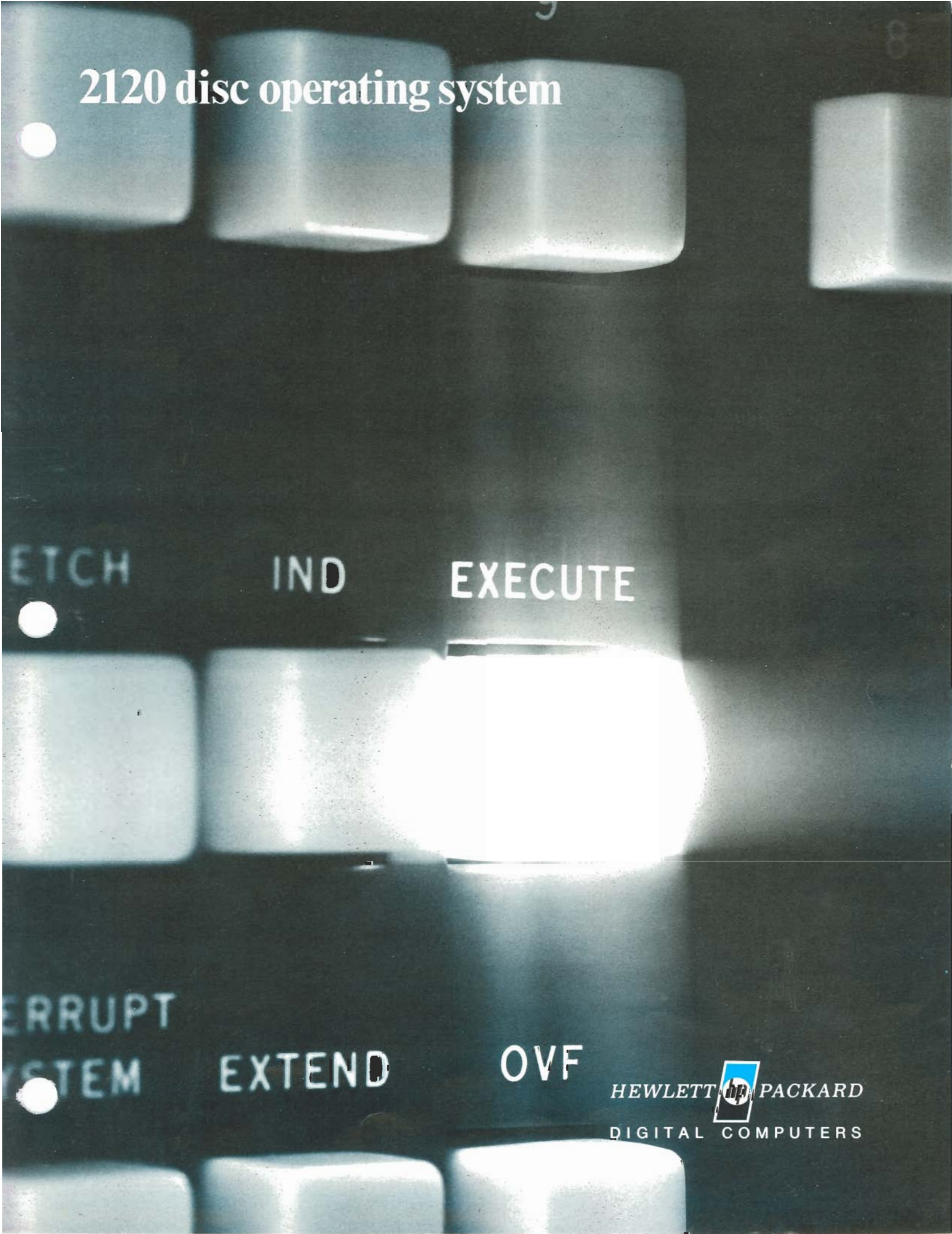
2120 disc operating system



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It powerfully responds to a variety of needs.

The 2120 Disc Operating system was designed to provide the convenience of a large system without a high overhead penalty. Here are just a few of the features you can choose to tailor this system for your specific application.

