APPLICATIONS

Manufacturer
Commercial, scientific, and engineering data processing.

Government Sample
Army Ballistic Missile Agency
Missile design and development activities.

Industrial Sample
Aerojet-General Corporation
Scientific, rocket engine manufacture activity.

General Dynamics Corporation, Convair Division
Engineering, aircraft manufacture activity.

General Electric Aircraft Gas Turbine Division
Engineering and scientific problems.

General Electric Company, Lynn Computations
Scientific, engineering and business applications.

General Motors Corporation, Research Staff
General scientific computation.

Glenn L. Martin Company
Engineering computation.

Midwestern Universities Research Association
Research with especial reference to high energy physics, accelerator design and the application of computers to problems concerned therewith.

North American Aviation
Engineering, computing and data processing.

Standard Oil Company of California
Mathematical computation and data processing.

United Aircraft Corporation
The United Aircraft Corporation provides a central computing facility located at the Research Department for the solution of engineering and research problems. It services the three UAC Divisions: Pratt and Whitney Aircraft, Sikorsky Aircraft, and Hamilton Standard which are engaged in the design and manufacture of aircraft engines, helicopters, propellers and other aircraft equipment. Two Type 704 systems are utilised.

University of California Radiation Laboratory
Scientific problems.

Westinghouse Electric Corporation
Engineering.
### NUMERICAL SYSTEM

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal number system</td>
<td>Binary</td>
</tr>
<tr>
<td>Binary digits per word</td>
<td>36</td>
</tr>
<tr>
<td>Binary digits per instruction</td>
<td>36</td>
</tr>
<tr>
<td>Instructions per word</td>
<td>1 decrement field</td>
</tr>
<tr>
<td>Instructions decoded</td>
<td>86</td>
</tr>
<tr>
<td>Instructions used</td>
<td>86</td>
</tr>
<tr>
<td>Arithmetic system</td>
<td>Floating point, fixed point, and logical arithmetic</td>
</tr>
<tr>
<td>Instruction type</td>
<td>One address</td>
</tr>
</tbody>
</table>

**Number range**

- **Fixed point**  \((-2^{35}-1) < n < 2^{35}-1\)
- **Floating point**  \(-10^{38} < n < 10^{38}\)

**Industrial Sample**

- General Dynamic Corporation
- Number range is ±34, 359, 738, 367

**University of California Radiation Laboratory**

Floating point operation is 8 bit exponent excess 128 and 27 bit fraction plus sign. Fixed point is 35 bit magnitude plus sign. The single address instruction word contains an 11 bit command, 3 bit tag and 15 bit ADR. Index instruction is sign plus 2 bit command, 15 bit decrement, 3 bit tag and 15 bit ADR.

### ARITHMETIC UNIT

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Fixed Point</th>
<th>Floating Point</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time</strong></td>
<td>Microsec</td>
<td>Microsec</td>
</tr>
<tr>
<td>Add (excl. stor. access)</td>
<td>12</td>
<td>72</td>
</tr>
<tr>
<td>Mult (excl. stor. access)</td>
<td>228</td>
<td>192</td>
</tr>
<tr>
<td>Div (excl. stor. access)</td>
<td>228</td>
<td>204</td>
</tr>
<tr>
<td>Construction Vacuum tubes, magnetic cores, transistors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapid access word registers</td>
<td>3 index 2 arithmetic</td>
<td></td>
</tr>
<tr>
<td>Basic pulse repetition rate</td>
<td>1 Mc/sec</td>
<td></td>
</tr>
<tr>
<td>Arithmetic mode</td>
<td>Parallel</td>
<td></td>
</tr>
<tr>
<td>Timing</td>
<td>Synchronous</td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>Sequential and concurrent</td>
<td></td>
</tr>
</tbody>
</table>

A sign is provided for the floating point exponent. Add and multiply times include access to instruction. Floating-point divide time is 24 microseconds if dividend fraction is zero.

**Industrial Sample**

- General Dynamics Corporation, Convair Division
- Operation times including storage access, operating fixed point, are 24, 240, and 240 microseconds, for add, multiply and divide, respectively. Diode switching circuits are used in the arithmetic unit.
**STORAGE**

Access Microsec
12 to any word (10 decimal digits equivalent and sign) 12,000 average access to first word, 96 per word for subsequent words. Of the 96 per word, 36 are available for further computation.

Time to accelerate magnetic tape to write status (75 inches per sec.) from standstill is 10,000 of which 7,000 are available for further computation. Time to write subsequent words is 400 each, of which 356 is available for further computation. Time to accelerate magnetic tape to read status (75 inches/sec.) from standstill is 10,000 of which 3,000 are available for further computation. Time to read subsequent words is 400 each, of which 288 are available for computation. Magnetic tape unit can rewind 2,400 feet of tape in 1.2 minutes.

Provision has been made in addressing and indexing system to increase main frame storage up to 32,768 words of magnetic core when made available by manufacturer.

**Industrial Sample**

General Dynamics Corporation, Convair Division Storage consists of one 4,096 word core unit, one 8,192 word drum unit and one 900,000 word tape unit.

General Electric Aircraft Gas Turbine Division Storage has up to 7 tape units attached.

General Motors Corporation, Research Staff Storage has 8,192 words of magnetic core, 8,192 words of magnetic drum, 900,000 and 540,000 words binary and binary-coded-decimal words in 8 tape units.

Word length may be considered to be 10 decimal digits equivalent plus sign.

