, depending on the number of heads on the drive. All available step rates are supported.

Model I/III LDOS disks can be either single or double density, and can be read or written on either machine. Model I LDOS supports double density with the Lobo LX-80 interface, or with certain double density boards.

A complete Supervisory Call table is available in LDOS 5.1. This will allow assembly programs to be transported directly between machines on all Z-80 implementations of LDOS.

LDOS is completely documented in an extensive operating manual (over 350 pages) containing both user instructions and a large section with technical information. Numerous examples are given to detail all operating functions.

Full customer support is provided and includes maintenance and enhancement updates as well as a full time support staff. Optionally available are a MicroNet bulletin board for feedback and messages and a quarterly newsletter.

All files created under LDOS carry their date of creation or last modification, and are marked with a "Mod" flag if modified since their last backup. Many LDOS commands and utilities can manipulate files by user specified file extension, full or partial file name (including the use of wildcard characters), by Mod flag, or by a date or range of dates.

The LDOS operating system comes with an extensive Job Control Language (JCL). This is a compiled language that allows the user to input commands and Job Control conditionals and execution statements into a file that will control the computer's job stream. Execution can be tied to the setting of the real time clock and can provide both visible and audible alerts. Variables and labels may be assigned by the user at run time to select the actual Job Control execution and starting position in the JCL file.

LDOS comes complete with an RS-232 driver program, a terminal utility including disk file send and receive, 128 character Type Ahead, a disk modifying Debug utility, a program Patch utility, a KeyStroke Multiply program for key redefinition, full printer Spooling to memory and/or disk, a printer output formatting program, a feature to reside system files in memory for very fast operation and more.

Library commands

APPEND - Appends two files together or a device to a file. Optionally, the first file may be backspaced one byte to allow an old end of text marker to be overwritten.

ATTRIB - Sets or alters a file's password and protection status. Also allows the disk's name, master password, and file protection to be changed.

AUTO - Causes a specified command line to be executed on power up or reset. Automatic Break key disable may also be specified.

BOOT - Causes the disk in drive zero to be booted into the system, effectively a software reset.

BUILD - Creates ASCII or packed Hex format files, or append to the end of existing files.

CLOCK - Turns the real time clock display on and off.

COPY - Copies from one file or device to another file or device. If copying files, dynamic defaults will be used for the filename, extension, and password. Copy also supports files with logical record lengths of other than 256, and allows the correct transfer of passwords, protection level, and visibility. Copy also provides for single drive copies between non-system disks.

CREATE - Pre-allocates file space in blocks. The file space is allocated in the most contiguous possible manner. This file space will never shrink but can expand dynamically if needed.

DATE - Sets or displays the current system date which remains intact until power down. Any files created or updated will show this date as the date of last modification.

DEBUG - Turns on the regular or extended debugger. Debug features include program single stepping, memory dump to a printer, disk read/write/modify, memory modify, and input/output to specified ports.

DEVICE - Displays all currently enabled disk drives, logical devices, and user selected options, along with I/O directions, routing, and I/O driver addresses.

DIR - Displays disk drive directories. Display parameters include full or partial file name and or extension (including wildcard characters), mod date or range of dates, invisible files, and system files. The display output may be selected to show file space and record allocation, logical record length, protection status, modification date, modification status, and may be sent to a line printer.

DO - The Do command allows the system to execute a predefined series of commands and keystrokes stored in a disk file. A unique Job Control Language provides video and audio alerts, conditionals, variables, logic, and user interaction during Do functions.

DUMP - Dumps memory to a disk file in either load module format or as a pure image (ASCII) type file. A special end of text marker may be specified for ASCII dumps.

FILTER - Allows all I/O to a specified device to be passed through a filtering routine. Several filter programs are provided with the LDOS system and examples of creating filtering routines are fully documented in the technical section of the manual.

FREE - Displays the space and number of free files available for all enabled disk drives, or a free space map of an individual drive showing used, free, and locked out granules. Either display may be sent to a line printer.

KILL - Deletes a specified file or device from the system.

LIB - Displays the primary and secondary LDOS command libraries.

LINK - Links together input and output to/from multiple logical I/O devices. This allows output to be sent to and input requests to be satisfied from multiple devices by linking these devices together.

LIST - Displays a listing of a file. Parameters include line numbering and tab extension for ASCII files, and record number and logical record length for hex formatted output. Listings may also be sent to the printer.

LOAD - Loads a load module format file into memory without execution. An (X) parameter allows loading from non-system disks in a single drive system.

MEMORY - Display and/or set memory protect address, allows direct modification of a memory address (either 1 or 2 bytes), allows a direct jump to a memory address, and provides a way to clear memory.

PURGE - Provides selective deletion of all files on a disk, regardless of password protection. All files may be acted on or files may be specified by full or partial file name and/or extension, Mod flag status, by date or range of dates, and by file type (visible, invisible, or system).

RENAME - Renames a disk file using dynamic defaults for filename and extension.

RESET - Resets a specified device to its normal power up driver. If the device is nonstandard, all I/O to it will be ignored.

ROUTE - Routes I/O from one device to another or from a device to a disk file. Route will also create new user specified logical devices.

RUN - Loads a load module format file into memory and begins execution. An (X) parameter is provided to run programs from non-system disks on a single drive system.

SET - Establishes a driver routine for a new or existing logical device. LDOS provides a Keyboard and RS-232 driver program.

SYSTEM - Allows changing the configuration of the LDOS system. Among the available features are break key disable, blinking cursor, drive parameters (step rate, enable/disable, delay before read, software write protect), residing system modules, and selecting system drive. These features along with most other device routing, filtering, and setting can be sysgened to disk and will automatically configure the system on power up or reset.

SPOOL - Spools output to a device through memory and optionally through a disk buffer. Output will continue even if the machine is performing other jobs.

TIME - Sets or displays the current time of the internal real time clock.

TRACE - Displays the CPU's program counter on a real time basis.

VERIFY - Causes read after write verification of all disk drives.

LDOS Utility Programs

BACKUP - Backup allows the following commands: Backup only those files identified by full or partial file names or extensions (including wildcard characters), Backup only those files that have been modified, Backup files by date or range of dates, Backup visible, invisible, or system files, Backup only those filesthat do/do not exist on the des- tination disk, and Backup between disks of different sizes and con- figurations will prompt for disk swaps if the destination disk becomes full.

CMDFILE - A user oriented utility for handling system tapes and load module format disk files. Cmdfile allows concantenation and load of tape and disk files, and will move files between disk and tape.

CONV - A utility to move files from Model III TRSDOS (1.2 or 1.3) to an LDOS formatted diskette (requires two drives and double density).

LOG - Provides a way to log in a diskette configuration when using double sided disks in drive 0.

FORMAT - Format allows the following disk parameters to be specified: disk name and master password, single or double density, number of tracks, and the bootstrap step rate for system disks. Format will also format hard drives, and add system information to a hard drive that has been partitioned.

LCOMM - An advanced communications package that allows machine to machine communications, supporting the keyboard, display, printer, and transmission and reception of disk files.

PATCH - Allows the alteration of disk files, either by direct disk file modification, or by memory load addresses. Patches by memory may later be removed with the Patch "Yank" feature.

REPAIR - corrects certain information missing from Model I TRSDOS (2.3) diskettes. This makes these disks directly available for read/write operations using LDOS.

LDOS includes the following Device Driver programs.

JL - This driver will enable the LDOS JobLog feature. The JobLog will send a list of all commands and error messages along with a time stamp to a specified file or device. Certain other information, such as filenames moved during a backup, will also be logged.

KI - This driver will enable certain keyboard related features such as Type Ahead, Screen Print, high speed key repeat, and CLEAR key recognition used with other LDOS features. Generates all 128 ASCII characters.

RS232 - An RS-232 driver which allows the operator to specify baud rate, word length, stop bits, parity, flags to set DTR and RTS, and checking of the DSR, CD, CTS and RI signals (either TRUE or FALSE conditions). It can also detect simulated Break and Pause keys sent from a remote terminal.

Several Filter programs are provided.

KSM - A keyboard filter routine that allows the KeyStroke Multiply feature of LDOS to read in predefined files, assigning phrases or character strings to be used as keyboard input when the CLEAR and specified alphabetic key are pressed together.

MINIDOS - A keyboard filter that provides constant access to certain LDOS commands such as Directory, Free space, Kill a file, and Debug. An immediate Top of Form function is also provided for use with line printers.

PR - A filter for use with line printers. It provides the setting of lines per page, physical page size, line width, line indent on wrap around, constant indent of the left margin, a one character translate feature, tab expansion, added linefeed, and a hard form feed during pagination.

LBASIC features

Upward compatibility with Microsoft BASIC. Many LDOS commands may be executed from LBASIC. Single key commands to edit or list the current program line, to list the next or previous program line, or to list the first or last program line. Built in string array sort. New file modes - files may be declared "Old" or "New" when opened. Single character abbreviations for some commands. A single step feature allows program execution to be paused and then single stepped statement by statement. High speed load and save. Run multiple programs with common variables. Programs may also be run at a specified line number. Blocked (variable length logical records) are supported. New statement - SET EOF - allows the user to adjust the end of file marker for random files, and reclaim disk space beyond the new EOF marker. New statement -RESTORE nnnn- Restores the data pointer to a specified line number. CMD"X" provides variable and line number cross references. CMD"N" allows program renumbering.

catalog #	product name	comment	weight	mfg
L-10-010	LDOS 5.1	TRS-80 Model I	6	LSI
L-10-030	LDOS 5.1	TRS-80 Model III	6	LSI

smal-LDOS

Smal-LDOS is a disk operating system based on a subset of the original LDOS operating system. Its purpose is to allow an OEM version of the system to be available to established vendors in order to distribute software on a useful operating system which does not require all of the extended features of LDOS. It is available with or without a manual in minimum quantities of 25 for original equipment or software manufacturers only.

Smal-LDOS has the following library commands : (for descriptions see original LDOS) APPEND, ATTRIB, AUTO, CLOCK, COPY, DATE, DEVICE, DIR, DO, FILTER, KILL, LIB, LIST, LOAD, MEMORY, RENAME, RUN, SET, SYSTEM, TIME, and VERIFY.

Smal-LDOS has most of the BACKUP, FORMAT and CONV utilities as original LDOS, along with the same double density board support for Model I, and a 1500 baud cassette utility for the Model III.

The LDOS keyboard driver which allows selection of repeat rate and delay, type ahead, and screen print is supplied. Smal-LDOS also contains a printer filter to control line printer output format.

