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CYBER 18/1700 MSOS ANALYSIS

GLOSSARY

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CYBER 18/1700 MSOS ANALYSIS

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or use Comment Sheet in the back of this manual.

CYBER 18

GLOSSARY

ABORT - The abnormal termination of a program under conditions which cannot be recovered by the computer or the program. The operator may request a program abort of an ITOS program by the entry of CONTROL A.

ABSOLUTE BINARIES - The file or contents of core containing the instructions for a program, after it has been loaded, in a form that can be executed; i.e., the core image of the program.

ABSOLUTE BINARY PROGRAM - A program that must be loaded at and executed from specific logical addresses.

ABSOLUTE PROGRAM - A program composed of command sequence storage information, which may be loaded by a checksum loader.

ADC - (1) Analog-to-digital converter. (2) Address constant pseudo instruction under the assembler.

ADT - Automatic data transfer; a mode of data transfer on the CYBER 18 that simulates block transfer at the micro level via interrupts.

AGENCY - A composition of processors dedicated to performing a single task.

ALLOCATE - To reserve an amount of a resource, such as core memory, in a computing system for a specific purpose.

ALLOCATABLE CORE MEMORY - That portion of protected main memory, part 0, that can be assigned to programs by the core allocator; e.g., as a result of a SPACE request, areas can be assigned dynamically according to the request priority.

ALTERNATE DEVICE - A peripheral device that can be assigned the tasks originally directed to another malfunctioning peripheral device.

APPLICATION MODULE - A series of programs used to perform several related types of tasks. ITOS supports 12 standard application modules written in RPG II language.

APPLICATION PROGRAM - A program written for or by a user to perform defined functions under ITOS.

A/Q CHANNEL - A CONTROL DATA CYBER 18/1700 data channel, which can handle input/output only through the A register.

ASCII - American National Standard Code for Information Interchange; the standard code using a coded character set consisting of seven-bit coded characters (eight bits including parity check), used for information interchange among data processing systems, communication systems, and associated systems. The standard code for ITOS terminals.

ASSEMBLER - A computer program that generates machine instructions from symbolic input data by either translating symbolic operation coding into computer operating instructions, assigning locations in storage for successive instructions, or computing absolute addresses from symbolic addresses. An assembler generates machine instructions from symbolic codes and produces, as output, nearly the same number of instructiions or constants as were defined in the input.

ASSIGN - To reserve a part of a computing system for a specific purpose (usually referring to an active part such as an I/O device; e.g., tape unit).

ASYNCHRONOUS - Not synchronous; not happening, exiting, or arising with a fixed-time correlation.

ATTACH - The process of joining a root program and a multiuser program in main memory so that the two programs are executed as a unit.

AUTO LOAD - The process of loading the MSOS/ITOS system into the CYBER 18 computer from the disk image of the system and begin execution of the system.

AUTO MODE (Editor) - The process of automatically supplying line (record) numbers to new records being entered into a file by the text editor utility.

AUTRAN-DACS - Automatic translator; a complete software system for either batch-sequencing or continuous process control, which can be configured, parameterized, and installed by the user. It is a flexible, English-like language that allows a process engineer to specify the process system and describe control actions conveniently. It can be intermixed with FORTRAN mathematical calculations. AUTRAN incorporates the parameterization of the integral data acquisition and control system.

BACKGROUND - For MSOS/ITOS, processing (such as compilation, loading, library manipulation (LIBEDT)) with low priority in which user application programs are executed in unprotected main memory. Background priority levels are 0, 1, and 2. The job processor monitors background programs.

BACKSPACE TEXT - The ability to move the cursor to the left on the display when correcting test in a line.

BACK-UP STORAGE - Copies of permanent file images on tape (as generated by the disk-to-tape program).

BATCH - In MSOS, jobs that run serially, one after another, sharing the central processing unit with the priority program, when a priority program is present, and executing only when the priority program is not in control of the processor. Batch interrupts have lowest priority in the interrupt processing priority scheme. Batch programs (sometimes called *BATCH) run in the background under the job processor.

BATCH JOB - A job submitted in the queue for batch processing (input queue); i.e., a job that runs under the job processor in unprotected memory where a job is defined from a *JOB card to a 6-7-8-9 card (overpunched).

BATCH PROCESSING - Pertaining to the technique of executing a set of computer programs so that each is completed before the next program of the set is started. Batch jobs are not considered to be time-critical since they do not need a particular response time (batch jobs will have the lowest priority).

BDC - Buffered data channel.

BIAS - A quantity added to the true exponent when packing a floating point number. Bias permits expression of both positive and negative exponents by positive numbers.

BINARY FILES - A file that does not contain characters exclusively, e.g., absolutized programs.

BLACK BOX - A generic term used to describe an unspecified electronic or mechanical device which performs a special function, or to describe known inputs producing known outputs in a fixed relationship.

BLANK ID - A user ID consisting of all blanks (that is, a carriage return response to USER ID = message). This response permits the operator to access common files.

BLOCK - (1) Consecutive matching words or characters considered or transferred as a unit, particularly applicable to I/O. (2) Core: a unit size of core or MSOS memory (4096 words).

BPI - Bits per inch. On multi-track magnetic tapes, this is often used to mean frames per inch (fpi).

BUFFER - A temporarily reserved area of storage for use in performing an input/output operation and into which data is read or from which data is written.

BUFFERED - Buffered drivers utilize the 1706 Buffered Data Channel. The 1706 controls read and write operations and moves data to or from core via the direct storage access bus (DSA).

BUFFERING - Overlapping execution of one or more I/O routines with the execution of a program.

BYTE - An eight-bit field. The CYBER 18 computer word contains two bytes (byte 1 contains bits 0 through 7 and byte 2 contains bits 8 through 15).

CARD COLUMN - A vertical line of punching positions on a card.

CARD IMAGE - A one-to-one representation of the contents of a punched card in core or on a file.

CARD ROW - A horizontal line of punching positions on a card.

CARTRIDGE DISK - One form of mass storage disk (1733-2/856).

CATALOG - An RPG II utility that places a new RPG II application program on the program library in a format that ITOS can execute. Catalog is available only in batch mode.

CATALOGING - The process of entering a program onto the program library and indexing the program in the program library directory.

CATENATE - To unite in a series, link together, chain, to bring together, e.g., A⌐►B means to catenate A and B with the result AB.

CDT - Conversational display terminal.