System Generation

The 2120 supervisor consists of a group of modules each designed to perform a given function. At system generation time, the user can customize his 2120 operating system. This is done by simply selecting the appropriate modules and I/O drivers for core residence. By building many systems on different discs, the user can easily change the characteristics of his 2120 system, to meet changing needs.

Batch Processing

System directives, source code, and data can be integrated into a single *job* deck. In batch mode, multiple *job decks* can be stacked upon one another, and executed in a *load and go* environment *without* manual intervention.

Disc and Core Memory Hardware Protection

System integrity is assured through hardware protection.

System Accounting

The 2120 Disc Operating System can be equipped with a system clock which will tell the operator how long a particular job has taken. The system clock can be also accessed by a user program.

Logical I/O Unit Designation

I/O programming is device independent. Programs written in FORTRAN, ALGOL, and Assembly Language specify a logical unit number. Logical unit numbers are assigned to appropriate devices at system generation time, but can be changed by the operator prior to the execution of a program.

Automatic System Disc Management

The system operator can add, change, and delete files from the system disc. All references to files are by name because the 2120 File Management System keeps track of all physical locations. After any file deletion, or edit, the system automatically repacks the disc to eliminate any wasted space.

Extended File Manager

User data files can be written under the command of an extended file manager. Files and record sizes are specified by the user at program execution time. All input/output is buffered to reduce the number of physical disc reads or writes. Records can be accessed on a direct or sequential basis.

Large Disc Capacity

The basic 2120 system has 5 million bytes of storage, and it can expand to 47 million bytes of *on-line* storage. In addition, data, source statements, and programs can be stored on removable cartridges, providing virtually unlimited capacity.

Program Segmentation

User programs may be structured into a main program with subservient segments. The segments can be stored on the disc and called into memory by the main program: the main program and its segments can share a common area of core for their data.

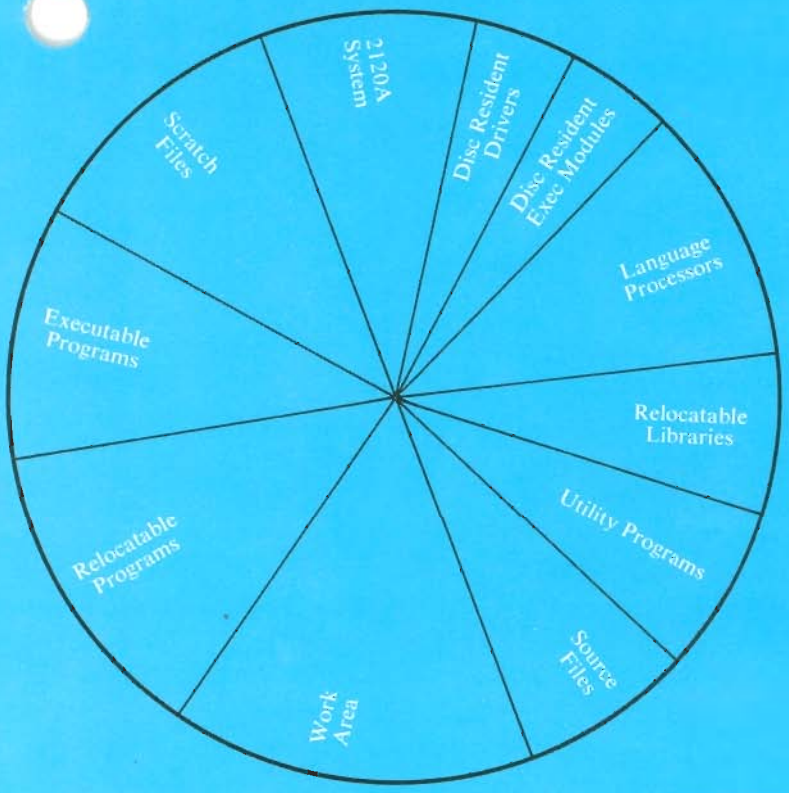
Utilities

The 2120 Disc Operating System includes many utility routines. A few of the capabilities of these routines are source code editing, program debugging, decimal arithmetic, and extensive formatting capability for the preparation of printed reports.