Finally, smal-LDOS contains substantial portions of the extended BASIC provided in original LDOS. Only the renumber and cross reference utilities are absent.

catalog #	product name	comment	mfg
0-11-010	smal-LDOS Mod I	OEM'S ONLY	LSI
0-11-015	smal-LDOS Mod I	w/o manual " "	LSI
0-11-030	smal-LDOS Mod III	" "	LSI
0-11-035	smal-LDOS Mod III	w/o manual " "	LSI

LANGUAGES / LANGUAGE AIDS

The BASIC Answer - (TBA)

The BASIC Answer is a BASIC text processing utility. It is designed to allow the BASIC programmer to construct code in a structured manner. "Source" code is created with a word processor or text editor which allows the user to exploit the powerful editing and movement features characteristic to those types of software. Source code can also be created by means of a BASIC interpreter. TBA is then used to process this source code into ordinary interpretive BASIC code. TBA is used exclusively with LDOS 5.1 operating systems.

TBA utilizes labels in lieu of line numbers. Branching in a program is accomplished by means of a descriptive label as opposed to an arbitrary line number. This means that blocks of code, subroutines, and procedures can be called and referenced by names which reflect their function, such as, @SORT.NAMES, @FIND.MINIMUM, @CALC.MEDIAN etc. Labels may be up to fourteen alphanumeric characters in length. This allows totally relocatable BASIC routines without the renumbering problems.

TBA supports variable names of up to fourteen significant alphanumeric characters. This means that cohesive descriptive names can be applied to variables in order to greatly augment program readability and comprehension especially in the case of code which has not been examined for a long time.

For example, a typical BASIC statement might be:

```
IF ACCNT.OVERDUE# > 0 THEN GOSUB @PRINT.WARNING
```

rather than

```
IFA1#>0THENGOSUB51000
```

Clearly the first line contains a veritable wealth of information when compared to the second.

TBA introduces the concept of "Conditional Translation". This feature allows co-existence of "machine-dependent" code within the same source. TBA can be instructed to ignore the irrelevant sections when processing.

TBA allows use of Global and Local variables. Local variables are those variables which retain their value only in a unique subroutine. This means that variable tracking and conflict problems are minimized.

The BASIC Answer combines the self-documenting benefit of COBOL with the casual structure of BASIC in concert with the editing power of a word processor. Truly a timely combination.

What looks like cobol,
writes like scripsit,
and runs like basic?

The BASIC Answer by LSI
that's what.

```
@program.start : cls
     print " Imagine a BASIC program with no line numbers"
     print " to worry about."
     for time.delay% = 1 to 1500 : next time.delay%
     print " The text is written in ASCII on either a word"
     print " processor, text editor, or in BASIC."
     print " Branches, such as GOTO, GOSUB, and IF...THEN"
     print " are referenced by 14 character labels."
     print
     print
     print " Variables are 14 significant characters so"
     print " a program reads like a script."
     for time.delay2% = 1 to 2500 : next time.delay2%
@ask.for.answer
     cls : input "Does that sound interesting to you "; decision$
     if decision$ = "NO" then goto @program.start
     if decision$ = "YES" then goto @where.to.order
     goto @ask.for.answer

@where.to.order
     print "The BASIC Answer is available from "
     print " Logical Systems Incorporated to"
     print " run on the LDOS operating system"
     print " for a cost of $69.00 -"
@end.of.run : end
```

catalog #	product name	comment	weight	mfg
L-21-030	The BASIC Answer	Model 1,3 LDOS 5.1	2	LSI

EDAS - Version IV

EDAS is an advanced disk-based combined editor and assembler supported under Model I and Model III TRS-80s running under LDOS. Among its features are direct assembly from one or more source disk files or memory buffer, conditional assembly, macro assembly, extensive cross reference listings, and a comprehensive line editor that supports upper and lower case text entry.

EDAS ASSEMBLER FEATURES

EDAS assembles absolute core-image object code to disk as a directly executable load module (CMD). Source code can exist in memory as well as included disk files when using the *GET assembler directive. *GET files can be nested to five levels. EDAS uses default file extensions of "ASM" for source and "CMD" for object code files to guard against inadvertent over-write of a source file with object code. EDAS also respects HIGH$.

A "*SEARCH filespec" assembler directive will invoke automatic search of the Partitioned Data Set (PDS) "filespec" containing a library of source code. The PDS directory will automatically GET any PDS member that would resolve an undefined label reference. This process can be correlated to a relocating assembler's resolving references at link time. In EDAS, the source library is ISAM accessed for minimal I/O overhead. PDS is required to construct this type of library.

Conditional assembly is supported with five pseudo-ops; IF expression; IFLT expression1, expression2; IFEQ expression1, expression2; IFGT expression1, expression2; IFDEF label; IFNDEF label; and IFREF label. Conditional assembly also supports the "IFx ELSE ENDIF" construct. Conditional expressions can be nested to 16 levels.

The expression evaluater supports left-to-right evaluation of the following operators: "+" addition; "-" subtraction; "*" 16-bit by 8-bit integer multiplication; "/" 16-bit by 8-bit integer division; ".MOD" modulo division; "<" shift; "&" or ".AND." logical AND; "!" or ".OR." logical OR; ".XOR." logical exclusive OR; ".NOT." one's complement; ".NE." logical not equal; and ".EQ." logical equal.

Pseudo-ops DEFB and DEFM are synonymous. EDAS also accepts DS, DW, DB, and DM as well as DEFS, DEFW, DEFB, and DEFM. EDAS provides for binary, octal, decimal, hexadecimal, and string constants. Constant declarations can be concatenated on one line, by separating terms with commas. This permits complex expressions such as:

```
DB  1,2,'Buckle your sho','e'.OR.80H,'I can''t'
```

Labels may be up to 15 characters long. Labels must start with A-Z, "@", or "$". Positions 2-15 may also use "?" and "_". The "*MOD" assembler directive is available to provide a unique character string substitution for the "?" character appearing in labels of all files accessed via *GET. The string value will increment each time *MOD is commanded. This will provide "local label" support for routines read off of disk.

A logical origin pseudo-op, LORG, will assemble load module files with the load addresses offset to the LORG address while execution addresses are based on the ORG address. When using EDAS to assemble applications that block move sections of code, the LORG can be used to assemble the entire job at once.

The EDAS assembler provides many switch options. These invoke: "-IM" assemble output to memory; "-LP" list to printer; "-NC" suppress false conditional blocks from listings; "-NE" suppress constant expansions on listing; "-NM" suppress listing of macro expansions; "-WE" wait on error; "-WO" assemble with object code; "-WS" generate a sorted symbol table listing; "-XR" generate a cross reference data file for downstream processing by XREF.

Nested 8-level MACROs are supported with both positional parameters and parameters by keyword. Values can be applied to any parameter at MACRO definition time to allow for expansion time defaults if a parameter is omitted at the time a MACRO is referenced. MACROs can be defined in memory or source files but must be defined prior to being referenced. Local labels are supported with the provision of a string substitution for the "?" character in labels. The string will provide a unique value for each MACRO expansion. The MACRO "?" substitution takes precedence over any *MOD substitution.

Additional pseudo-ops are provided for enhanced operation: "COM" will allow a comment line to be written to the load module. These comment records will not be loaded when executing the module, but will merely provide an easy way to store such things as copyright messages in object deck files; "TITLE" will paginate listings with a title string including the current date and time, and an incrementing page number; "SUBTTL" lists the sub-title string after each title; "PAGE" ejects a listing to a new page; "SPACE" generates additional line feeds during listings for highlighting modules.

A sorted symbol table listing is available during the assembly. A complete CROSS REFERENCE listing is available by a downstream processing utility, XREF. Once an XR data file is generated, XREF will produce a listing identifying all defined labels, the line number containing the definition, its value, and the file name of the source file containing the definition ($CORE is used to designate labels defined in memory). For each defined label, all references to the label are listed by line number and source file containing the reference. XREF lists statistics on the quantity of defined labels and references. XREF can also be used to generate a file containing EQUates (or DEFLs) for all symbols or a subset of symbols (those including a special character). The EQU file is useful for interfacing separately executable modules to a resident module (such as in overlay applications).

EDAS EDITOR FEATURES

The EDAS editor operates on text in memory and uses a command syntax identical to BASIC for intra-line editing. Lines hacked to null length will be automatically deleted.

EDAS will "Load" and "Write" text buffers from/to disk with text file concatenation in memory. The standard source file will be un-headered and un-numbered which saves approximately 20% of disk file storage requirements. However, EDAS will AUTOMATICALLY recognize and properly read a file that is headered and/or numbered whether through "Load" or "*GET" input. Two switches are provided in the "Write" command to generate a header or line numbers when saving a text buffer to disk.

Input text can be in upper or lower case. In the case-converted mode, all assembler source input is properly converted to upper case, AUTOMATICALLY. In the case consistent mode, text remains as it was input. Thus, the editor can be used for assembler source, or source for other languages such as PASCAL and C.

The editor supports relocating a block of lines with the "<M>ove start,end,to" command. Global changes to character strings can be made throughout the text buffer or to only a designated range of lines with the "<C>hange /string1/string2/start,end" command. Want to copy a block of lines? The "<C>opy start,end,to" command will duplicate the block numbered from "start-end" to follow the line numbered "to".

A "<F>ind string" command will search the text buffer starting from current line+1 for the next occurrence of "string". String may be up to 15-characters in length. If "string" is null, the next occurrence of the previous "find string" will be searched for.

Single line scrolling is supported with the <UP-ARROW> and <DOWN-ARROW> keys. The <SHIFT-CLEAR> key invokes a "warm-boot" which aborts the current operation, clears the screen, and re-initializes line numbering while maintaining the current text buffer.

A "<U>sage command displays buffer status (in use and remaining), and the first available in-memory address. The latter is useful for assembling into memory then executing a "<B>ranch" to the in-memory object program for debugging purposes.

EDAS provides MiniDOS-type directory "<Q>uery" and file "<K>ill" functions. A "<V>iew" command will list a source file to the screen without affecting the buffer contents.

When all things are considered, writing system software, support software, applications - big or small, EDAS provides the power to make an assembly job easier, faster, and more worthwhile. It does everything but teach programming. EDAS comes complete in a three-ring binder with extensive documentation of over 100 pages of useful information (not OP-code explanations). A Z-80 quick reference card is included. EDAS, for LDOS equipped Model Is and IIIs.

catalog #	product name	comment	weight	mfg
M-20-020	EDAS 4.1.x	Model 1,3 LDOS 5.1	3	MIS

LC COMPILER

One of the high-level languages getting a great deal of attention lately is the "C" language. This is due in part from the knowledge that UNIX (*), a powerful operating system for minicomputers, mainframes, and now micros, is written in the C-language. Why did they choose C? Because the UNIX designers realized that application software and system code could be both created and maintained more easily when written in the high-level C-language. Another reason for C's growing popularity is that it is a language rich in the use of expression operators, functions and structured code.