CENTRAL MEMORY - Refers to the directly addressable core storage of computers.

CENTRAL PROCESSING UNIT - The arithmetic control unit of a computer that includes the circuits controlling the interpretation and execution of instructions; abbreviated as CPU.

CHAINING - A system for reading or writing records in which each record belongs to a list or group of records and has a linking field for tracing the chain.

CHARACTER STRING - A sequence of characters.

CHECKSUM - A summation of digits or bits used primarily for checking purposes and summed according to an arbitrary set of rules. Usually a value appended to a file; used to check the validity of the information in the file.

CIRCULAR BUFFER - Refers to a buffer mechanism that allows write/read of data in a rotating manner; controlled by in/out and limit pointers where the first-word-address will logically follow the last-word-address when the end-of-buffer is reached.

CLEAR - To clear a bit is to cause its value to become zero (see set).

COLLECTIVE SWAP - The process of swapping several user programs at once to gain a large enough main memory area to load one large program.

COMMENT DEVICE - The user terminal where MSOS functions can be called and executed. Also called the master terminal when ITOS is active.

COMMON - An area of memory that may be shared between programs; common may not be preset with data.

COMMON FILES - Files that are available to anyone who logs onto the system with a blank user ID. Contrast with private files and system files.

COMM18 - The software package that links the CYBER 18 to remote computers via 200UT and HASP protocol.

COMPILER - A program that translates a programming language, such as FORTRAN, into a machine language file acceptable to the loader. A compiler may generate many machine instructions for a single symbolic statement.

COMPLETION PRIORITY - The priority assigned to the completion phase of a request (see request priority) after the requested task has been accomplished.

COMPONENT - A constituent part or ingredient; a software component is a basic logical software unit; several components form a module.

COMPRESS FILE - The process of rewriting a file to remove all records in that file previously marked for deletion. The remaining records are rewritten sequentially.

CONCURRENT BATCH - The mode of operation allowing ITOS, COMM18, and BATCH to be active at the same time.

CONNECT REQUEST - The ITOS request that brings a terminal on-line to ITOS.

CONTROL A - The program abort command (pressing the CONTROL and A keys simultaneously).

CONTROL D - The program interrupt command (pressing the CONTROL and D keys simultaneously).

CONTROL G - The MSOS manual interrupt command (pressing the CONTROL and G keys simultaneously on the Master terminal only).

CONTROLLER - A hardware device that controls access and data transfer to I/O units which are connected to it.

CONTROL CARD, CONTROL STATEMENT - A command instruction recognized by the operating system for initializing or modifying program execution.

CONTROL POINT - A software method of monitoring page memory files assigned to a user under ITOS.

CONTROLWARE - A processor program for a particular processing unit providing the self-modifiable functional operating characteristics.

CORE - (1) The core-type memory of the 1700 or System 17 or CYBER 18-10 CPUs. (2) Loosely used: The main memory (as opposed to the micro memory) of the CYBER 18. In fact, the core in some CYBER 18 machines is composed of MOS memory elements.

CORE QUEUE - The ITOS queue holding the programs awaiting execution (NXUC).

CORE RESIDENT - The part of the operating system that resides permanently in central memory; it contains the code, various system tables, special buffers, etc., and begins at absolute location zero in the central memory, e.g., SYSDAT is core resident.

CORE SWAP - The contents of unprotected core is stored on mass storage and unprotected core is protected and made available for assignment by the SPACE request processor.

COSY - Program compression processor cumulate; an MSOS utility used to establish a card image type file with sequence numbers so that it may be edited by COSY.

CPU - See central processing unit.

CR - Carriage return (key), sometimes called return key.

CREATE FILE - The process of defining file parameters so that the File Manager allocates space and includes the file in the file directory for that volume.

CREP - Core-resident entry point table; this table holds entry points (linkage addresses) to protected programs executed in part 0 of core.

CREP1 - Core-resident entry point 1 table; this table holds entry points (linkage addresses) to protected programs executed in part 1 of core.

CRT - Cathode ray tube; a video display terminal.

CURSOR - The marker beneath the line on the display indicating the relative position in the data buffer currently being read or written.

CYLINDER - A set of tracks in a drum or disk that can be read without repositioning the read/write heads.

DACS - Data acquisition and control system, see AUTRAN-DACS.

DATA AREA - An area of memory that may be preset with data at load time and can be shared between programs; both batch and priority programs may have data areas; i.e., labeled common.

DATA BLOCK - Equivalent to labeled common; less formally, an area in a program that contains data.

DATA MANAGER - A set of RPG II runtime programs with data management functions.

DEADSTART - An initial action taken to start a computer when no software is resident or active on the system. This is serial interface via panel commands as contrasted to auto load; e.g., the deadstart procedure builds the auto load program on mass memory.

DECK - (1) A collection of punched cards that has a definite service or purpose. (2) Structured to represent a processing unit in the operating system.

DEFINE (file) - A utility command that creates a new file.

DELIMITER - A character used before and after a character string (for example, *) to set the enclosed character string apart from the rest of the data in the record.

DESTRUCTIVE PROCEDURE - A procedure that is modified in place when executed. For example, a return jump to a subroutine modifies the entry point; therefore, the return jump and the subroutine are a destructive procedure.

DIAGNOSTIC - A message printed when an assembler, compiler, or monitor detects an error or isolates a malfunction.

DIAGNOSTIC LOGICAL UNIT - A logical unit defined for recording diagnostic routines only.

DIAGNOSTIC ROUTINE - A program or routine designated to locate and explain errors in a computer routine or malfunctions of a hardware component.

DIRECT FILE - A type of sequential file created by the DEFINE command of UTIL (used by EDITOR). A direct file has 80-character records with all records filled with blanks at file creation. Records can be added to a direct rile by relative record number rather than sequentially.

DIRECT STORAGE ACCESS - Method of accessing blocks of data directly in CYBER 18 core memory by the peripheral equipment, without using the A/Q channel; abbreviated as DSA.

DIRECTORY - An index to programs, files, or other system information. ITOS/MSOS has the following major directories: program library directory, program name directory, procedure directory, and file directories (one per volume).

DISK - A magnetic storage device; the standard mass memory device.

DISPATCHER - That portion of the monitor which locates the highest priority program awaiting execution and transfers control to that program for execution.

DISPLAY - The CRT portion of the terminal.

DMA - Direct memory access; CYBER 18 terminology same as direct storage access.

