Dropped 9/77

IBM 1130

Compilation of a 150-statement source program that yields a 50-card object deck will take about 2.75 minutes if a 1442 Model 7 Card Read Punch is used and no listing is required.

The Disk Monitor FORTRAN compiler requires at least 4K words of core storage, one disk drive, and either a card read/punch or a paper tape reader and punch. FORTRAN source programs, entered via cards or paper tape, are compiled into relocatable object programs in disk storage. The object programs can be loaded for execution, inserted into a disk library, and/or punched as binary card decks or paper tapes. Compilation of a 150-statement source program will take about 1.8 minutes if a 1442 Model 7 Card Read Punch is used for input and no listing is required. (Producing a listing on the 1132 Printer or Console Printer would raise the total compilation time to about 3.8 or 7.2 minutes, respectively.)

RPG: A Report Program Generator that operates under the Disk Monitor System, Version 2, facilitates the programming of many commercial applications for the 1130. The 1130 RPG language uses the same coding forms as System/360 RPG and provides similar functional capabilities, though there are a number of incompatibilities. The programmer prepares a set of specifications describing the input data, calculations, and desired output. The RPG then generates a machine-language program that is executed to perform the required functions. The RPG requires at least 8,192 words of core storage, one disk drive, a card reader or read/punch, and a printer (1132, 1403, or Console Printer); no RPG is available for paper-tape-oriented systems. Compilation of a 52-statement RPG source program that reads cards and produces an accounts receivable register takes about 20 seconds if a 2.2-microsecond CPU and a 1442 Model 7 Card Read Punch are used and no listing is required. (Producing a listing on the 1132 Printer or Console Printer would raise the total time to about 95 or 500 seconds, respectively.)

ASSEMBLERS: Both the Card/Paper Tape Programming System and the Disk Monitor System include assemblers, which permit programs to be coded in a machine-oriented language that uses symbolic operands and mnemonic operation codes. A fixed-format coding form is used, and most symbolic instructions are converted into machine instructions on a one-for-one basis. A number of pseudo-instructions are used to define constants and control the assembly process.

The Card/Paper Tape Assembler requires at least 4K words of core storage and either a card read/punch or a paper tape reader and punch. A two-pass assembler, it accepts source programs and produces object programs on either cards or punched tape. Approximately 520 symbolic labels can be held in a 4K core memory. Assembly speeds are generally input/output-limited, resulting in speeds of about 90 to 100 statements per minute for a card system with a 1442 Model 7 Card Read Punch and 6 to 17 statements per minute for a paper tape system.

The Disk Monitor Assembler is a disk-oriented assembler that produces object programs in disk storage and permits the label table to overflow onto the disk if necessary. A number of additional pseudo-instructions provide capabilities for disk data organization, program linking, and control of the assembly listing. Minimum equipment requirements are 4K words of core storage, one disk drive, and either a card read/punch or a paper tape reader and punch. Assembly speeds range from about 14 to 500 statements per minute, depending upon the equipment configuration and the listing requirements.

The 1130 Macro Assembler performs all the functions of the Disk Monitor Assembler described above. In addition, it provides facilities for defining, cataloging, and using user-defined macro-instructions, which can simplify programming and facilitate the development of specialized, application-oriented languages. At least 8K words of core storage are required for use of the macro facilities.

UTILITY ROUTINES: The Card/Paper Tape Programming System and the Disk Monitor System each contain a variety of utility routines, as described above. In addition, the following facilities are available:

- Graphic Subroutine Package (GSP): Facilitates the programming of interactive graphic applications using the 2250 Display Unit; operates under the Disk Monitor System and requires at least 8K words of core storage.
- Satellite Graphic Job Processor: Permits definition and initiation of Operating System/360 jobs from a remote 1130 computer equipped with a 2250 Display Unit; requires a 16K 1130 with disk drive, card read/punch, display unit, and Synchronous Communications Adapter.
- FORTRAN Subroutines for Data Transmission: Permit FORTRAN programmers, by means of appropriate CALL statements to control the transmission of data between a System/360 and a remote 1130 computer.
- Remote Job Entry Work Station: Permits entry of Operating System/360 jobs from a remote 1130 for execution on a System/360 computer.
- Scientific Subroutine Package: Consists of 121 FORTRAN-coded subroutines designed to handle a broad range of statistical, matrix manipulation, integration, polynomial evaluation, and other mathematical functions.
- Commercial Subroutine Package: Consists of 28 Assembler-language subroutines that can be called by FORTRAN programmers to facilitate the processing of variable-length decimal or alphanumeric fields and perform a variety of code and format conversions.