To get started in C, or for those who are C experts just waiting for the perfect Model I or Model III release, we wish to announce "LC". "LC" (pronounced 'elsie'), a C-language compiler, is now available for use with LDOS. LC provides a substantial subset of the C programming language as described in, "THE C PROGRAMMING LANGUAGE" by Kernighan and Ritchie. LC was written to be compatible with UNIX programs. LC programs using the standard library (supplied with the compiler) can be compiled and run under UNIX. Programs written under UNIX which use only statements supported by LC are also portable to LC. A large amount of existing software, both commercial and public domain, will be directly usable by LC owners.

C is a structured, portable language. A "C" program is a collection of functions arranged hierarchically. C functions can be recursive and re-entrant, as local variables are created and stored in a stack. All machine-dependent features needed, such as I/O, are not implemented in the language; rather, they are placed in the standard library. Thus, only the implementation of the standard library changes from installation to installation, and C programs are written in machine independent ways. The language itself provides ways of expressing program structure, and of giving arithmetic and logical expressions. C is known for having one of the most powerful expression capabilities available in any language. C statements supply the WHILE, DO-WHILE, FOR, IF, and SWITCH-CASE constructs. C also provides powerful pointer capabilities to enable direct access to memory and variable storage.

LC is an integer-only implementation of C which provides all C statements except "struct", "union", "goto", and "typedef". All data types except "float" and "double" are implemented; "long" and "short" declarations are accepted, but 16-bit fields are used for all integers. In LC, "char" variables are implicitly unsigned. Single-precision and double-precision floating point operations are supported via functions supplied in the FP/LIB library included with the LC compiler. LC accepts multiple input files, with four levels of nesting for "#include'd" files. The compiler generates an EDAS Version IV assembler source file which is then assembled with the standard library and any other libraries needed to resolve function references in order to generate the executable program. The value in generating assembler source is twofold. First, it is possible to obtain a complete machine code source listing which could prove invaluable in debugging complex code. Second, local optimization of assembler source code can be performed as required by the experienced assembler programmer. The LC standard library provides such functions as standard I/O redirection, dynamic memory allocation, automatic standard I/O opening and closing, and program chaining.

In addition, functions specific to LDOS and the Model I/III are supplied in an installation library, to provide access to such functions as graphics and system entry points.

LC supports separate compilation; programs may be compiled in segments, and frequently used functions can be pre-compiled. The assembler source code output by LC is designed to use the extensive SEARCH and conditional assembly support in EDAS Version IV. The assembler and companion assembler cross-reference utility are supplied with the LC package. Nothing more is needed to start writing and running C-language programs except an LDOS-equipped computer and a copy of "THE C PROGRAMMING LANGUAGE". A 48K-RAM two-drive Model I (lower case video) or Model III is required. Some highlights of the LC compiler are:

Integer subset of the C language.

Access to floating point routines in ROM via function calls.

All statements supported but STRUCT, UNION, TYPEDEF, SWITCH-CASE, GOTO.

All operators supported except "->", ".", SIZEOF, and (TYPENAME).

UNIX-compatible standard I/O library.

Standard I/O redirection with complete device independence.

Input using FGETS or GETS functions support LDOS Job Control Language.

Dynamic memory management (ALLOC, FREE, SBRK).

Sequential files open for READ, WRITE, and APPEND.

Generates Z-80 EDAS Version IV source code as output.

User libraries in Z-80 source ISAM-accessed PDS files.

Compact one-line invocation of the compiler.

LC's friendly interface provides an easy way to learn LC options.

Supports separate compilation of functions.

Compiled programs run under both Models I and III without modification.

Installation library gives access to graphics and LDOS entry points.

Supplied with example programs and utilities in source form.

LC/LIB has: FPRINTF, PRINTF, ALLOC, FREE, SBRK, and String functions.

The LC package is LDOS 5.1 compatible and includes LC/CMD, LC/LIB, FP/LIB, IN/LIB, EDAS-IV, XREF, and more than 200 pages of documentation.

With LC, in no time at all it is possible to be writing C programs such as:

```
#include stdio/csh /* standard I/O definitions */
/*  XFER - copy standard input to standard output  */
int  c, bytes, lines;
FILE *fp;
main()
{   while( (c=getchar()) != eof)
    {   putchar(c);
        ++bytes;
        if (c == eol) ++lines;
    }
    fp = fopen("*do","w");
    fprintf(fp,"%d  characters  , %d  lines  were  copied", bytes,
lines);
}
```

This program copies standard input (*KI) to standard output (*DO) while it counts the number of characters and lines. However, with LC's I/O redirection, input and/or output can be changed to any other device or file. Type directly into a file or copy a file to a printer!

Get C - get LC!

* - UNIX is a trademark of Bell Laboratories

catalog #	product name	comment	weight	mfg
M-21-010	LC - "C" Compiler	Model 1,3 LDOS 5.1	2	MIS

Snapp Extended LBASIC

Snapp Extended LBASIC is a group of extensions to LBASIC which augment both the function as well as the operational simplicity of the interpreter. The program is written entirely in machine language for fast execution of commands. The system is comprised of six modules all of which are invoked from the keyboard.

The subsequent commands are included:

SYSTEM TRON/TROFF - enables or disables the single step trace function. Prior to execution, an LBASIC line number appears in the upper right portion of the screen. Any key pressed will execute the line and then halt the program again.

XBASIC module - relegates certain BASIC commands to single keystrokes if they appear as the first character of a line. These are A-AUTO, C-CLS, D-DELETE, E-EDIT, K-KILL, L-LIST, L"-LOAD", M-MERGE, N-NEW, P-LLIST, S-SYSTEM, V-SAVE. Additionally, XBASIC supports a "U" function which can recover programs accidentally lost by incorrect commands such as NEW or CMD"S".

XREF module - this routine produces a listing of any or all variables or line numbers used within a resident LBASIC program. This listing will contain information about each location within the program where the variable/line number is used.

XDUMP module - this routine allows the programmer to list to the video or printer all variables used in the program. This list also includes their current values. The routine can greatly simplify debugging.

XRENUM module - this is an expanded program line renumbering utility which allows relocation of blocks of program code, duplication of code blocks, and functions much faster on large programs than CMD"N".

XFIND module - this routine produces a listing of any/all strings and/or keywords used within the resident program. The functions are identical to those performed for variables and integer constants by XREF.

XCOMPRESS module - this routine reduces the size of a resident BASIC program to an absolute minimum for optimal execution using the interpreter. Programs which have been so compressed typically occupy 30 to 40 per-cent less memory space and run 7 to 10 percent faster.

catalog #	product name	comment	weight	mfg
S-25-040	Snapp Ext LBASIC	Model I LDOS 5.1	1	SNP
S-25-050	Snapp Ext LBASIC	Model III LDOS 5.1	1	SNP

SNAPP Trial Package

An excellent way to examine several Snapp packages for very little cost. Six systems are provided on a diskette which may not be backed up. The user is provided with the temporary use of $192.00 worth of Snapp utilities to sample at leisure.

Included are the extended LBASIC modules described above plus 23 functions to add to LBASIC in a system called XBIF, automated video display management for LBASIC in a system called XBMS, an extended file mapping support system (XFMS), and a college educated garbage collector (CEGC) providing substantial performance improvement to BASIC programs utilizing extensive string manipulation.

catalog #	product name	comment	weight	mfg
S-25-010	Snapp Trial Pack	Model I LDOS 5.1	1	SNP
S-25-030	Snapp Trial Pack	Model III LDOS 5.1	1	SNP

UTILITIES, FILTERS, EDITORS, MONITORS

FED (file editor)

FED is an all purpose file editor designed to run exclusively with the LDOS operating system on the TRS-80 Models I and III. Its wide range of abilities make it excellent for an advanced operator, but its simplicity makes it easy to use for the novice.

FED works by displaying a single 256 byte record of the specified file. The display will show both ASCII and hexadecimal equivalents of the bytes in that record. Full cursor positioning makes it possible to quickly attain any spot in the record. FED also provides a 128 byte mode, displaying an operator selected window of the current record. In this mode the decimal and binary equivalents of the byte at the cursor are displayed.

FED - 256 byte display mode

```
.lespec:.Relativ |00> ..6C 6573 7065 633A A052 656C 6174 6976 |0|F
e Byte .Command. |10> 6520 4279 7465 20BE 436F 6D6D 616E 64BA |0|E
Byte X'nn' => X' |20> 4279 7465 2058 276E 6E27 203D 3E20 5827 |0|D
nn' = ...Zbbbb b |30> 6E6E 2720 3D20 0102 D65A 6262 6262 2062 |1|/
bbb =            |40> 6262 6220 3D20 2020 2020 2020 2020 2020 |-|C
 Press <ENTER> t |50> 2050 7265 7373 203C 454E 5445 523E 2074 |  M
o continue, <BRE |60> 6F20 636F 6E74 696E 7565 2C20 3C42 5245 |  D
AK> to abor.   D |70> 414B 3E20 746F 2061 626F 72F4 2020 2044 |  :
rive    Record R |80> 7269 7665 2020 2020 5265 636F 7264 2052 |  0
ecord X'nnnn.  X |90> 6563 6F72 6420 5827 6E6E 6E6E A720 2058 |
'0123456789ABCDE |A0> 2730 3132 3334 3536 3738 3941 4243 4445 |
F  BYTE  00 01 0 |B0> 4620 2042 5954 4520 2030 3020 3031 2030 |
2 03 04 05 06 07 |C0> 3220 3033 2030 3420 3035 2030 3620 3037 |
  08 09 0A 0B 0 |D0> 2020 2030 3820 3039 2030 4120 3042 2030 |
C 0D 0E 0F.Print |E0> 4320 3044 2030 4520 3046 0D50 7269 6E74 |>00
er Not Read.Stri |F0> 6572 204E 6F74 2052 6561 64F9 5374 7269 |C:
```

128 Byte display window

```
..FED/CMD(Copyright 1981 by Galactic Software Ltd....Y00102030 4
05060708090A0B0C0D0E0F0.........................................
================================================================
    00>  05 06 46 45 44 32 20 20   1F 28 43 6F 70 79 72 69
    10>  67 68 74 20 31 39 38 31   20 62 79 20 47 61 6C 61
    20>  63 74 69 63 20 53 6F 66   74 77 61 72 65 20 4C 74
    30>  64 2E 01 02 D6 59 30 30   31 30 32 30 33 30 34 30
    40>  35 30 36 30 37 30 38 30   39 30 41 30 42 30 43 30
    50>  44 30 45 30 46 30 20 20   20 20 20 20 20 20 20 20
    60>  20 20 20 20 20 20 20 20   20 20 20 20 20 20 20 20
    70>  20 20 20 20 20 20 20 20   20 20 20 20 20 20 20 20
================================================================
FED/CMD:0  Drive 0   Record  0  X'0000'     Relative Byte >00
Command:                                    Values    X'05'=5
```

FED allows record advancing, backspacing, and direct positioning. Paging through a file is quickly accomplished both backward and forward. FED will also position directly to the first or last record and will also indicate the true end of file byte. The user need not keep track of current cylinder number, sector number, disk density, number of sides etc. FED automatically handles all spanning of sectors, cylinders and extents.