DOCUMENTATION - The group of techniques necessary for the orderly presentation, organization, and communication of recorded specialized knowledge in order to give a historical reference record for reasons of understanding and for making modifications to the program.

DOUBLE BUFFERING - Two accessing elements that share a buffer space; e.g., processing data in one buffer while data is being input to an alternate buffer.

DRIVE - A hardware device such as a tape drive or disk drive.

DRIVER - A program whose main function is to perform a physical I/O transfer of data between one storage medium and another (e.g., between central memory and mass storage, between central memory and magnetic tape); that part of the operating system that does I/O on a specific device.

DSA - Direct storage access, same as DMA.

DSKTAP - A disk-to-tape utility program.

DUMMY DRIVER - An I/O driver that processes requests to a non-existent peripheral device, usually by returning control directly to the requesting program with a normal termination status.

ECC - Error correction code; a special technique for reconstituting garbled data on certain disk systems.

ECHOING - The process of displaying data on the screen as it is typed on the keyboard. Almost all information from the keyboard is echoed in the ITOS system (exceptions: PASSWORD and USER ID).

EDITOR - The text (line-by-line) editing utility for ITOS. Since each line is a complete record, this is a record editor.

EMULATOR - The 1700 emulator is a firmware component that allows the CYBER 18 hardware to function as an enhanced 1700 computer.

END-OF-FILE (EOF) - Information designating the termination point of data or of a program.

END-OF-FILE INDICATOR - A signal supplied by an input or output unit that makes an end-of-file condition known to the routine or operator controlling the device.

ENGINEERING LOG - Also called engineering file. A file for saving unrecoverable I/O error information. Data in the log is stored by logical unit. Each failure item has an identifying time tag associated with the failure status word.

ENT - Entry points to programs.

ENTRY - (1) An entry point to any program. (2) Initiator entry point to an I/O driver. (3) Continuator entry point to an I/O driver. (4) Timeout entry point to an I/O driver.

EOB - End of buffer.

EOF - End of file.

EOP - End of operation.

EOT - End of text; end of tape.

EQUIPMENT - An interface between a data channel and a unit; a channel controller.

ERS - External reference specification; a document or working paper describing how a program is going to be written according to design requirements.

ETX - End of text.

EXECUTE - To carry out an instruction or perform a routine.

EXECUTION - The process whereby the instructions contained in a program direct the activities of the central processing unit.

EXECUTIVE - See System Executive.

EXIT - (1) The request that allows the operator to log off his terminal. (2) The request that ends an MSOS program.

EXT - Externals; symbols used by a program and are defined in other programs.

EXTENDED MEMORY - Main memory in the CYBER 18-20 above 128K bytes. In ITOS, this memory is executable only in page mode.

EXTERNAL INTERRUPT - An interrupt that occurs as a result of conditions within peripheral devices or their immediate interfaces; interrupts that occur as a result of conditions whithin a data channel are classified as external or internal, according to specifications set forth in the individual hardware system reference manuals.

FCB - File control block; see File Manager table.

FCBT - File control block table, used by File Manager.

FCR - Functional control register; an internal register on the CYBER 18 that allows the user to select and display operational machine modes and determine machine status when the master terminal is in panel mode; FCR has the same functions, plus some others, as the panel on the 1700 computer.

FDB - File definition block; mass memory resident used by File Manager.

FDD - File definition directory; mass memory resident used by File Manager.

FDS - File definition segment, used by File Manager.

$FFFF_{16}$ - -0 (negative zero); often used as a flag to indicate end of a table, list, etc., or to indicate the physical absence of an I/O device.

FIAT - File control block index allocation table, used by File Manager.

FIELD LENGTH - The number of central memory words that is assigned to an ITOS user or to a batch job.

FIFO - First-in-first-out; a method of handling queued entries.

FILE - A collection of related records treated as a unit.

FILE CONTROL BLOCK (FCB) - The set of definition and control parameters for a file.

FILE DEFINITION DIRECTORY (FDD) - A table that contains pointers for each file on a volume; there is one pointer, pointing to the file control block for each file.

FILE MANAGER - The set of programs that manages mass memory files.

FILE MANAGER REQUEST - Specially formatted requests that cause the File Manager to perform a file related task.

FILE MANAGER TABLE - A table containing pointers for each FCB in the File Manager.

FILE MANAGER UTILITIES - The set of utility functions operating under UTIL.

FILE NAME - The file identifier. It is derived from the file name plus the volume name plus the owner name.

FILE ORDINAL - A number equated to a mass storage file for the duration of the job.

FILE REQUET BUFFER - A buffer of information associated with each file that is open for processing.

FIRMWARE - A physical electronic component in which a program resides that is incorporated in a product to provide a programmed mode of operation defining the product's functional characteristics. Firmware is not self-modifiable and is subject to change or modification only by physical modification or replacement.

FLOW - A general term used to indicate a sequence of events.

FNR - Find-next-request routine. Used by I/O drivers to find the next request queued to an I/O device.

FOREGROUND - For MSOS and ITOS processing that is time-critical with high priority and executed in protected main memory.

FPI - Frames per inch. Sometimes called bits per inch (bpi).

FREAD - The formatted read request.

FREE FIELD - A format in which the next field begins at the first non-blank character after the previous field's end. Field length is not predefined (contrast with fixed field format such as RPG II utilizes).

FUNCTION - A procedure that supplies a single result to be used at the point of reference; for example, the set of standard applications available under ITOS appearing in the system menu.

FWRITE - The formatted write request.

GHOST INTERRUPT - An unsolicited interrupt from a peripheral device or an unused line.

HANG-UP - The condition existing when a request is unable to be completed because a peripheral device is not able to issue the necessary interrupt.

HIGH CORE - Those words in core with addresses greater than $FF which cannot be referenced by one-word absolute storage reference instructions.

HOLLERITH - The method of representing alphanumeric data.

HOOK - Any piece of software that is embedded in the operating system, whose presence serves only to generate or save information about the activities of the operating system, and whose purpose is to allow easy addition or deletion of subroutines.

HOST - The program executive receiving remote communications via 200UT protocol or HASP protocol; i.e., a computer receiving remote batch or interactive programs for execution.

HOUSEKEEPING - Initialization procedures (e.g., establishing initial values in a program) or termination procedures (e.g., cleaning up miscellaneous details at the end of program execution) of computer programming or execution. These procedures may be inherent to any operating system when custom-tailored by the user.

ID - Identification.