APPLICATION PROGRAMS: A large library of programs for specific applications, developed by both IBM and users, is available for the 1130. Type II programs, which receive full IBM support and are offered at no additional charge, include:

Automated Chemistry Programs
Civil Engineering Coordinate Geometry (COGO)
Continuous System Modeling
Control Optimization
Data Presentation System
Linear Programming/Mathematical Optimization
Mechanism Design System – Kinematics
Mechanism Design System – Springs and Gears
Optical System Design
Petroleum Engineering (15 programs)
Problem Language Analyzer (PLAN)
PLAN Graphic Support for 2250
Project Control System

IBM 1130

Rigid Frame Selection Program
Route Accounting System
Statistical System
Structural Engineering System Solver (STRESS)
Type Composition
Work Measurement Aids

PRICING

EQUIPMENT: The following systems illustrate typical configurations of the IBM 1130. All necessary features and adapters are included in the indicated prices, and the quoted rental prices include equipment maintenance.

MINIMUM PAPER TAPE SYSTEM: Consists of 4K 1131 Model 1A Central Processing Unit, 1134 Model 1 Paper Tape Reader, and 1055 Paper Tape Punch. Monthly rental and purchase prices are $763 and $17,664, respectively. Substitution of the 4K 1131 Model 2A CPU, which includes a single-disk storage drive, increases the rental and purchase prices to $986 and $22,424, respectively.

MINIMUM CARD SYSTEM: Consists of 4K 1131 Model 1A CPU and 1442 Model 6 Card Read Punch. Monthly rental and purchase prices are $999 and $26,080, respectively. Substitution of the 4K 1131 Model 2A CPU, which includes a single-disk storage drive, increases the rental and purchase prices to $1,215 and $30,840, respectively.

TYPICAL DISK/CARD/PRINTER SYSTEM: Consists of 8K 1131 Model 2B CPU with single-disk storage drive, 1442 Model 6 Card Read Punch, and 1132 Model 1 Printer. Monthly rental and purchase prices are $1,736 and $41,837, respectively. Substitution of the faster 1131 Model 3B CPU increases the rental and purchase prices to $2,096 and $50,227, respectively.

EXPANDED DISK/CARD/PRINTER SYSTEM: Consists of 32K 1131 Model 3D CPU with single-disk storage drive, 1133 Multiplex Control Enclosure, four 2310 Disk Storage drives, 2501 Model A2 Card Reader, 1442 Model 5 Card Punch, and 1403 Model 7 Printer. Monthly rental and purchase prices are $6,629 and $167,647, respectively.

SOFTWARE: Most of the existing 1130 software was being distributed prior to IBM's June 1969 unbundling announcement, and is still available to users at no charge. There are, however, nine application packages for which IBM charges a monthly fee. These include the Construction Cost Control System, Construction Estimating, Continuous System Modeling Program II, Distillation Program, Electronic Circuit Analysis Program II, EPIC school administration and financial programs, Linear Programming System, Project Control System II, and Mathematics Subroutine Library. Their prices are listed at the end of this report.

EDUCATION: All IBM "professional courses" are now individually priced. System Features Instruction is offered to users of IBM computers at no charge. Customer Executive Seminars, Industry Seminars, and promotional sessions are still offered at no charge by IBM invitation.

SUPPORT: IBM Systems Engineering assistance is available to 1130 users at a basic rate of $37.75 per hour.

For non-contract field engineering or programming service, $35.75 per hour is charged during IBM's normal working hours and $46.50 per hours at other times.