FED provides two types of character string searches. These searches allow ASCII strings of up to 30 characters and hexadecimal strings of up to 15 bytes in length. The search modes will search the entire file, starting at the cursor location in the current record. If the string is found, the cursor will be positioned to the start of the string in the appropriate record. A single key command will also resume the search.

FED supports complete editing of a file in both the ASCII and hexadecimal modes. Modifications can be done to any type of file - data files, load module format files, BASIC programs, ASCII files etc. When modifying a file, changes are made to a memory buffer containing the desired record, which can then be saved to disk with a single command.

FED command set

<;>	Advance File Record	<BREAK>	Cancels command
<->	Back up File Record	<N><ENTER>	New File
<B>	Beginning Record of File	<S><ENTER>	Save Record
<E>	Ending Record of File	<X><ENTER>	Exit FED
<R>	Position to Record	<H>	Hexadecimal Modify
<Z>	Zip through File Blocks	<A>	ASCII Modify
<M>	Calculate Load Address	<T>	Toggle Display Modes
<C>	Find ASCII String	<F>	Find Hex string
<L>	Locate Hex Address	<G>	Goto next occurrence
<D>	Dump File to Printer	<O>	Output top-of-form
<P>	Send Buffer to Printer		

This is a file editor, not a file copier, text editor, or word processor. It is for displaying, printing, and modifying existing files. FED works on a file level not a track sector level. Files cannot be extended but only modified.

catalog #	product name	comment	weight	mfg
L-30-010	FED - File Editor	Model 1,3 LDOS	1	LSI

LED - LDOS Text Editor

LED is a screen oriented text editor that is designed to work on the LDOS operating system. It can be used to edit most types of ASCII source files, including BASIC programs, The BASIC Answer source code, as well as LDOS JCL and KSM files. LED works on both Model I and Model III but does require the lower case modification on the Model I.

The LED command menu can be displayed on the lower portion of the screen while editing text. The display contains all LED command keys, the name of the file being currently edited, the current cursor column, the hex value of the character under the cursor, and the available memory in the text buffer.

Since LED uses the LDOS keyboard driver, type ahead and all keyboard filters are available for use. All 128 ASCII characters are available directly from the keyboard.

Cursor positioning is accomplished with the four arrow keys. The <CLEAR><ARROW> keys will move to the top, bottom, left, or right of the text. Tabs are supported as well as typeover, insert, insert line, or delete.

A Hex mode is available either when overtyping or inserting. It allows the input of characters as two hexadecimal digits over the entire X'00' to X'FF' range. This makes possible direct editing of graphics characters.

Certain parameters may be specified when entering LED. TABS will cause any X'09' tab character to be expanded. XLATE=X'fftt' will perform a character translation when loading or saving a file.

catalog #	product name	comment	weight	mfg
L-30-020	LED - Text Editor	Model 1,3 LDOS	1	LSI

I/O MONITOR

I/O Monitor is a disk input/output error intercept utility designed to run exclusively with the LDOS operating system. Its purpose is to intercept a disk read/write error and offer the operator certain options. Monitor will display the error message. Included in the error message will be the error number and the description, along with the relevant information such as disk number, cylinder, buffer location, and error number.

Monitor will be useful when using programs, lacking sophisticated error trapping, to manipulate files. With Monitor installed, disk I/O errors which would normally abort processing may be intercepted, giving the operator the ability to abort or continue.

Four options will be available. The Abort option will discontinue the I/O attempt, normally returning back to the LDOS Ready prompt. The Continue option will proceed with the normal I/O path. This usually results in the error being passed back to the calling program. The Ignore option will cancel the I/O error code, and attempt to continue the operation as though no error occurred. The Retry option will re-attempt the operation that caused the error.

catalog #	product name	comment	weight	mfg
L-30-030	I/O Monitor	Model 1,3 LDOS	1	LSI

MemDISK

Who ever heard of a disk drive for less than $40! By using a portion of existing RAM in a TRS-80, MemDISK will create a fully functional disk type device. This RAM based "disk" may be accessed as a normal disk drive with Copy, Backup, Free, Dir, Save, Load, Dump etc.

The amount of storage available on MemDISK is user selectable from 1.5K through 28.5K. Tracks may be set up in 1.5K or 3K blocks. The access time of MemDISK is guaranteed to be faster than any floppy drive available and it's even faster than most hard drive systems. Things can now be done that were too slow or impossible. MemDISK involves no additional hardware of any sort. 48K and the LDOS operating system are required.

catalog #	product name	comment	weight	mfg
L-30-040	MemDISK	Model 1,3 LDOS	1	LSI

FILTER PACKAGE #1

This handy product contains a series of 14 modules, most of them filters, which act as an extension to the LDOS operating system.

XLATE/FLT - A complete translation filter system for input or output. Included are an EBCDIC translate system and a DVORAK keyboard table. The user can easily build any other translation tables needed for special use.
LISTBAS/FLT - This filter will format the output of a BASIC program. All program lines which contain multiple statements will have their appearance reformatted when displayed.
STRIP7/FLT - Strips bit seven off of each character.
STRIPCNT/FLT - Replaces an output character above X'7F' or below X'20' with a pound sign (#).
MONITOR/FLT - Similar to STRIPCNT/FLT except that characters less than X'20' will be displayed as a per-cent sign (%) followed by an ASCII representation of the actual character + X'41'.
TITLE/FLT - A printer filter that will put a user defined title after each Top-of-Form character (X'0C') is encountered.
UPPER/FLT - Converts every alphabetic character (a-z) to UPPER case.
LOWER/FLT - Converts every alphabetic character (A-Z) to lower case.
SLASH0/FLT - Will cause a printer that is capable of backspacing to do a backspace and type a "/" over every zero.
TRAP/FLT - Will trap and throw away a certain user defined character each time the character tries to pass through the filter.
LINEFEED/FLT - Either adds or removes a linefeed after each carriage return.
PAGEPAWS/FLT - Will wait after each Top-of-Form is printed and pause until the <ENTER> key is pressed to continue.
CALC/FLT - This keyboard filter performs hex/decimal/binary conversions. Hex addition and subtraction may also be accomplished.
REMOVE/CMD - Removes each occurrence of a specified byte from a file.

catalog #	product name	comment	weight	mfg
L-32-050	Filter Package #1	Model 1,3 LDOS	1	LSI

UTILITY DISK #1

The Utility Disk is a group of potent packages that enhance LDOS. The packages are file generating, diagnostic, or provide a means of testing. Included are:

COMP/CMD - A file to file or disk to disk byte for byte comparison utility. It sends differences between two files/disks to either video or printer.
DCT/CMD - Used to view or modify the Drive Code Table (DCT) for any of the eight logical drives. Very useful for developing disk drivers or using non-standard drives.
DIRCHECK/CMD - Checks the integrity of a directory and provides recovery from several errors. Can virtually rewrite the HIT and most of the GAT sectors!
FIXGAT/CMD - Re-creates an unusable Granule Allocation Table on a diskette. Writes user supplied information such number of cylinders, sides, and the density. This utility in conjunction with DIRCHECK can save many situations of directory failure.
HIGH/CMD - Shows allocation of high memory. If the modules conform to the standard LDOS memory header, name of the module will also be displayed.
MAKE/CMD - This utility allows the allocation of space for a file by specifying size in K (1024 bytes) or by the number of records of a given logical record length similar to the CREATE library command. However, the file can now be filled with a specified byte. Additionally, the file can be "closed" or the CREATE flag, which prevents file shrinking, may be toggled.
MAP/CMD - Displays to printer or video the actual storage path (cylinder, granule and sector) of either a current or deleted file.
RAMTEST/CMD - A memory testing utility which verifies RAM from X'4000' to the end of memory.
RDTEST/CMD - Does a non-destructive forced read of the entire diskette to determine accessibility of the entire disk.
READII/CMD - Displays a directory or copies from a Model II TRSDOS 2.0a eight inch diskette to LDOS.
READ40/CMD - Will allow the reading of a 40 track 5" diskette in a drive which is designed for 80 track 5" diskettes. BACKUP and COPY may be implemented under this utility.
TYPEIN/CMD - Combines Job Control Language (JCL) and KeyStroke Multiply (KSM). Allows the user to have a specified stream of characters or commands taken as keyboard input. Unlike JCL, the utility works with any program requesting keyboard input. Programs such as LSCRIPT, LBASIC (INKEY$) or any keyboard strobing requests for input can be satisfied from TYPEIN. The data supplied to TYPEIN can come from keyboard, file, or /JCL which are not compiled. TYPEIN can also be called from within a JCL sequence.
UNKILL/CMD - Will re-instate a file inadvertently Killed or Purged.
WRTEST/CMD - Attempts to write to every sector on a diskette. This tests both the media as well as the drive's ability.

catalog #	product name	comment	weight	mfg
L-32-070	Utility Disk #1	Model 1,3 LDOS	1	LSI

DSMBLR

This program is a machine language disassembler that produces an assembler source code using ZILOG mnemonics from Z-80 machine language resident in memory. This disassembler operates in two passes in order to incorporate symbolic labels in the source output.

References preceding the START address are output as EQUates. A reference is any relative instruction target address or a 16-bit target for load, call, jump, add, or subtract instructions.

Byte or Word values that begin in the range A-F are preceded with a 0 for proper assembly without error.

Output routed to the CRT is displayed in 16-line pages. The display will include the hex address, the hex code, a sequential line number, the OP code, operand, and displayable ASCII characters equivalent to the disassembled instruction's hex code. A page advance is user controlled by key entry.