IDLE - The condition in which the computer processes only the idle loop program while waiting for a task request to perform.

IFIPS - Internal Federation for Information Processing Societies.

IMS - Internal Maintenance Specification; a document describing tables, interfaces, parameters, data structures, and program operations needed for software maintenance.

INDEX - An ordered set of pointers for a file, or the position indicator of a word within a table.

INDEXED FILE - A file in which records can be accessed by one or more key words.

INDEX SEQUENTIAL - A method of file organization in which records are in a logical collating sequence, according to a key that is part of every record; a separate index or levels of indexes are maintained to give the location of certain records or segments of the file. The records may be accessed sequentially in a serial manner or directly in a random manner, through the index structure.

INITIALIZE - The process of placing system programs in the computer and preparing the system for execution.

INPUT BUFFER - A buffer designated to receive data from an I/O device.

INPUT/OUTPUT - The bi-directional transmission of information between computer memory and peripheral devices.

INTERACTIVE MODE - The ITOS terminal processing mode; it allows the operator to communicate with the programs by entering unsolicited requests and by supplying data in response to messages displayed at the terminal.

INTERLOCK - A set of interrelated entities, where the status of one entity affects the functions of others in the set. Examples include (1) the ensurance that only one process at a time can update something in a computer system (e.g., a system table), and (2) the result of interlocking; the user can obtain an interlock on a table, allowing him exclusive access to that table.

INTERNAL INTERRUPT - An interrupt occurring as a result of conditions within the computer mainframe or immediate interfaces; e.g., a parity error or a program protect fault causes an internal interrupt, and a disk fault causes an external interrupt.

INTERRUPT - (1) To stop a process so that it can be resumed at a later time. (2) A break in the normal flow of a system or routine so that the flow can be resumed from that point at a later time; an interrupt is usually caused by a hardware-generated signal.

INTERRUPT MASK - A device for preventing interrupts of lower priority from interrupting the interrupt handler currently controlling the CPU.

INTERRUPT STACK - A table in SYSDAT that contains information concerning programs that have been interrupted by a higher priority I/O task. Entries are processed on a last-in-first-out (LIFO) basis.

INTSTK - The Interrupt Stack.

I/O - Input/Output.

I/O DATA BUFFER - A buffer to hold data during a transfer with an I/O device such as a terminal, printer, magnetic tape transport, or disk.

ITOS - The Interactive Terminal-Oriented System.

ITOS EXECUTIVE - A group of programs that performs system executive functions (scheduling, queueing, translating requests) in the ITOS system. MSOS also has programs that perform system executive functions.

JOB - The user's unit of work for the computer which is defined by the cards between the *JOB control statement and the 6-7-8-9 (EOF card) and runs in background.

JOB PROCESSOR - The MSOS executive for batch-oriented operations; the background program executive.

JOB TERMINATION - Those activities necessary to logically terminate job execution.

K - Kilo; thousand; 1024 bytes or words used in referring to storage capacity.

KERNEL DRIVER - Drivers that are written in a special modularized fashion such that some modules, if not needed, may be excluded from the driver at system initialization, thereby saving CM space during execution.

KEY - (1) An index to a file, such that, indexed files may have up to four keys. (2) A specific attribute of a record, such as age, birthdate, social security number, etc.

KEYBOARD - The set of keys and switches at an ITOS terminal.

KEYWORD - A key, or specific word, indicating either a specific course of action or a specific attribute, respectively.

KIB - Key information block, a File Manager table.

KIS - Key information segment, a File Manager table.

LABEL - An identifier for disk packs (volumes).

LABELED COMMON - A common block into which data can be stored at load time, and is declared by the DAT statement in Assembly Language. This common block resides immediately before the first program loaded that declares it. There may be more than one labeled common in the foreground but only one labeled common for each job under Batch.

LIBRARY - An organized set of programs and subroutines that are callable by system requests. A library consists of a directory and the binaries. Under MSOS there are two principal libraries: the System Library for programs that run in the foreground and the Program Library for programs that run under either Batch or ITOS.

LIBRARY UNIT - The disk pack containing the libraries. It must always be mounted and ready. It is also called the system volume (SYSVOL).

LIFO - Last-in-first-out; a method for processing queued requests.

LINKAGE - The interconnections between subprograms or between a main routine and closed subroutines; for example, the entry into a closed routine and the exit back to the main routine.

LIST - A sequence of ordered data items in which special items or groups of items can have different meanings.

LIST DEVICE - The peripheral unit used to receive listed outputs. It is usually a line printer for system outputs; it is the terminal display for terminal outputs.

LIST PROCESSOR - A routine or a set of routines working on a list.

LOADING - The process of transferring a program from external devices to storage; in MSOS the relocatable loader transfers a relocatable program to the first sequentially available positions in core. The loader makes addresses absolute, links externals, prints the load map, and transfers control to the loaded program.

LOCAL BATCH - Referring to currently running jobs under *BATCH on the CYBER 18; that is, those programs that are transmitted for execution as jobs in the background.

LOCATION - A position in storage where a computer word can be stored and which is usually identified by an address.

LOG TABLES - The logical unit tables (LOG1, LOG1A, and LOG2) in SYSDAT.

LOGGING OFF - The process of taking a terminal offline from ITOS.

LOGGING ON - The process of bringing a terminal online to ITOS.

LOGICAL MEMORY - The mapped memory of ITOS. By use of paging registers, user programs may be executed in logical memory while residing in another area of physical memory. If the execution specifies a root/multiuser program, the two parts are not usually contiguous.

LOGICAL UNIT - (1) A number used to reference peripheral units, such that the number is defined by the operating system, and is the link the system uses to find the actual physical address. (2) An I/O or pseudo I/O device. Each logical unit has a number that identifies it to MSOS, where the same physical I/O device may have more than one logical unit number.

LOW CORE - Address 00 to $FF in memory; those address locations which can be referenced by one-word absolute storage reference instructions.

LSB - Least significant bit(s).

LU - See Logical unit.

MACRO - On the CYBER 18, macro describes those features applicable to the actual set of hardware (e.g., macro instructions, macro interrupt, macro memory).

MACRO ASSEMBLER - The program that compiles source language into CYBER 18 machine language statements (ASSEM), and is the lowest programming source language available to MSOS.

MACRO INSTRUCTION - An instruction in a source language that is equivalent to a specified sequence of machine instructions; usually a mnemonic instruction that a programmer can write in a source program to call for library or special routines.