CONTRACT TERMS: The standard IBM rental contract includes equipment maintenance and entitles the user to up to 176 hours of billable time per month. Time used in excess of that amount is billed, for most 1130 components, at an extra-use rate of 10% of the basic hourly rate (i.e., 10% of 1/176 of the monthly rental for each hour of extra use). ■

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EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Rental (short-term lease)
PROCESSORS AND MAIN STORAGE				
1131	Central Processing Unit:			
	Model 1A: 4,096 words, 3.6 microseconds, no disk	$14,150	$ 95.00	$ 644
	Model 1B: 8,192 words, 3.6 microseconds, no disk	18,570	102.00	867
	Model 1C: 16,384 words, 3.6 microseconds, no disk	30,730	205.00	1,405
	Model 1D: 32,768 words, 3.6 microseconds, no disk	54,210	226.00	2,470
	Model 2A: 4,096 words, 3.6 microseconds, with disk	18,910	129.00	867
	Model 2B: 8,192 words, 3.6 microseconds, with disk	23,330	136.00	1,085
	Model 2C: 16,834 words, 3.6 microseconds, with disk	35,480	205.00	1,620
	Model 2D: 32,768 words, 3.6 microseconds, with disk	58,580	226.00	2,700
	Model 3B: 8,192 words, 2.2 microseconds, with disk	31,720	198.00	1,445
	Model 3C: 16,384 words, 2.2 microseconds, with disk	45,820	213.00	2,090
	Model 3D: 32,768 words, 2.2 microseconds, with disk	73,600	233.00	3,390
	Model 4A: 4,096 words, 3.6 microseconds, with disk	10,150	129.00	499
	Model 4B: 8,192 words, 3.6 microseconds, with disk	15,310	136.00	698
	Model 5B: 8,192 words, 2.2 microseconds, no disk	26,970	198.00	1,225
	Model 5C: 16,384 words, 2.2 microseconds, no disk	41,070	213.00	1,870
	Model 5D: 32,768 words, 2.2 microseconds, no disk	69,070	233.00	3,170
FEATURES FOR 1131 CENTRAL PROCESSING UNIT				
3616	1132 Model 1 Printer Attachment	254	2.00	10
3617	1132 Model 2 Printer Attachment	254	2.00	10
3623	1134 Paper Tape Reader Attachment (for all 1130's except Model 4's)	254	2.00	10
3624	1134 Loader Feature	254	NC	10
3625	1134 Paper Tape Reader Attachment (for 1130 Model 4's)	847	2.00	54
3854	Expansion Adapter	128	NC	5
4449	1443 Model 5 Card Punch Attachment	830	3.00	37
4454	1442 Model 6 or 7 Card Read Punch Attachment	830	3.00	37
4455	1442 Model 6 or 7 Attachment for 1130 Model 4's	830	3.00	26
7187	1627 Model 1 Plotter Attachment	381	0.50	15
7189	1627 Model 2 Plotter Attachment	381	0.50	15
7490	Storage Access Channel	615	0.50	26
7690	Synchronous Communications Adapter	5,375	14.50	248
7923	1055 Paper Tape Punch Attachment (Feature 7924 for 1130 Model 4's)	508	1.50	21
8034	1231 Optical Mark Page Reader Attachment	1,480	3.00	64
8042	2501 Card Reader Attachment	2,090	5.50	90
1133	Multiplex Control Enclosure	983	NC	42
1865	Channel Multiplexer (for 1133)	3,105	11.00	121
3201	Disk Control 1 (for 1st 2310 drive, on 1133)	1,110	2.00	47
3202	Disk Control 2 (for 2nd 2310 drive, on 1133)	979	3.00	42
3203	Disk Control 3 (for 3rd 2310 drive, on 1133)	1,110	2.00	47
3204	Disk Control 4 (for 4th 2310 drive, on 1133)	979	3.00	42
3301	Disk Control 1 (for 1st 2311-11)	4,905	29.50	321
3302	Disk Control 2 (for 2nd 2311-11)	4,905	29.50	321
3303	Disk Control 1 (for 1st 2311-12)	3,555	29.50	233
3304	Disk Control 2 (for 2nd 2311-12)	3,555	29.50	233
4423	1403 Model 6 Printer Attachment: 210 lpm (for 1133)	5,640	35.50	221
4424	1403 Model 6 Printer Attachment: 340 lpm (for 1133)	11,060	35.50	483
4425	1403 Model 7 Printer Attachment: 600 lpm (for 1133)	12,280	41.00	538
7492	Storage Access Channel II (for 1133)	615	0.50	26
PERIPHERAL EQUIPMENT				
2310	Disk Storage:			
	Model B1; one single-disk drive	$ 8,165	$ 51.50	$ 277
	Model B2; two single-disk drives	13,130	92.00	445
2315	Disk Cartridge for 2310's	90	Time & Mat'ls.	Purchase Only
2311	Disk Storage:			
	Model 11, 2,560,000 words (12-23 month rental, $588; 24-month rental, $537)	16,510	65.50	639
	Model 12, 1,536,000 words (12-23 month rental, $360; 24-month rental, $328)	14,430	41.00	391
1316	Disk Pack for 2311's	360	Time & Mat'ls.	15
1442	Card Read Punch:			
	Model 6; reads 300 cpm, punches 80 cols/sec.	11,110	75.00	311
	Model 7; reads 400 cpm, punches 160 cols/sec.	11,970	89.00	453
1442	Card Punch, Model 5; punches 160 cols/sec	9,720	71.00	300
3630	1130/1442 Coupling (required on 1442 Model 5 only)	252	NC	5