Output routed to the printer is paged at 56 lines per page. Each page has column headings, supports a user-entered title, and is numbered for producing sophisticated print-outs that look identical to an assembler listing.

Output routed to the tape cassette produces a source tape suitable for loading into the Radio Shack Editor Assembler. Output routed to disk produces a file suitable for loading into EDAS, Disk-modified EDTASM, or Microsoft's ALDS (M-80).

DSMBLR functions under all popular operating systems and is supplied on a cassette tape easily transferable to disk. The following is a sample of the output:

```
MISOSYS Disassembler - Disk Version 2.4  Partial ROM  PAGE  00001
     ADDR CONTENTS LINE# LABEL  INSTRUCTION      ASCII

                   00001        ORG  0000H
     0000 F3       00002 Z0000  DI                 s
     0001 AF       00003 Z0001  XOR  A             /
     0002 C31530   00004        JP   Z3015         C.0
     0005 C30040   00005 Z0005  JP   Z4000         C.@
     0008 C30040   00006        JP   Z4000         C.@
     000B E1       00007 Z000B  POP  HL            a
     000C E9       00008        JP   (HL)          i
     000D C31230   00009        JP   Z3012         C.0
     0010 C30340   00010        JP   Z4003         C.@
     0013 C5       00011 Z0013  PUSH BC            E
     0014 0601     00012        LD   B,01H         ..
     0016 182E     00013        JR   Z0046         ..
```

catalog #	product name	comment	price	weight	mfg
M-35-200	DSMBLR	Model 1,3	$25.00	1	MIS

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CON80Z

For the Z-80 assembly language programmer, the need arises to maintain or modify programs written in 8080 code using Intel mnemonics. Since 8080 code is a subset of Z-80 code, a useful approach is to translate the 8080 code source file to Zilog mnemonics (Z-80) source code. Files could be hand translated from 8080 files to Z-80 files - a formidable task, indeed! An alternative would be to use a translator program. This tool should prove quite useful in such a task. CON80Z has been designed to facilitate the conversion of assembler source files written in 8080 Intel mnemonics to Z-80 Zilog mnemonics. CON80Z is a source translator to help convert 8080 files to Z-80 files - easily.

CON80Z consists of two programs: One, CON80Z/CMD, performs the necessary translations of code on a line by line basis. The translation is one-to-one. Each logical input line is replaced by one output line. The second program, UNNUMBER/CMD, is a preprocessor to CON80Z/CMD and is used to alter certain source files to conform with the requirements for the input file structure.

Although certain code sequences written in 8080 code can be optimized if the Z-80 extensions to 8080 code are utilized, CON80Z performs no such optimizations. CON80Z does help to transform the source into a file structure that can be loaded by an assembler's editor. Most 8080 assembler source files are structured as pure ASCII files with each line terminated by a Carriage Return (CR) followed by a Line Feed (LF). Source lines are also generally not line numbered as is the case with most TRS-80 assemblers. CON80Z will expect the source file to be un-numbered. The line feed may or may not be present.

Some 8080 assemblers support a logical line ending character, such as the exclamation mark (!), to create multiple source statements on one physical line. This is similar to the colon (:) separator in BASIC. By using the CR="c" parameter in the command line, the character "c" will be interpreted as a logical line end when found in the operand field of the source statement and not within single quotes.

Register nomenclature in 8080 code is always a single character. Eight-bit register references in 8080 assembler language are identical to Z-80 references {B, C, D, E, H, L}. The "(HL)" 8-bit memory reference is denoted in 8080 code as the single character M. The appropriate translation from "M" to "(HL)" will be made by CON80Z wherever necessary.

The 8080 16-bit registers available are denoted as B, D, and H with the OP code changed to "extended" to interpret the reference as 16-bit register use (e.g. LD changed to LDX). In addition, the Accumulator and FLAG register are referred to as "PSW" when used in PUSH and POP instructions (PSW is a carry over from main frames and stands for Program Status Word). CON80Z makes the appropriate translations on extended instructions and will translate B, D, H, and PSW to BC, DE, HL, and AF.

During the translation process, CON80Z will convert all comments in upper case characters to lower case characters except for the character immediately following the semicolon (;) comment indicator. CON80Z will also translate multiple blanks used as field separators to one tab (X'09').

CON80Z will perform translations on selected pseudo-ops where there is a similarity of usage on common TRS-80 assemblers. The following pseudo-op translations will be performed: <DB/DS/DW/SET> to <DEFB/DEFS/DEFW/DEFL>.

CON80Z requires LDOS Model I or Model III.

catalog #	product name	comment	weight	mfg
M-35-230	CON80Z	Model 1,3 LDOS	1	MIS

CONVCPM

The CONVCPM utility will allow the transfer of files from certain CP/M diskettes onto an LDOS formatted diskette. CP/M formats supported are standard 8" Single Density and 5" Single Density 128-byte sectoring (Omikron version and equivalent). Two drives are required.

The CONVCPM utility will allow movement of all or groups of files from certain CP/M disks onto LDOS disks. It provides many different parameters to choose the files to be moved. The file specifications on the CP/M disk must conform to LDOS file specification standards. The filename and extension must begin with an alphabetic character (A-Z). Subsequent characters of the filename and extension must be alphanumeric characters (A-Z,0-9).

The CONVCPM utility has been designed to aid in transferring data files and other files that are not directly executable under CP/M. Once moved to an LDOS diskette, the transferred file is an exact image of the file as it appeared on the CP/M diskette.

CP/M uses a sector skew translation scheme during disk I/O. CONVCPM has two sector translation tables for commonly used CP/M formats. The single-density 8" diskette structure supported is the Digital Research standard. Each company implementing a version of CP/M on other than 8" single density media chooses their own sector skew translation table. A version of CP/M that is on 5" media may or may not utilize the same translation table as that used in CONVCPM which is that implemented by Omikron. CONVCPM translation tables are Single Density 8" (1, 7, 13, 19, 25, 5, 11, 17, 23, 3, 9, 15, 21, 2, 8, 14, 20, 26, 6, 12, 18, 24, 4, 10, 16, 22) and Single Density 5" (1, 5, 9, 13, 17, 3, 7, 11, 15, 2, 6, 10, 14, 18, 4, 8, 12, 16). A parameter provides the means for entering a different translation table into CONVCPM.

catalog #	product name	comment	weight	mfg
M-35-220	CONVCPM	Model 1,3 LDOS	1	MIS

PDS

The definition of a Partitioned Data Set (PDS) is a data file that is divided into sequentially organized members. Each PDS includes a directory that points to the beginning of each member. Data sets of this type are most frequently used to store object programs - each member corresponds to a single object program. The PDS as a whole is referred to as a library. Operating system libraries and user libraries are stored in this fashion. This definition describes exactly, the two LIB files in LDOS, SYS6/SYS and SYS7/SYS.

The PDS structure has provided a technique for combining separately executable object programs into one file, thereby saving directory slots. It also saves time by not having to load an entire 10K-15K file just to get a few hundred bytes or a few thousand bytes of program loaded if all LIB commands were just one big file. The system overhead of having to read and search the member directory is minimal.

Up until now, only the system library has supported the PDS structure. Now, with the PDS utility from MISOSYS, user PDS structures are possible. The PDS command can be used to create custom libraries. A library could be a collection of a dozen utility programs - all stored under one name but directly executable by specifying the library name followed by the member name.

Suppose that a library exists consisting of CMDFILE, DSMBLR, FED, BINHEX, EDAS, and XREF. The library name MYLIB was chosen. EDAS can be executed by entering, MYLIB(EDAS), at the LDOS ready prompt.

The PDS command is itself a Partitioned Data Set and supplies the following functions via installed members:

APPEND - Appends a new member to the existing PDS and updates the member directory and ISAM table records.
BUILD - Creates a new Partitioned Data Set. The PDS is composed of a Front End Loader program, a MEMBER directory, and an ISAM table.
COPY - Transfers an image of a PDS member from the PDS to a designated file.
DIR - Provides a directory listing for each member with its name, type, date of addition, and file space occupied.
KILL - Makes a member inaccessible for access.
LIST - Will list a specific member in standard hex format or ASCII format.
PURGE - Removes killed member(s) from the PDS and compresses the file to reclaim the space previously occupied by the killed member(s).
RESTORE - Restores a killed file to accessibility.

The following is sample PDS directory:

```
PDS: U/CMD        07/07/82    Size:  45K Members: 15/ 16
convcpm  P 13-Mar-82  1597    dct      P 13-Mar-82  3620
debugger P 13-Mar-82  2398    dircheck P 13-Mar-82  2137
dirlist  P 27-Mar-82   957    doconfig P 30-Apr-82   459
dsmblr2  P 13-Mar-82  5724    edas     P 13-Mar-82 10123
fed      P 13-Mar-82  7308    led      P 07-Apr-82  5699
monitor  P 13-Mar-82  1814    reformat P 13-Mar-82   614
strip    P 13-Mar-82   767    unhash   P 13-Mar-82   346
xref1    P 13-Mar-82  2127
```

The directory is sorted, shows the size of each member (in bytes), and has the date that each member was added to the PDS. This is an excellent tool to organize disk space and unclutter directories! PDS requires LDOS Model I or Model III Version 5.0.3 or later.

catalog #	product name	comment	price	weight	mfg
M-35-210	PDS	Model 1,3	LDOS	1	MIS

SOLE

LDOS is a sophisticated operating system. Logical Systems has expended great effort in producing a good DOS for TRS-80 users. Paramount in their implementation was the concept of standardization. The media format chosen for double density operation on the Model I was an entire diskette formatted in double density. Since the TRS-80 Model I cannot begin to BOOT a diskette unless the BOOT sector (track 0, sector 0) is formatted in single density, the standard LDOS double density diskette cannot be BOOTed.

SOLE is an application to accomplish that goal. It will create a double-density booting SYSTEM diskette for use with LDOS on a Model I. It essentially constructs a single density track 0 on a previously formatted double density diskette. It then proceeds to add a second BOOT routine and double density READ ONLY disk driver to be used to read SYS0. This SOLE BOOT routine and driver is what the sector 0 BOOT routine will read. Since the track 0 is single density, the ROM can read sector 0. The sector 0 BOOT passes control to the SOLE BOOT after it successfully loads the SOLE BOOT.

The SOLE BOOT routine interfaces with a double density driver that can do only one thing - read sectors. It reads the SYS0 which is obviously positioned on some double density track. After SYS0 is loaded and before passing control to SYS0, the SOLE BOOT slides its booting drive code table into the standard drive 0 position. Then when SOLE passes control to the SYS0 initialization, SYS0 is interfaced to the double density read-only disk driver.