MAIN MEMORY - The memory bank on a CYBER 18 composed of core or MOS memory (CYBER 18-20/30). Main memory does not include the micro memory of the micro processor. Maximum size of main memory for CYBER 18-10M is 128K bytes; maximum size of main memory for CYBER 18-20 is 256K bytes. Main memory is physical memory.

MAN-MACHINE COMMUNICATION - Software components that establish communication between the operating system and the operators.

MAPPING - The process of using paging registers to map programs in physical main memory into logical memory.

MASK - A machine word specifying which bits of another machine word are to be operated upon in logical instructions such as AND or OR.

MASS MEMORY (MM) - The disk memory for the system. It consists of one to eight disk drives and the associated controller for CYBER 18-20 configurations; CYBER 18-10M configurations may use one to four cartridge disks. It can be randomly accessed. Also called Mass Storage.

MASS QUEUE (NXUM) - The ITOS queue holding the swapped or non-resident user programs awaiting further processing in main memory.

MASS STORAGE DEVICE - A disk or drum capable of storing large quantities of information; it can be randomly accessed. Data may also be stored and accessed by sectors (96 words) in formatted mode.

MASS STORAGE RESIDENT - A part of the system that resides on mass storage and which is brought into core when needed by the system.

MASTER CLEAR - A switch that returns a computer or peripheral devices to initial conditions; e.g., all status bits are set to normal; abbreviated as MC.

MASTER TERMINAL - The terminal from which ITOS is started and stopped; the only terminal that can be used for batch processing output requests or query. It is also the MSOS comment device.

MC - Master clear.

MEMORY PROTECT - Hardware and software features that prevent batch programs from destroying foreground programs or system programs.

MENU - A selection display from which the user may choose any of several tasks listed on the display.

MERGING - The process of building a new file, sorted according to selected key(s), from the records of two or more existing files.

MI - Manual Interrupt. Activated by CONTROL G under MSOS (accepted only at the master terminal).

MICRO - On the CYBER 18, describes those features applicable to the actual set of hardware (e.g., micro instructions, micro interrupt, micro memory).

MICRO MEMORY - The program emulation memory of the CYBER 18 CPUs. It contains both ROM and RAM memory and is not currently programmable by the user.

MIPRO - Manual interrupt processor; processes the operator generated manual interrupt.

MNEMONIC - An abbreviation or representation of a name or command.

MODULE - A group of programs that performs a system task, such as one of the user application modules.

MODULO (MOD) - A function such that if $x = r \pmod{k}$, there exists an integer n such that $x = n \cdot k = r$.

MODULUS - An integer that describes certain arithmetic characters of registers, especially counters and accumulators, within a digital computer; the modulus of a device is defined by R^n for an open-ended device and R^n-1 for a closed (end-around) device, where R^n is the base of the number system used, and n is the number of digital positions (stages) in the device Generally, binary devices with modulus 2^n use twos complement arithmetic; devices with modulus 2^n-1 use ones complement.

MONITOR - The supervisory routine in an operating system that coordinates and controls the operation of user and system programs, also called the executive.

MOTION - The MSOS system request to position an I/O drive (e.g., rewind magnetic tape).

MOUNT - The MOUNT command for disks under ITOS.

MOUNTED AND READY - The disk condition in which the disk pack (volume) is ready for I/O transfers and is online to ITOS.

MULTIUSER PROGRAM - Programs that can be used by several other programs. Multiuser programs are pseudo-re-entrant. They are attached to a root during execution.

MSB - Most significant bit.

MSEC - Millisecond.

MSOS 5 - The current version of the Mass Storage Operating System for CYBER 18/1700 systems, of which ITOS is a subset.

MULTIPLEX - (1) To interleave or simultaneously transmit two or more messages on a single channel. (2) To utilize a single device for several similar purposes or to operate several devices in a time-sharing mode.

MULTIPROGRAMMING - The interleaved execution of two or more programs, which stay in the same memory, by a single processing unit; e.g., several programs in memory sharing one control processor.

NAM - The program name block, a loader table.

NMONI - The entry point to the system for system requests.

NONDESTRUCTIVE PROCEDURE - A procedure that is not modified in place when executed; see destructive procedure.

NONREUSABLE PROCEDURE - A procedure that is destructive and non-initializing.

NSWP QUEUE - The NEXT-TO-SWAP Queue; the ITOS queue holding those programs in main memory that are eligible to be swapped.

OBJECT PROGRAM - The output of a given translation process; e.g., the language into which an assembler or compiler translates the source language. An object program must be loaded before it can be executed.

OCR - Optical character reader.

ODEBUG - Online debug package, a utility under MSOS.

OFFLINE - Equipment or devices not under control of the CPU.

ONLINE - Equipment or devices under control of the CPU; a user's ability to interact with a computer.

OPEN LOOP - A loop used to control a repeated operation, but having no feedback for self-correcting action; contrast with closed loop.

ORDINAL - (1) A number that specifies the relative order of an element (such as a word in a table in memory) within a collection of items (i.e., all the words of the table). For example, the System Directory has seven words per Mass Memory Program; ordinal 3 would begin on the 16th word of the System Directory table. (2) In assembly language coding, the ordinal of the first element in a collection is one.

ORIGIN - (1) The absolute address of the beginning of a program or block. (2) In relative coding, the absolute address to which addresses in a region are referenced.

OUTPUT DEVICE - An I/O device that can accept data, such as a terminal display or printer.

OVERFLOW - The state of having too many entries (bits) for a register, fixed size list, etc., e.g., the result of an arithmetic operation that is too big to be represented by a 16-bit word.

OVERLAY PROCESSING - A technique for processing a program whose total storage requirement for instructions exceeds available memory; the user divides the program into elements which are brought into core at different points of processing. When brought into core memory, an element of an overlay program may occupy the same storage locations as another element that was previously executed.

OWNER - The name of the user who created a private file, or who had the file created using his name.

OWNER NAME - The name of the person owning a file. It is part of the file name.

PAGE REGISTER - Hardware registers in the CYBER 18 CPU used for main memory addressing.

PAGING - In main memory; the process of reserving a user program area in which programs are loaded into physical memory in blocks of 2048 contiguous words (one page). The page registers are then used to map the pages onto the region of logical memory where the absolute addresses of the program are set to be executed.

PARAMETER - (1) A variable that is given a constant value for a specific purpose or process. (2) A quantity in a routine that specifies a machine configuration, subroutines to be called, or other operating conditions.