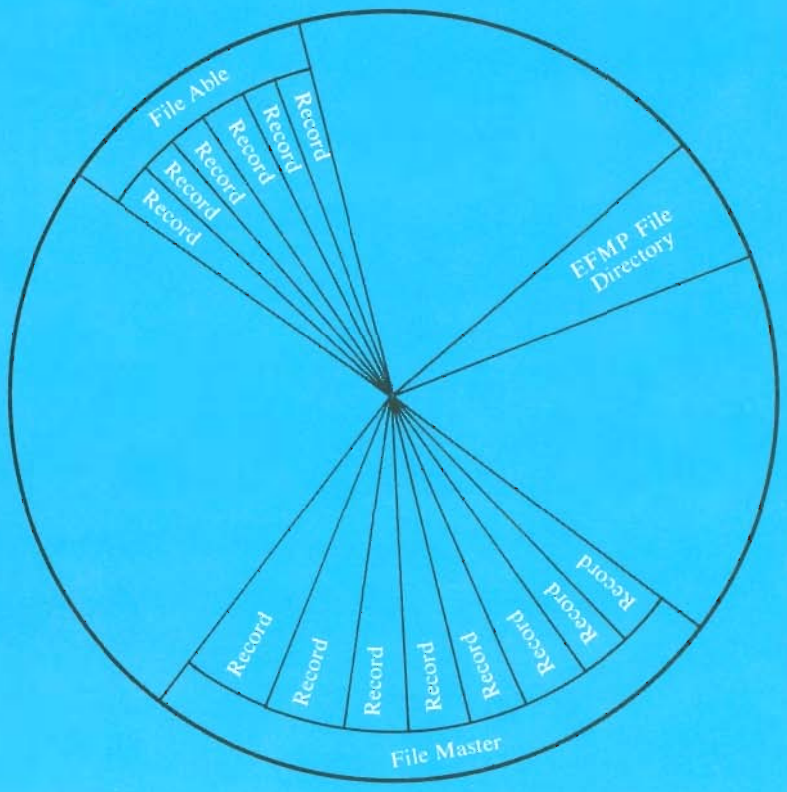
Languages

To make your programming easier the 2120 has FORTRAN IV, ALGOL 63, and Assembly Language available.