SOLE supports PERCOM-type double density adaptors and the Radio Shack type adaptor. SOLE is for Model I LDOS only.

catalog #	product name	comment	weight	mfg
M-35-240	SOLE	Model I LDOS	1	MIS

HELP

The HELP series of utility programs provides prompting notes on the LDOS 5.1.3 system commands and syntax. It is supported under LDOS on lower case equipped Model I and Model III machines. The HELP files contain detailed descriptions of the system functions including explanation of parameters and their default values. The HELP function can be executed from LDOS Ready or from within LBASIC.

The HELP programs provide adequate explanations of the specified commands. HELP file also contains a HELP function that will yield a menu of the helps within the HELP file.

The HELP file allows quick access to any help member within the files with minimal memory requirements and rapid response time.

The HELP utility also comes with a Quick Reference Card. The QRC is a ten-panel foldout that identifies all LDOS library commands, utilities, drivers, filters, and LBASIC. Over 90% of LDOS reference needs can satisfied with the HELP utility.

catalog #	product name	comment	weight	mfg
M-35-250	HELP	Model 1,3 LDOS 5.1	1	MIS

LSI has a Quick Reference Card for LDOS version 5.1.3. It is a 10 panel pocket size reference of LDOS commands and utilities in alphabetical order for ease of use. LBASIC is on the flip side. The card is typeset and color coordinated to the LSI binders.

catalog #	product name	weight	mfg
L-40-060	LDOS Quick Reference Card version 5.1.3	1	LSI

GRASP

The GRAphics Support Package (GRASP) is a collection of programs, filters, and drivers that will enhance the capabilities of the Epson MX-80 Graftrax or MX-100 printers. GRASP implements customized character sets which include standard ASCII characters, TRS-80 graphics blocks, and Model III special character symbols.

A screen-oriented character editor makes it easy to modify or create any character font desired up to a size of 16 vertical by 12 horizontal dots. In the double-character mode, the character font can occupy a width of up to 24 dots. The editor displays an individual character in a visual matrix made up of large graphics blocks. By manipulating the graphics cursor within the matrix it is possible to control exactly what "dots" will be present in a character.

Filters are provided to toggle underlining and invoke selected double-width characters intermixed with standard width. Another filter allows the capability of printing the Model III special characters with a minimum of high-memory usage.

A program is provided to easily set the custom functions of the MX-80G or MX-100 from the LDOS Ready mode instead of having to write complex PRINT CHR$ instructions.

The ALTCHAR/CMD program is a special-purpose graphics editor for use in constructing and customizing entire character sets to use with the ALTCHAR/DVR printer driver.

ALTCHAR comes supplied with seven already defined character sets which are: STD10/12 - a 10/12 pitch character set of "standard" characters, block graphics, and Model III special characters; TYPE10/12 - a 10/12 pitch set of typewriter like characters, block graphics, and Model III special characters; SCI10/12 - a 10/12 pitch set derived from STD10 which includes greek characters plus superscripted and subscripted numerals; and OLDENG - a 10 pitch double-width character set of Old English characters.

ALTCHAR/DVR implements the printer support drivers that will use the character files to generate the customized character sets on a the printer. The driver options include the following parameters. ADDLF will cause a line feed to be sent after each carriage return. SPACE will cause the output of an extra one-half line feed between each line of text. WIDTH establishes the number of characters to print on a line. DOUBLE will cause the interpretation of the character set as being "double-width". HIGH will allow the printing of only characters with an ASCII value less than or equal to the value specified. Only the necessary portion of the character data set will be read and stored in memory, thus allowing reduction of the ALTCHAR driver high memory requirements. LENGTH will set the page form length in one sixth inch lines.

ALTLINE is a filter to implement character underlining using a toggle character. The ALTLINE filter works in conjunction with the ALTCHAR driver to allow the printing of a continuous underline with little user intervention. Upon receipt of the switch toggle character, ALTLINE will underline all characters until either the end of the line is reached or the switch toggle character is detected. The toggle character is not printed.

This ALTWIDE filter provides the capability of printing selected characters in double width while all others are printed in standard width. It could be used, for instance, to print all capital letters in double width.

MOD3CHAR/FLT is a filter that adds the capability to print the special video characters as displayed on the Model III without the high memory overhead needed by ALTCHAR. If only the special characters are needed, this filter will do it. However, ALTCHAR is still needed for custom character sets.

GPD/DVR allows the use of all dot addressable graphics on the Epson printers. GPD/DVR replaces the printer driver routines located in the TRS-80 ROM. The TRS-80 ROM printer driver routines convert some characters and trap others. GPD/DVR eliminates this problem. When GPD/DVR is set, all codes will be passed unmodified to the printer.

The SETMX80G and SETMX100 utilities permit conveniently setting the printer options for the Epson MX-80G or MX-100 printers. Command line options for MX-80G are:

RESET - reset to defaults
Paper - paper transfer mode
Comp - compressed mode
Italic - italics mode
Double - double strike mode
Form - form length in lines
Margin - restores PR/FLT left margin

RSmode - Radio Shack mode
Emph - emphasized mode
eXpand - expanded mode
MSB - MSB function
Space - line spacing
Lines - lines per inch

The SETMX100 program also supports the following:

US/FRench/GErman/ENglish/DAnish/SWedish/ITalian/SPanish
SKip - skip over perfs
COLumn - column width

UNDRLINE/FLT is used to provide an easy means of underlining on any printer that will backspace (without erasing) and print an underline character (ASCII 95). This filter will work with the Epson MX-80 w/Graftrax but not with the Epson MX-100. The character specified by the parameter, CHAR, will be used to start and stop (toggle) underlining.

GRASP is complete for the Model I/III machine and Epson printer. Seven character sets are provided with GRASP.

catalog #	product name	comment	weight	mfg
M-35-260	GRASP	Model 1,3 Epson Ptr	1	MIS

MSP-01

The MSP-01 package is a collection of four utility programs to further enhance the use of LDOS. Each program functions under Model I or Model III LDOS.

Wouldn't it nice to be able to command the AUTO to execute without having to type BOOT or hit the RESET button? The DOAUTO command is a short program that will execute the "AUTO" command buffer located on ANY drive - not just the SYSTEM drive. It's as easy as typing "DOAUTO :2".

DOCONFIG is a major enhancement of the configuration capabilities of LDOS. DOCONFIG works in one of two ways. SAVE the current configuration of the system to ANY file of choice on any drive of choice. The ability exists to restore the machine's configuration at any time from any of the configuration files created. The configuration file is constructed identically to the LDOS CONFIG/SYS file, except that now it is possible to control configurations without having to re-boot the machine.

DOCONFIG can even be executed from a Job Control Language file to either SAVE or RELOAD a configuration file while the JCL is executing. This will work even if a re-loaded configuration changes the drive assignment for the drive currently executing the JCL file - be it the system's SYSTEM/JCL file or an execute-only JCL file. DOCONFIG is smart enough to correct the JCL interfacing being done by LDOS if drive assignments are switched. If the JCL is SAVING a configuration, the CONFIG file will not reflect JCL as being active. The use of DOCONFIG now gives JCL more power to run job streams that require revised high-memory configurations for selected applications.

MEMDIR is here to give a directory of high memory. It tells what program/module is there, where it resides, and how long it is. MEMDIR makes use of the front end linkage protocol as documented by Logical Systems in the January 1982 LDOS QUARTERLY and requires all high-memory modules to adhere to that standard.

The biggest part of the MSP-01 package is PARMDIR. Essentially, PARMDIR is a specific-purpose report writer that uses the on-line disk directories as a data base of information. PARMDIR was originally written to automatically generate Job Control Language files based on tests of data contained in the directory.

```
PARMDIR /DOC:3 REN:0 (A="RENAME ",X="/SCR")
```

This will produce a JCL file containing an entry for all files on drive 3 that have an extension of "/DOC". Each JCL line of the file, REN/JCL, will appear as: "RENAME filename/DOC:3 /SCR". If the parameters were entered as "(A,X)", then each JCL line would appear as: "#A# filename/SCR #X#". Thus, at JCL compilation time, parameters may be substituted for "A" and "X".

However, PARMDIR goes light years beyond this simple example. Parameters A,B,C,X,Y,Z can be constructed with directory data information for each filespec selected. The information is positioned according to key-word assignment within the parameter string. For example,

```
"(A="$NAM $EXT $LRL $REC")"
```

will recover in each output line, the file name, extension, logical record length, and number of records. Keywords are available also for protection level ($PRO), ending record number ($ERN), file date ($DAT), end-of-file byte location ($EOF), drive spec ($DRV), volume name ($VNM), volume date ($VDT), or the entire volume id ($VID).

Each of the keywords (except filename/ext) may be tested for value comparisons in order to select the directory record for output. The comparison is constructed as a complex "IF expression" syntax. For example:

```
IF="$LRL <= 18 & $REC < 3"
```

selects those directory records with a logical record length of from 1-18 only if the number of records is less than 3. If incorrect syntax were used PARMDIR will tell exactly what character was in error.

The output can be directed to any file or device and the output is SORTED by filename/extension. Since PARMDIR can make extensive use of parameters, it is possible to enter parms in the command line OR from any file or device. Creation is allowed of a PARMSLIB disk file that contains NAMED parameter procedures and refer PARMDIR to the specific procedure of parameters for a particular execution of PARMDIR - just like JCL can use a PROCLIB with named JCL procedures. PARMDIR even permits typing in parameters from the keyboard at execution time if PARMS="*KI" is selected as the parameter input device. There is no limit to the amount of parameters that can be entered from a parameter file or device input - only the command line limits its entry to 63 characters max.

When PARMDIR generates its JCL file, all of the parameter entries are written as comments to the output.

PARMDIR can access the directory information of a specific drive or all on-line drives. PARMDIR can construct customized directory listings to mechanize JCL file construction. In essence, PARMDIR is the most versatile program to come along that allows tapping the data contained in directories.

catalog #	product name	comment	weight	mfg
M-35-270	MSP-01	Model 1,3 LDOS	1	MIS

APPLICATIONS PROGRAMS

Mail/File Series II

The Mail/File Series II System is designed to meet all the requirements of a Mailing List data base manager. No effort has been spared to provide for maximum operator ease, while retaining overall system flexibility. It is without a doubt the most versatile package of its kind.

Mail/File Series II is designed to run on the TRSDOS or LDOS operating system.