PARAMETER LIST - A portion of a calling statement which defines all special values necessary to the call.

PASSWORD - A security measure available in ITOS that requires a user to enter the secret password before the terminal can be brought online.

PARITY - A method of checking the validity of a word or byte.

PART 0 - A system-defined block of contiguous memory extending from location 0 up to the location ENDOV4; part 0 must be large enough to include SYSDAT, SPACE, allocatable core, and system common.

PART 1 - Part 1 is the block of contiguous memory immediately following part 0 and extending to the highest available core location; it contains the monitor and drivers, and may contain the File Manager, FORTRAN library, and partitioned core; a program must be written in a run-where-loaded form.

PARTITION - A collection of subsets of a set (main storage) such that any pair of subsets are disjoint and the union of all the subsets is the entire set; for MSOS, it is the unit used for allocating core in part 1.

PATCH - A temporary correction to a program.

PERIPHERAL DEVICE - Any I/O device attached to the CYBER 18 except a user terminal. Peripheral devices for ITOS are disk, card reader, printer, and magnetic tape units.

PHYSICAL DEVICE TABLE - A table containing necessary parameters for the I/O driver. Every logical unit has its own physical device table (PHYSTB). It is located in SYSDAT or the pool area.

PHYSICAL MEMORY - The complete main memory of the system's computer. See Logical memory.

PHYSTB - See Physical device table.

POSITIONING TIME - The time required for the access arm to move to a selected track on a disk.

POSTAMBLE - A group of special signals recorded at the end of each block on phase encoded tapes for the purpose of electronic synchronization.

PREAMBLE - A group of special signals recorded at the beginning of each block on phase encoded tapes for the purpose of electronic synchronization.

PRESET TABLE - A table of protected program entry points that can be used by unprotected programs.

PRIORITY - A rank assigned to a task which determines its precedence in receiving system resources; thereby determining the order programs should be executed.

PRIORITY LEVEL - All programs are assigned a priority level, which determines the use of the central processor. The highest program priority is 15; the lowest is -1;. Programs run in order of priority, the highest first.

PRIVATE FILES - Files created by a user who logged onto the system using a nonblank user ID. In general, these files can be accessed only by an operator who uses the same user ID when logging onto the system.

PROCEDURE DIRECTORY - An index to all ITOS procedure streams in this system (ITOS 1.2).

PROCEDURE STREAM - A group of related programs, commands, and parameters stored in a file and called into execution by a procedure name or file name.

PROCESS - A process or process control application is a function external to the machine that is to be monitored or controlled by the CYBER 18. Programs performing operations with respect to a process are referred to as process programs.

PROCESSOR - The term given to subroutines of the operating system, such as the Job Processor to Read Write Processor.

PROGRAM - A related group of instructions and data areas that are run as a unit.

PROGRAM LIBRARY - Library of background programs. These can be relocatable binary or absolute (program files), or data files. It is modified through LIBEDT utility under MSOS.

PROGRAM NAME DIRECTORY - The index to ITOS programs. The directory is held in the program name file ($$PGMNAM) (ITOS 1.2).

PROGRAMMING SYSTEMS REPORT - A form (AA1901) to report system problems or of suggested system modification to replace or to be added to a specified software component submitted to CDC; abbreviated as PSR.

PROMPTING CHARACTER - The character (>) that is displayed to remind the operator that data must be entered via the keyboard to continue program processing.

PROTECT BOUNDS REGISTER - The registers holding the first and last addresses of the user's unprotected area.

PROTECT PROCESSOR - An element of the ITOS executive that checks access to protected main memory.

PROTECTED MAIN MEMORY - A defined area of main memory storage in which each word of that area can only be accessed by words in that area, thus providing memory protection; i.e., that part of main memory that is protected from erroneous storage or entry. Attempted storage into a protected word or transfer of control to a protected instruction by an instruction in unprotected main memory causes a protect violation interrupt.

PSEUDO DISK - A portion of a disk addressed as if it were a separate disk.

PSEUDO INSTRUCTION - Instructions that require translation prior to execution.

PSEUDO TAPE - A portion of mass memory which is treated and addressed as if it were a separate magnetic tape unit.

PSR - See Programming systems report.

PURGE (FILE) - The process of removing outdated files from the system.

PUSHDOWN POP-UP STACK - A list that is constructed and maintained so that the item to be retrieved is the most recently stored item in the list; i.e., last-in-first-out (LIFO); the Interrupt stack is a pushdown, pop-up stack.

QUEUE - A list or requests waiting to be processed containing information necessary to start the requests where position in the queue determines the order of performance. MSOS, ITOS, and drivers all use and maintain various queues that determine the order of processing tasks.

RANDOM ACCESS - The ability to access data by address rather than sequentially; disks are random access devices, magnetic tapes are sequential devices.

READ - (1) To transfer information from an external device to main memory. (2) The ITOS or MSOS unformatted request to read data from an I/O device.

READ MODE - The terminal mode wherein the terminal is ready to accept operator entered data. All terminals other than the master terminal are always in read mode (except during the time when data is being written onto the display). The master terminal is placed in read mode by depressing CONTROL and G.

REAL-TIME - Pertaining to a program for which time requirements are particularly stringent.

RECORD - (1) The smallest accessible data unit in a file; all files contain one or more records. (2) A set of data that is input or output at one time.

RECOVERY - The process of resuming processing following an error.

RE-ENTRANT - Programs that may be interrupted, called by interrupting programs, and resumed at the point of interruption without loss of continuity. A program may be re-entrant to any level; an interrupted program might be called again, etc.

RE-ENTRANT CODE - A code that does not alter itself during execution. The same body of code may be used concurrently by two or more processors. This feature saves space as does a serially reusable

subroutine. It also saves time because there is no waiting for high priority programs. Re-entrant subroutines rely quite heavily on the use of storage in the calling program's field length so that each task will have its own data storage area and so that all valuable information will be stored if the processor is interrupted.

RELATIVE MODE - Addressing which applies to storage reference type instructions and system request parameters, a method whereby the addresses are made relative to the machine word. Programs running in allocatable core must use relative mode, whereas programs used in Part 1 must use absolute mode.

RELATIVE RECORD - The position of a record relative to the first record in the file.