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EQUIPMENT PRICES

	PERIPHERAL EQUIPMENT (Continued)	Purchase Price	Monthly Maint.	Rental (short-term lease)
2501	Card Reader:			
	Model A1; 600 cpm	12,330	47.00	228
	Model A2; 1000 cpm	12,550	66.50	300
3630	1130/2501 Coupling (required on either model)	168	NC	5
1134	Paper Tape Reader:			
	Model 1; 60 char/sec, for strips only	798	11.00	36
	Model 2; 60 char/sec, for strips or reels	1,380	11.50	63
1055	Paper Tape Punch; 14.8 char/sec	1,700	7.50	42
3571	Edge-Punching (for 1055)	212	0.25	5
6121	Take-Up Reel (for 1055)	122	0.25	3
1132	Printer:			
	Model 1; 80 lpm, 120 print positions	6,195	33.50	288
	Model 2; 40 lpm, 120 print positions	3,380	33.50	187
1403	Printer:			
	Model 6; 210 lpm (with 4423 on 1131 CPU) or 340 lpm (with 4424 on 1131 CPU); (12-23 month rental, $402; 24-month rental, $367)	18,760	135.00	437
	Model 7: 600 lpm (with 4425 on 1131 CPU); (12-23 month rental, $650; 24-month rental, $594)	21,140	159.00	707
1231	Optical Mark Page Reader, Model 1	20,520	43.00	465
1264	Asynchronous Mode Feature (required on 1231)	1,545	4	42
1627	Plotter:			
	Model 1; 300 increments/sec, 12" wide chart	4,930	49.00	Purchase Only
	Model 2; 200 increments/sec, 30" wide chart	8,545	52.50	Purchase Only

SOFTWARE PRICES

		Monthly Charge
5711-M62	Construction Cost Control System	$ 82
5711-M61	Construction Estimating	55
5711-XS1	Continuous System Modeling Program II	55
5711-P71	Distillation Program	104
5711-EE1	Electronic Circuit Analysis Program II	165
5735-E91	SOCRATES (Secondary & Elementary School Scheduling)	192
5735-E92	FAST (Test Scoring & Analysis)	104
5735-E93	Budget/Finance (Administrative & Financial Records for Secondary & Elementary Schools)	
5735-E94	STUDENT (Student Record Filing & Retrieval)	87
5711-C01	Linear Programming System	32
5711-XP1	Project Control System	82
5711-XM2	Mathematics Subroutine Library	110