1> Maximum capacities are as follows:

Model I - 600 Names per file
Model III - 1200 Names per file
Model II - 2500 Names per file

2> Nine data fields plus Mail/File System Control Number are provided.

#0 Control # - 4 Characters
#1 Name #1 (or company name) - 27 Characters
#2 Name #2 (or individual) - 27 Characters
#3 Address - 27 Characters
#4 City - 15 Characters
#5 State - 3 Characters
#6 Zip Code - 11 Characters
#7 Telephone Number - 14 Characters
#8 Telephone Extension - 4 Characters
#9 Code - 6 Characters

3> All records are sorted Alphabetically and by Zip Code. Alphabetic sort is by a combination of Name #1 plus Name #2.

4> Each entry is sorted into the system when entered. An assembler module allows for quick sorting, with an average wait of about 5 seconds per added item. Deletions are performed within 5 seconds, no matter how many items are in the list.

5> The Mail/File System provides for an 11 digit alpha/numeric Zip Code, allowing the system to handle both foreign and domestic Zip Codes.

6> Complete record maintenance is supported. Editing of any data field, including sorted fields, is allowed.

7> Records can be accessed in Alphabetic, Zip Code, or Control Number order. Control Number access is immediate, while access in Alphabetic or Zip Code order is always less than 10 seconds, even when operating at maximum capacity.

8> To provide for literally thousands of sublists, additional access criteria may be specified as follows:

* Any data field other than Name #1, Zip Code, or Code may be used as an inclusion criteria.

* Up to 19 different whole or partial Codes may be used as inclusion criteria.

9> The Mail/File System supports standard 3-line and 4-line labels, with provisions for a user entered message line. Labels may be printed in single or multiple across formats. Zip Code changes may be identified during label printing and directory printing if required. The total number of items printed is always included during any printout operation.

10> The Mail/File System supports Directory printouts of 80 or 132 columns. The 132 column directory supports up to 199 lines per page, and includes full heading and page numbering. Control number is included in both types of directory listings to allow access by Control Number for purposes of editing.

11> The Mail/File System also allows printouts to be structured in a unique User Defined format with up to 16 format lines per data record, providing the exact type of output required by the user.

12> "Word Processor" type input editor allows for transparent cursor positioning, type over, and character insertion and deletion.

13> User may request a printout of items as they are added to the file.

14> A unique "Totaling" option allows the counting of items meeting user specified criteria.

15> Extensive error trapping has been employed to insure the integrity of the Mail/File System and to help eliminate operator error.

16> All data records created by Mail/File are upward compatible with all of LSI's Mailing List programs.

catalog #	product name	comment	weight	Mfg
L-50-010	Mail/File II	Model 1 TRSDOS 2.3 ***	3	LSI
L-50-020	Mail/File II	Model 2 TRSDOS 2.0	3	LSI
L-50-030	Mail/File II	Model 3 TRSDOS 1.2 ***	3	LSI

***

These versions are standard on smal-LDOS unless specified with TRSDOS

Mass/Mail Subscription System

The Mass/Mail System is designed to meet all requirements of a subscription/mailing data base manager. No effort has been spared to provide maximum operator ease, while retaining overall system flexibility. Each Mass/Mail System is custom tailored to fit the needs of the individual customer.

1> Maximum capacity of 10,500 records, stored at 3,500 per diskette.

2> Nine use entered data fields plus a system supplied control number are provided.

#0 Control # - 4 Characters
#1 Name #1 (or company name) - 27 Characters
#2 Name #2 (or individual) - 27 Characters
#3 Address - 27 Characters
#4 City - 15 Characters
#5 State - 3 Characters
#6 Zip Code - 11 Characters
#7 Telephone Number - 14 Characters
#8 Telephone Extension - 4 Characters
#9 Code - 6 Characters

These data fields can be custom labeled to support specific customer needs.

3> The Mass/Mail System provides for an 11 digit alpha/numeric Zip Code, allowing the system to handle both foreign and domestic Zip Codes.

4> All records are sorted Alphabetically and by Zip Code. Alphabetic sort is by a combination of Name #1 plus Name #2.

5> Complete record maintenance is supported. Editing of any data field, including sorted fields, is allowed.

6> All sort information is stored and "batched" at the operator's convenience, providing instantaneous addition, deletion, and editing. Up to 1000 operations can be stored before batching is required.

7> Records can be accessed in Alphabetic, Zip Code, or Control Number order. Control Number access is immediate, while access in Alphabetic or Zip Code order is always less than 10 seconds, even when operating at maximum capacity.

8> To provide for literally thousands of sublists, additional access criteria may be specified as follows:

* Any data field other than Name #1, Zip Code, or Code may be used as an inclusion criteria.

* Up to 19 different whole or partial Codes may be used as inclusion criteria.

* One whole or partial Code to be used as exclusion criterion.

9> The Mass/Mail System supports standard 3-line and 4-line labels, with provisions for a user entered message line. Labels may be printed in single or multiple across formats. Zip Code changes may be identified during label printing and directory printing if required. The total number of items printed is always included during any printout operation.

10> For publishers using second class mailing a zone count option is available.

11> The Mass/Mail System supports Directory printouts of 80 or 132 columns. The 132 column directory supports up to 199 lines per page, and includes full heading and page numbering. Control number is included in both types of directory listings to allow access by Control Number for purposes of editing.

12> LSI will custom configure all label and directory formats to meet the customer's specific needs.

13> The Mass/Mail System also allows printouts to be structured in a unique User Defined format with up to 16 format lines per data record, providing the exact type of output required by the user.

14> "Word Processor" type input editor allows for transparent cursor positioning, type over, and character insertion and deletion.

15> Four user programmable input keys are provided to prevent having to re-enter often repeated data time after time.

16> Mass delete and Mass Code change are provided.

17> Certain functions are accessible only with a password to ensure protection of the data files. The password is supplied by the user and may be changed only by knowing the existing password.

18> Additional data diskettes (up to three total) may be added to the Mass/Mail system whenever more records are needed.

19> Extensive error trapping has been employed to insure the integrity of the Mass/Mail System and to help eliminate operator error.

20> Each diskette in the Mass/Mail system is given a user supplied name and system supplied verification number and session number to prevent mixing diskettes when running multiple systems.

21> The Mass/Mail System is upward compatible with LSI's Series II Mail/File System.

Mass/Mail Accessory Modules

Mass/Mail Zone Count - counts zones used in second class mail.
Mass/Mail Country - substitutes a Country Name field for the phone number field.
Mass/Mail Reconstruct- allows data base re-assembly after a hardware problem has caused base reading faults (also available as a support service from LSI).

Mass/Mail Demo - allows manipulation of a predefined data base to demonstrate the system. This module is very useful for training new operators. Or, it may be used to determine whether or not the system will be useful in a given operation.

Mass/Mail requires a TRS-80 Model II microcomputer with at least one expansion drive, an 80 or 132 column printer, and TRSDOS 2.0 or later operating system.

catalog #	product name	comment	weight	mfg
L-50-040	Mass/Mail System	Model II 2.0a	3	LSI
L-50-042	M/M Zone Count	" " "	0	LSI
L-50-044	M/M Country	" " "	0	LSI
L-50-046	M/M Reconstruct	" " "	0	LSI
L-50-049	M/M Demo Package	" " "	3	LSI

INVENTORY MASTER

The Inventory Master System has been modeled after a proven main-frame system costing tens of thousands of dollars and is designed to aid the user in inventory tracking.

The system maintains all in-stock, on-order, re-order, and minimum to stock quantities as dictated by the user and sales. In addition, the system tracks quantity sales of items according to present month, year, and previous year. It uses a rotating quarter system to track quarterly sales for up to one year. Dollar figures for month year and previous year are also included.

The Inventory Master System provides the following capabilities.

1> The user may track up to 2700 stock items with an equal amount of vendors.

2> Complete add/edit/delete utilities allow ase of file maintenance.

3> The Search mode allows the user to bring up complete fileXrecords for viewing. A "screen print" function allows the user to obtain a hardcopy of all information regarding an item.

4> Machine language routines allow insertion and deletion to be completed in seconds not hours or minutes.

5> Items are grouped according to vendor and are kept in sorted order according to part number.

6> Items can be accessed by vendor and part number or by the index number.

7> User may design a selection code for each item which allows tracking similar items from different vendors.

8> The user may manually place an order or may elect to have a computer generated order. In computer ordering the user may specify order level by user defined specs or by computer recommended order. Complete add/edit/delete utilities are supported on the order file for ease of order placement. Differences between user and computer orders are clearly defined.

9> Computer generated orders may be either for an individual vendor or for the entire file.

10> The order file is batch processed so that the user need not be present during final processing. The final order is printed in alphabetical order according to vendor.

11> Separate customer back orders may be placed and are isolated from regular stock orders.

12> Daily input of sales from sales tickets is a batch operation capable of storing 190 entries in a daily sales file. A printed report in alphabetical order is generated when the sales file is processed.

13> The user may receive orders by user key or index number. At this time a choice to fill customer backorders or stock orders may be made.

14> Reports may be generated by vendor or for the entire deck. A user defined selection code may be specified for printing reports. Reports are generated in alphabetical order with title, date, and page number. The following reports are possible:

- A> Standard Deck Printout (alphabetically or index number).
- B> Recommended Order Report.
- C> Report on out of stock items.
- D> Report on orders outstanding.
- E> Overstock Report.
- F> Cost/price information report.
- G> Sales Report.

15> Monthly/Quarterly/Annual processing module is provided to close out sales information on a given period. A full report accompanies this processing.

16> The system allows in stock and on order quantities of up to 10,000 per item.

17> The system tracks total sales (both by quantity and amount) for each inventory item. Maximum value for quantity sales per year per item is 30,000 and maximum dollar sales per item is $1,000,000

The system works on Radio Shack TRS-80 Model I with 48K of RAM and four disk drives, or the Radio Shack TRS-80 Model III with 48K of RAM and two disk drives. The respective TRSDOS operating system is required.

catalog #	product name	comment	weight	mfg
L-50-050	Inventory Master	Model I TRSDOS 2.3	3	LSI
L-50-060	Inventory Master	Model III TRSDOS 1.2	3	LSI

STOCK MARKET MONITER

A "technically" oriented system designed for the active "trader" as opposed to the "long term" investor. The system is designed for the TRS-80 Models I or III with at least 32K or RAM.

The system tracks user selected issues in a technical system that reflects an issue's performance against the overall market. Set up data is input by the user from the Standard and Poor's stock guide or from Value Line.

Daily issue data, "high", "low", "close", and "volume" are input from any source containing that information. Daily overall market, "Volume" and "closin DOW" are also obtained from the same source.