RELATIVE RECORD NUMBER - Position of the record within a file, expressed as an ordered pair of integers (n,m). A relative record number is stored in a two-word array with n stored in the first word and m in the second word of the array. If the relative record number r = (n,m), then

$$r = n \times 65{,}536 + m$$

where:

$$0 \leq m \leq 65{,}535 \text{ and}$$
$$0 \leq n \leq 255$$

That is, m is a 16-bit (two-byte) positive integer and n is an eight-bit (one-byte) positive integer.

RELOCATABLE BINARY SUBPROGRAM - A program that can be loaded contiguously into available memory with the aid of a loader program; e.g., output from the FORTRAN compiler.

RELOCATABLE PROGRAM (Object Deck) - A program that includes control information regarding program name, entries, externals, transfer address, and command sequence storage; it may be loaded anywhere in absolute form by a relocating loader; this is the code produced by the Assembler or the FORTRAN compiler.

REMOTE - Physically displaced; e.g., a remote terminal might be located miles from a central computer and be linked by telephone lines.

REMOTE HOST - A computer connected to another central computer by means of special communication protocol; e.g., when CYBER 18 is connected to another computer through COMM18, the other computer is the remote host.

REQUEST PARAMETERS - The list of parameters accompanying a request call. The list specifies all values and addresses necessary to start the request.

REQUEST PRIORITY - The priority of a request with respect to other requests; determines when the request is processed.

REQUESTOR'S BUFFER - A data buffer supplied with the request, and used to hold data during the processing of the request.

RESIDENT PROGRAM - A program normally stored on specified medium. Main-memory-resident programs include most MSOS executive functions, many drivers, and much of the ITOS executive. Other programs are mass-memory-resident and are called into main memory only when needed to process a request.

RESPONSE TIME - The time interval between the occurrence of an event and the perception of some action at the source of the event; e.g., the time the system takes to respond to Input at a terminal.

RETURN - To transfer control back to a point in a program or subprogram from which a call was issued.

REWIND - To return a tape or disk file to its beginning.

RMS - Rotating mass storage; refers to disks and drums.

ROOT - A portion of a user program that uses a multiuser program. The other portion is one or more multiuser programs. The root must contain all the information and data that is unique to the program. It can read a multiuser into main memory, attach itself to the multiuser, detach itself from the multiuser, and be swapped.

ROUTINE - The smallest programming element in a program that can be called independently. Programs contain one or more routines.

ROW BINARY - Pertaining to the binary representation of data on punched cards in which adjacent positions in a row correspond to adjacent bits of data; e.g., each row in an 80-column card may be used to represent 80 consecutive bits of two 40-bit words.

RPG II - Report Program Generator II; source language and compiler. RPG II includes runtime programs that are in multiuser format under ITOS.

RSM - Request system modification; a type of PSR.

RTJ - Return jump.

RUN-ANYWHERE - Programs that can be moved and successfully operated elsewhere in core after being loaded by a relocatable loader with all addressing internal to the program being referenced by relative addressing. Run-anywhere programs may only run in part 0.

RUNTIME PROGRAM - Subroutines that become part of the set programs for a run at load time; for example, SIN for FORTRAN.

RW - The read/write request processor.

SCALING - Changing the value of a quantity by a factor in order to bring its range within prescribed limits.

SCATTER CODE - A function that maps integers into a specified subset; for example, the integer's modulo n is a hash code where n is any positive integer. The File Manager uses this code to distribute entries in the File Definition Directory, and on access to find where to begin looking for the entry.

SCHEDULER STACK - A reserved area in SYSDAT containing Scheduler request and Timer request parameter lists. Six queues are threaded through this stack: one for programs that can be immediately executed; four for programs to be delayed, and one for empty entries. Programs in the scheduler queue are FIFO within priority; programs in each of the four timer queues are threaded on a time-to-go-before-execution basis.

SCHSTK - The scheduler stack.

SCMM - Small Computer Maintenance Monitor, a system used by the customer engineers to check out the CYBER 18.

SCREEN OF DATA - One full data display. In extended data output, a screen consists of at least 23 data lines followed by the word PAUSE at the end of the last record.

SECONDARY SCHEDULER'S REQUEST - A scheduler request resulting from a System Processor scheduling a completion address; it is distinguished by a request code that does not equal nine (SCHDLE) and bit 15 of the request code word set to one.

SECTOR - (1) A contiguous space (96-words) directly addressable part of mass storage. (2) A set of words on a drum defined by software to be a sector for drum/disk software compatibility, even though sectors do not exist physically on a drum.

SECTOR MARKS - Flags on disk tracks, marked off in equidistant points for addressing purposes.

SEEK - The process of moving the disk heads over the desired track.

SEQUENTIAL FILE ACCESS - A process for obtaining information from or placing information into a file where the access time depends on the number of undesired logical records that must be processed before reaching the desired location in the file (also referred to as serial access); a file on magnetic tape can only be accessed sequentially.

SEQUENTIAL FILES - Files in which records are entered in sequence. Records may be retrieved in sequence or by relative record number.

SET (BIT) - To set a bit means that the bit is given the value one (see clear).

SET POINT - Data output that informs the test object as to what reference point it should start and maintain.

SHARED DEVICE - A device that has more than one logical unit associated with it; for example, the Printer has a logical unit for FORTRAN carriage control formats and another logical unit for system request control methods.

SLEW - To bypass data until desired end-of-input pattern is sensed.

SMD - Storage module disk; one of the types of mass memory used by ITOS. Up to eight disk packs (for a total of 400 million bytes) can be managed by the SMD.

SMM17 - System Maintenance Monitor for the 1700 computer systems.

SNAP DUMP - A selective dump performed at various points in a program run.

SORTING - The process of sequencing alphanumerically according to one or more keys supplied in the sorting request.

SORT/MERGE - The ITOS utility. It can be called as a part of a procedure stream.

SOURCE LANGUAGE - Input language for a given translation process.

SOURCE CODE - The coded statements as written by a programmer according to the syntax of RPG II, FORTRAN, or Macro Assembler language.

SPACE ALLOCATION - The process of making a block of main memory available so that a program can be read into that space.

SPECIFICATION FORMS - RPG II coding sheets that show the field length and locations for each of the eight input formats recognized by ITOS RPG II.

SPOOLING - The process of allowing multiple concurrent access to a single device by directing data to a mass storage file for subsequent serial processing. For example, reading or writing input and output streams on disk concurrently with job execution in a format convenient for later processing or output operations.

STACK - A contiguous area in core reserved for entries of fixed size, e.g., queue.