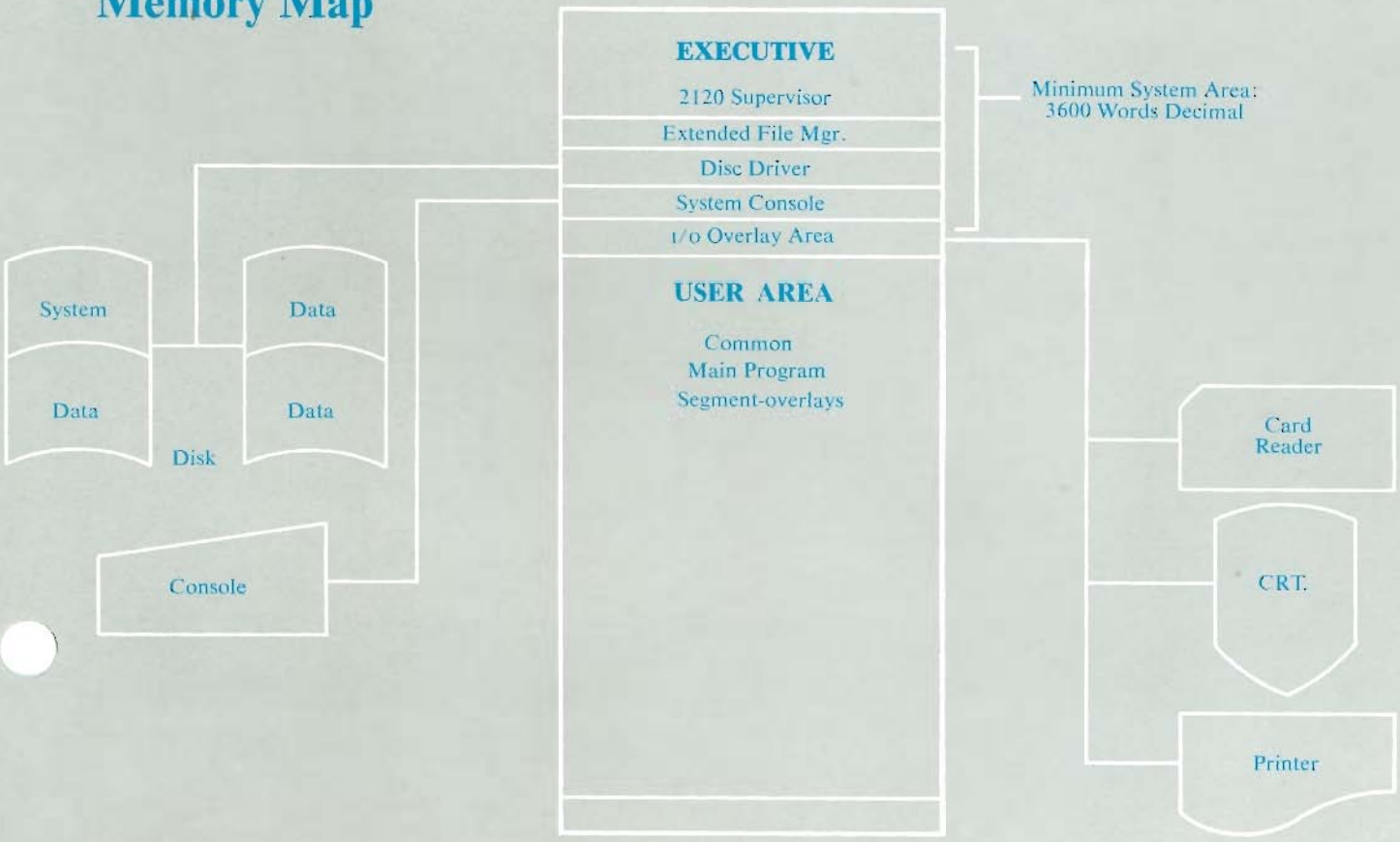
System Disc Layout



Extended File Manager Disc Layout



Memory Map



System Disc Layout

1. 2120 System

A copy of the configured system is kept on the system disc. A bootstrap program brings the system into core. It is possible to build many systems, and to use the one that is best suited for a given application.

2. Disc Resident Drivers

The 2120 doesn't have to have all of the I/O drivers resident in core. All the drivers that are not defined as core resident systems are stored here.

3. Disc Resident Executive Modules

All the executive modules that are not permanent residents of core are stored here, and they are called into memory by the supervisor as they are needed.

4. Disc Resident System Main Programs

These include compilers, debug routines, editors, and system loader. Having these programs here lowers the overhead of the system and increases the amount of core available to the user.

5. Relocatable Libraries

These are the routines that are needed by the 2120 Loader to prepare executable programs from relocatable code.

6. User Area

Contains user source statements for compilation, executable programs, relocatable programs, binary files, and a disc work area.

Extended File Manager Disc Layout

1. The extended file manager keeps a directory for each logical file under its control. This directory contains: file names, file length in records, record length, user supplied security code, and status information.

2. Files

All the files are accessed by name. The extended file manager determines the location and properties of the file by referring to its system directory.

3. Records

A record is the smallest addressable unit. Record size is determined by the user under program control when the file is established. Records can be addressed in a random or sequential method.

4. Maintenance

A complete set of routines are provided to maintain the users data file.

Memory Map

1. 2120 Supervisor

The 2120 supervisor operates in response to directives by the operator or the user program currently in process. The supervisor transfers control to the proper executive module after it verifies its accuracy. If the module is not in core the supervisor reads it from disc and then transfers control.

2. Extended File Manager

The 2120 supervisor can talk to the disc directly. On the other hand, the user programs have a powerful extended file manager for data file manipulation.

3. Disc Driver

The 2120A Disc Driver can control up to 4 disc drives concurrently. System and user programs can have access to as much as 47 million bytes of ON-LINE storage.

4. System Console

Operator communication with the system is through a system console. The operator has at his command, a group of directives that let him obtain information on, and control the operation of the supervisor.

5. I/O Overlay Area

Peripheral drivers are a set of re-entrant subroutines that control the operation of all external devices.

At program generation, I/O drivers can be declared either core or disc resident. All disc resident drivers share the same core reducing the overhead the user has in the operating system.