Volume and price changes of an issue compared to volume and price changes of the overall market are the basis of this system's analysis of a given issue. Comparisons of an issue against itself are also done. This may allow the user to spot "unusual" activity on the issue.

Clear indications are given as to whether the issue is "out-performing", "under performing", or "performing with" the market.

Complete video and printed output is provided.

The program is intended to be a guide to indications, and is not to be used as a sole recommendation to buy, sell, or hold an issue. These decisions are the responsibility of the user and their brokerage.

catalog #	product name	comment	weight	mfg
L-50-410	Stock Market Mon	Model I	2	LSI
L-50-420	Stock Market Mon	Model III	2	LSI

ZGRAPH

ZGRAPH is a graphics editor that allows creation of graphic images. ZGRAPH possesses two sets of commands, primary commands and secondary command functions. A 'help' list of commands at both levels is available by typing <H> for primary commands or <F><H> for secondary functions.

The video display screen of the TRS-80 consists of 1024 bytes of memory arrayed as 16 rows of 64 columns. Each memory location is capable of displaying one ASCII or special character or any combination of the six (2 wide by 3 high) graphic dots referred to as pixels. ZGRAPH allows any of the 160 (224 on the Model III) possible characters (ASCII, graphic and special) to be displayed at any point on the screen.

Cursor movement depends on the mode that ZGRAPH is in. In the graphics mode, movement is achieved using the number keys 1-4 and 6-9. Movement over the border of the screen will reappear on the opposite side.

In the DRAW mode, the cursor will leave a trail of bright graphic pixels everywhere it goes. In the ERASE mode, the graphic pixels will be turned off everywhere the cursor is moved. The MOVE mode is a non-destructive means of moving the cursor. While in the text INSERT mode, cursor movement is via the arrow keys. The cursor is non-destructive of both graphics and text. Simply move the cursor to the desired position and start typing text.

The entire screen can be reversed (graphic on/off) via the REVERSE command. Text will not be reversed. The XFLIP command will create a mirror image of the screen about the Y-axis. The graphics will be a true mirror image and the order of text characters will be reversed. The YFLIP is similar to the XFLIP except rotation is about the X-axis.

ZGRAPH has five in-memory screen buffers in addition to the video display screen. Four of these buffers are general purpose buffers and are available to the user to store displays. This is useful when creating a large graphic consisting of several ZGRAPH images or in creating those images using the MERGE function. ZGRAPH can also load and save images to disk files. All data moving to and from the disk passes through the primary video display. The fifth internal display buffer is used for error recovery.

GET is the function for loading the video display screen from a disk file or one of the buffers. Any one portion of the screen can be saved to a buffer or file by using the SAVE command. MERGE allows the user to superimpose one graphic image over another. To exchange the screen display with a buffer, use the XCHANGE command.

The DUPLICATE command replicates a block defined by markers to another area of the screen. LINE will establish the best fitting line between the marker SET and the current cursor position. The marker position will be updated to the current cursor position after each line is drawn providing an easy way to construct lines connected end-to-end. The RECTANGLE command creates a rectangle with opposing diagonals being the SET marker and current cursor position. The CIRCLE function "rounds out" the ZGRAPH graphics functions by drawing a circle or an arc around the current cursor position.

While in the WINDOW mode, the entire screen display will move in response to the arrow keys. Any part of the image moved off of the edges of the screen is erased. This command is very useful to reposition an entire image on the screen.

To allow ZGRAPH created displays to be used in other applications, the BINCONV post-processing program is provided. ZGRAPH's standard file format is a pure binary representation of the screen display. Each line of the screen memory is saved as the values of the memory bytes terminated by a carriage return. BINCONV converts its standard file formats to:

<1> - ZGRAPH to Load Module in order to create an executable /CMD file that will place an image on the screen.

<2> - ZGRAPH to Packed BASIC - creates a file of packed graphics strings with each line consisting of the string {ZG$(#)= "packed value of one line of your image"} starting with an index (#) of 0, line number of 100 and line number increment of 10.

<3> - ZGRAPH to BASIC Data which creates BASIC data statements of 16 decimal numbers representing the sequential values of a screen image.

<4> - ZGRAPH to EDAS creates a file in assembler source format of DEFB statements with 16 decimal values per statement representing the values of the bytes of your image. This file may then be merged into an EDAS assembler program.

The ZGRAPH graphics package also includes a keyboard filter, DOSAVE, that is similar to the LDOS screen print function. However, where the screen print directs an image of the screen to the printer, DOSAVE will direct the screen image to a disk file specified by the user at the time <CLEAR><SHIFT><S> is depressed. These screen files may be loaded into ZGRAPH for further operations. Also included is the BINPRINT program which provides the capability of printing a binary graphic file to a printer that supports compatible bit graphics (MX-80/Graftrax, MX-100).

catalog #	product name	comment	weight	mfg
L-50-210	ZGRAPH	Model 1,3 LDOS	1	LSI

QuizMaster

QuizMaster is an educational/informational question and answer program and can also be used as a game. Its basic operation is to display a question and four possible answers. It scores the operator's response based upon the speed as well as correctness from one of three possible skill levels.

QuizMaster randomizes the order of the answers to prevent memorization. The question sequence is never the same. Extended play provides a "sudden death" feature for the skillful user.

QuizMaster comes with three subject files of 100 questions each, U. S. Information, General trivia as well as Fantasy and Science Fiction trivia. These files can be increased or edited, or the user's own specialty files can be created and utilized. Each file can hold up to 255 question/answer sets and the only limit to the number of files is the number of diskettes you possess.

QuizMaster is educational, interesting and addictive. QuizMaster runs under the LDOS operating system to utilize maximum efficiency. The QuizMaster system includes all the facilities necessary to establish and maintain a series of multiple choice questions on any subject whatsoever. The system is comprised of several machine language modules for fast and accurate access and response times.

Word Processor-Like Input Editor

For ease of entry an "input editor" allows full transparent cursor motion along with insert and delete modes, type over and fast cursor positioning. This feature is found in both the "Add" and "Edit" modes.

Five Support Programs Included

Five support programs are provided to create, extend, edit, print and maintain question/answer files. Also included is a program to reconstruct a file that has been damaged by disk I/O errors or faulty disk media. A packing module allows files that have been heavily edited to be compressed and use disk space more efficiently.

All features are easy to use and easy to operate. Everybody loves trivia and now you can control it. Other uses include :

*** classroom testing
*** procedure quizzes
*** product knowledge
and
*** group entertainment

catalog #	product name	comment	weight	mfg
L-51-500	QuizMaster	Model 1,3 LDOS 5.1	2	LSI

ULTRA-TREK GAME

The Starship Enterprise was on routine patrol in the Gamma-Ophichi sector. It was somewhat unusual for one of the twelve elite starships to resort to boundary police action, but the entire 49 sector Quadrant had been the scene of numerous sabotage operations by rings of Klingon agents. The resulting arrests and interrogations revealed little explanation for the upsurge in the treasonous acts. It was, therefore, necessary to reinforce the existing Federation Sector Task Force by sending in the Enterprise. It was felt (for a fee) that the presence of so powerful a force would make all potential agents and provocatuers wary of further action.

What is needed is someone to command the Enterprise in this endeavor. Be prepared, however, because the enemy does not play dead in this game.

Ultra-Trek is a logical game intended for the serious game player. The player is under constant duress, because the enemy is constantly trying to destroy the Enterprise. Considerations to be made while commanding include: supply levels, status of operating systems, relative position of the ship and each sector.

Ultra-Trek is for the TRS-80 Model I or III and comes with a seventeen page story/reference manual. The following is a sample of the command display.

```
YOU ARE IN SECTOR  -  6 , 6          .  .  .  B  .  .  *
AT COORDINATES - - -  4 , 4          K  .  .  S  .  .  *
ENERGY LEVEL (UNITS) - 5000          *  .  K  .  .  .  .
SHIELDS ARE AT - - - -  50%          R  .  .  E  .  .  .
LIFE SUPPORT SYSTEM - GREEN          .  .  .  .  .  .  .
COMPUTER SYSTEMS  - - GREEN          .  .  .  .  .  .  .
WEAPONS SYSTEMS - - - GREEN          .  .  .  .  .  .  .
WARP DRIVE SYSTEM - - GREEN            STAR DATE - - -  10.50
IMPULSE POWER - - - - GREEN          ALERT CONDITION - - RED
...................................................................
YOU ARE IN THE COMMAND MODE: CALLED BY ENTERING CMD
YOU MAY NOW SELECT THE AREA OF COMMAND FROM BELOW
     NAVIGATION - 1 : WEAPONS - - - - 4
     COMPUTER - - 2 : SHIPS LOG - - - 5
     DEFENSE  - - 3 : DISPLAY - - - - 6                ? .
```

catalog #	product name	comment	weight	mfg
L-55-010	Ultra-Trek	Model 1,3	1	LSI

CAPTAIN - 747

Captain 747 is a rather exiting flight simulation. It is supported by extensive real time graphics which simulate the actual flight of the famous Boeing Jumbo Jet.

Flight Plans must be filed prior to take off along with certain vital pre-flight arrangements.

The operator then becomes the pilot simultaneously attempting to remember flaps, ailerons, power, altitude, speed, weather etc.

Imagine the fun of crashing forty million dollars worth of aircraft time after time at a mere fraction of the otherwise cumbersome expense.

But all kidding aside, the user will gain a theoretical knowledge of jet flight in this excellent simulation which provides it all except the 106db noise, and no place to park. The following is a sample of the main screen display prior to take off.

```
To go     0.0 I                                   I      N
-------------I                                    I      .
Time 0:00:00 I                                    I W   000    E
-------------I              ===0===               I
Fuel        0 I                                   I      S
-------------I                                    I-------------
Alt.        0 I                                   I Turn  +0.0
-------------I-----------------------------------I-------------
VSI        +0 I  +0'  ========================== I Elev     Att
-------------I Ail.    40   20    0    20   40   I  +0  .45.  +0
Flaps ====<  I-----------------------------------I      .30.
  +0     .<  I   0    ========================== I      .15.
Stall    .<  I IAS.  100   200   300   400   500 I    ====00====
 185     .<  I-----------------------------------I      .15.
Gear     .<  I   0%   ========================== I      .30.
         .<  I Power 0    20    40    60    80  100 I    .45.
```

catalog #	product name	comment	weight	mfg
I-55-020	Captain 747	Model 1,3 (Disk)	1	LSI
I-55-022	Captain 747	Model 1,3 (Tape)	1	LSI

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