START UP - The process of bringing ITOS online.

STANDARD LOGICAL UNIT - A logical unit defined by the system for specific uses such as input or listing. The logical unit for a particular use may be changed by the operator, e.g., the standard unit for input may be changed from the card reader to magnetic tape.

STATE INDEX - An ITOS index indicating the current location (main memory or swapped) and state of execution for active user programs.

STATUS - The request (MSOS or ITOS) that generates the current state or condition of an I/O device, or of hardware, or of a task; e.g., busy or not busy.

STATUS WORD - Any word containing (in bit-by-bit format) a series of indicators for program or device status.

STX - Start of text.

SUBPROGRAM - A part of a larger program that can be converted into machine language independently.

SUBROUTINE - (1) A portion of a routine that causes a computer to carry out a well-defined mathematical or logical operation. (2) A routine arranged so that control may be transferred to it from a master routine, and at the conclusion of processing, control is returned to the master routine; such a subroutine is usually called a closed subroutine.

SWAPPING - The process of moving one or more suspended programs from main memory to mass memory so that the space is available to read other requested programs into main memory.

SYSDAT - The MSOS and ITOS system tables located in low core with a beginning address of 0.

SYSTEM - A regularly interdependent group of subsystems forming a unified whole.

SYSTEM FILES - A set of files used by the ITOS executive. Files are identified by the name that begins with $$, and can be reached for maintenance purposes by a user who logs onto the master terminal with USER ID = $$.

SYSTEM EXECUTIVE - A set of program modules that controls the operation of other programs within the system.

SYSTEM TABLES - Tables that are used by the operating system and which lie outside the user's field length (SYSDAT).

SYSTEM VOLUME - The volume (disk pack) called SYSVOL, which contains all MSOS and ITOS programs. It must always be mounted and ready.

SYSVOL - The system volume.

TAPE SIMULATOR FILES - A method of formatting mass storage to simulate a magnetic tape.

TEXT EDITING - A capability, provided by the text editor utility, to add, alter, or delete text from files.

THREAD - A list of entries (requests) such that each contains a pointer to the next entry; e.g., logical unit thread. Threads may extend throughout core.

TERMINAL - The I/O device used by an operator to communicate with the ITOS system. It consists of a display and a keyboard or card reader.

TERMINAL MANAGER - The ITOS module responsible for managing data flow between the computer and terminal.

THROUGHPUT - The time taken for a task, or many tasks, to complete processing from beginning to end.

TIME-SHARING - The capability of a computing system to accommodate more than one user during the same interval of time without apparent restriction caused by the existence of other users; a given device is used in rapid succession by a number of other devices, or various units of a system are used by different users or programs. The sharing is controlled automatically and may, or may not, include a priority scheme by using multiprocessing. The time-sharing may reduce total processing time from that required to do batch processing.

TIME SLICE - The maximum period of execution time allocated to a program before that program must release the computer. If the time slice is exceeded, the program is interrupted and then suspended so that other programs can be executed.

TRACK - One of the concentric rings on a disk such that the entire string (track) of data passes a read/write head every time the disk completes one revolution.

UCT - User control table.

UNIT - A peripheral device capable of storing, receiving, transmitting, or interpreting data; connected to an equipment.

UNIT RECORD DEVICES - Devices which accept one record for complete processing, such as the card reader, line printer, and card punch.

UNLOAD - To remove a tape from ready status by rewinding beyond the load point; the tape is then no longer under control of the computer.

UNPROTECTED - A defined area of core storage in which memory references are restricted to other locations in that area; memory accesses which reference a protected area will generate an internal fault condition, thus providing memory protection. References from a protected area may legally access this area.

UNPROTECTED MAIN MEMORY - Any part of main memory that can be accessed by any program, protected or unprotected. User programs and batch programs run in unprotected memory.

UNSOLICITED INPUT - Any data entered at a terminal that is not in response to an MSOS read request.

UNSWAP - The process of returning a swapped program to the location in main memory where it was placed prior to swapping.

UPDATE - (1) To modify a file with current information according to a specified procedure. (2) To modify an instruction so that its operand address is changed by a stated amount each time the instruction is performed.

USER - A program, process, or job that runs under the system (ITOS and MSOS).

USER AREA - A block of partitioned main memory that is controlled by the ITOS executive and used to execute user programs under ITOS control. This area is unprotected memory based on the setting of the protect bounds registers and page registers (see the ITOS Reference Manual). User programs execute at a priority level controlled by the ITOS executive.

USER ID - The code entered by an operator in response to "USER ID =" at the time the operator logs only the terminal. The user may use his own code to gain access to his private files. He may use a carriage return to gain access to common files, or he may use '$$' to gain access to system files.

USER PROGRAMS - Programs written to be executed in unprotected main memory under the executive applications modules are user programs.

USER'S EXECUTABLE CODE - That portion of a program that represents steps that the computer will perform; for example, in FORTRAN, the GO TO statement results in executable code.

USER'S WORKING AREA - That portion of a program that results in storage for data prior to post-processing; for example: In FORTRAN, the COMMON statement generates a working area.

USER TERMINAL - Synonymous with terminal.

UTIL - The file management utility under ITOS.

UTILITY ROUTINE - A routine in general support of the operation of a computer, e.g., a code updating, I/O diagnostic, tracing, or monitoring routine.

VERIFY - For certain ITOS requests (such as STOP), a message (VERIFY) is presented to the operator. The operator must confirm that the request is to be performed before ITOS will perform it.

VOLATILE STORAGE - Temporary storage area to save register contents or data; used by re-entrant programs.

VOLUME - A single physical unit of a peripheral storage device. A volume that can be used for File Manager file storage is a removable disk cartridge, a disk pack, a nonremovable disk cartridge, or a drum.

VOLUME LABEL - A sector at the start of a disk pack containing a unique ID (and other data) for the disk pack.

VOLUME NAME - Mnemonic (up to eight characters in length) identifying the disk pack.

WORD - The 16-bit basic unit of computer or mass memory storage.

WORK STATION - A user terminal that has a card reader and printer associated with it.

WORST CASE - That which gives maximum stress or consumes maximum time; e.g., the pattern of ones and zeros in storage that creates the greatest noise or the maximum possible time between two significant programming operations.

WRITE - (1) To transfer information, usually from internal storage, to an output device. (2) The MSOS and ITOS unformatted write request.

WTREAD - The ITOS write-then-read request used for terminal output.

COMMENT SHEET

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