6. User Area

Upon command, the supervisor reads executable programs from the system disc into the user area for execution. Programs can consist of a main program with segments. Segments can be read into core at the request of the executing program. After completion of a program, the supervisor gains control.

2120 Basic Hardware

Number	Description
2100	Digital Computer 8K, Direct Memory Access
7900	Disc System
2752	System Teletype
2940	Single Bay 56″ cabinet
2748	Paper Tape Reader

2120 Additional Hardware Available

Number	Description
2600	CRT Keyboard Display Keyboard entry; visual display of input/output. 10 to 218 characters/second.
2895	Tape Punch Punches tape at 75 characters/sec.
2853	Tape Punch Punches tape at 120 characters/sec.
2761	Optical Mark Reader Reads punched and marked cards. 200 cards/minute, Automatic feed.
2605	Console Printer Used as printer, console or terminal. 30 char/sec, 132 pos.
7970B/C	Magnetic Tape Drive IBM compatible 7-track NRZI read after write 200/556/800 bpi; 25 ips (first drive).
7970E	Magnetic Tape 9 Track, 1600 bpi, Phase Encoded.
2883	Disc File w/controller Storage: 11,776,000 16-bit words. Transfer rate: 118K words/sec. Access time: 32 msec average.
2892	Card Reader Reads punched cards at 600 cards/minute.
2767	Line Printer 300 to 1100 lines/minute. 80 columns/line. ASCII character set.
2610	Line Printer 200 lines/minute. 132 columns/line. ASCII character set.
12539	Time Base Generator Generates real-time intervals from 100 usec to 1000 sec (derived from crystal oscillator) for use as source of timed interrupts for software clock.
12551	Relay Output Register Provides 16 form-A contacts and 48-pin mating connector for operating external devices.

2120 Directives

: ABORT
Terminate the current job.

: ADUMP (Parameters)
Dump a program if it aborts.

: BATCH, logical unit
Switch from keyboard to batch mode.

: COMMENT string
Print a message.

: DATE (Parameters)
Set the date and the time.

: DD
Dump the entire current disc onto a disc on another subchannel.

: DD, X
Dump the system area only to another disc.

: DD, U (Parameters)
Dump all or specified files of the current user disc to another disc, optionally assigning new file names.

: DN, n
Declare an I/O device down.

: DUMP (Parameters)
Dump all or part of a user file to a peripheral I/O device.

: EDIT (Parameters)
Edit a source statement file stored on disc, optionally creating a new file.

: EF (, logical unit)
Write end-of-file on magnetic tape.

: EJOB
Terminate the current batch and/or job normally.

: EQ
List the equipment table.

: GO
Continue processing a suspended program.

: IN, label
Label or unlabel ("*") the current user disc.

: JFILE, file
Specify a source file on the disc for the assembler or compiler.

: JOB (, name)
Initiate a user job.

: LIST, S (Parameters)
List all or part of a source statement file.

: LIST, U (Parameters)
List all or part of the user directory.

: LIST, X
List all or part of the system directory.

: LU (Parameters)
Assign or list logical units.

: OFF
Abort the currently executing program or operation without terminating the job.

: PAUSE
Suspend the current job or program.

: PDUMP, (Parameter)
Dump a program after normal completion.

: PROG, name (Parameter)
Start a system or user program.

: PURGE (, file, file, . . .)
Delete user files.

: RUN, name (Parameter)
Run a user program.

: SA, (Parameter)
Dump disc in ASCII to standard list device.

: SO, (Parameter)
Dump disc in octal to standard list device.

: SS
Set up system search for file names.

: STORE, A (Parameter)
Reserve space for an ASCII data file.

: STORE, B (Parameter)
Reserve space for a binary data file.

: STORE, P (Parameter)
Store temporary loader generated programs as permanent files.

: STORE, R (Parameter)
Store a relocatable file.

: STORE, S (Parameter)
Store a source statement file from a peripheral I/O device.

: TRACKS
Print the disc track status of the current user disc.

: TYPE
Return to keyboard mode from batch mode.

: UD (Parameter)
Change the subchannel assignment for the user disc, or request label & subchannel information for a user disc.

: UP, n
Declare an I/O device up.

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