Westinghouse Bettis Atomic Power Division System utilizes 4,096-word magnetic core, 8,192-word drum, ten IBM type 727 magnetic tape units, and a 262,144-word magnetic drum.

**INPUT**

<table>
<thead>
<tr>
<th>Media</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Punched Card</td>
<td>150 or 250 cards per minute. Cards are 80 column.</td>
</tr>
<tr>
<td>Reader</td>
<td></td>
</tr>
<tr>
<td>Magnetic Tape</td>
<td>If magnetic tape is alphanumeric: 15,000 char/sec.</td>
</tr>
<tr>
<td></td>
<td>If magnetic tape is pure binary:</td>
</tr>
</tbody>
</table>
25,000 decimal equivalent digits per second. See STORAGE, Magnetic Tape.

Card to Magnetic Tape (Independent operation) 250 80-column cards per minute. Cards must be in decimal alphanumeric code. Tape is written in binary coded decimal alphanumeric code and simultaneously checked.

290 or 177 milliseconds are available between cards for computation. Time to convert the worst case of decimal to binary (floating-point word) and check conversion is 7 milliseconds per word. Therefore, all conversion in one 80 column card can take place between the reading of successive cards.

Industrial Sample General Dynamics Corporation, Convair Division Magnetic tape reading speed is 2,500 words/sec after tape is in motion.

General Electric Aircraft Gas Turbine Division Tapes may be prepared as a peripheral operation.

General Electric Company, Lynn Computations Plastic magnetic tape unit reading speed is 4,200 words/minute.

General Motors Corporation, Research Staff System utilizes punched card reader at 250 cards/min. and magnetic tape at 15,000 binary coded decimal char/sec or 25,000 equivalent decimal digits if straight binary. Cards to magnetic tape conversion proceeds at 250 80-column cards/min. (alphanumeric only) as an independent operation.

OUTPUT

<table>
<thead>
<tr>
<th>Media</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Punched Card</td>
<td>100 cards/min., 24 words/card (binary). 342 milliseconds computing time available/card (binary and decimal).</td>
</tr>
<tr>
<td>Recorder</td>
<td>150 lines/min. 72 characters/line. 322 milliseconds computing time available/card.</td>
</tr>
</tbody>
</table>

| Line Printer   | 6,500 data points/second. 7 in. tube for photos. 21 in. tube for visual. |
| Wheel type     | |

| Magnetic Tape  | If magnetic tape is to be written in alphanumeric or binary coded decimal code: 15,000 characters/second. If magnetic tape is to be written in binary digits: 25,000 decimal equivalent digits/sec. |

| Magnetic Tape to 80-column card | 100 cards/min. Punched characters are automatically internally checked by unit. |
| Magnetic Tape to Printer Line   | 150 lines/min. (Wheel printer). 120 alphanumeric characters/line. |
1,000 lines/minute at 60 characters/line (wire matrix printer).

Industrial Sample
General Dynamics Corporation, Convair Division System utilizes printer 150 lines/min. and 120 char./line, card punch 100 cards/min., and magnetic tape at 2,500 words/sec after tape is in motion.

General Electric Aircraft Gas Turbine Division System utilizes line printer, cards and magnetic tapes.

General Electric Company, Lynn Computations System utilizes direct print, direct cards and plastic magnetic tape.

General Motors Corporation, Research Staff System utilizes punched card, line and printer, magnetic tape. Magnetic tape to cards and tape to printer conversion is performed as an independent operation.

Glenn L. Martin Company
System utilizes printer, punch and tape.

University of California Radiation Laboratory System utilizes magnetic tape, cards, printer and CRT. The cathode ray tube output speed is 140 microseconds/point. A Univac Hi-speed printer was adapted to 704 tapes at 600 lines/min.

Westinghouse Bettis Atomic Power Division System utilizes on-line printer, cards and magnetic tape.

CIRCUIT ELEMENTS ENTiRE SYSTEM

Industrial Sample
General Dynamics Corporation, Convair Division System has 147,456 magnetic cores, 15 separate cabinets, and tube types used are the 5965, 5657, 6211, 12AY7, 5998, 6072, 6390.

General Motors Corporation, Research Staff System has approximately 160,000 magnetic cores, 16 separate cabinets including main frame, card machines, power cabinets, 2 core storage units, and 6 tape and synchronizing units. The card to tape, tape to card and tape to printer converters each have 3 separate cabinets.

University of California Radiation Laboratory Approximate circuit component complement is:

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tubes</td>
<td>5,000</td>
</tr>
<tr>
<td>Crystal diodes</td>
<td>10,001</td>
</tr>
<tr>
<td>Magnetic cores</td>
<td>395,168</td>
</tr>
<tr>
<td>Tube types</td>
<td>5965, 6211, 5687, 12AY7, 5998</td>
</tr>
<tr>
<td>Separate cabinets</td>
<td>20</td>
</tr>
</tbody>
</table>

CHECKING FEATURES

Manufacturer
Magnetic Tape -- Horizontal and vertical parity bit check for each tape row and column.
Line Printer -- Echo checking for each printed character.
Card to Magnetic Tape -- checks magnetic tape as above. Checks card.
Tape to Printer -- Checks magnetic tape as above. Echo checking for each printed character.
Tape to Card -- Same as above. Punched card is checked.

Arithmetic and Logical Unit -- Overflow in accumulator. Two extra positions are on left side of accumulator so that overflow is not lost. Divide check if |Dividend| > |Divisor|. Machine can operate in trapping mode for checking flow of the problem to assist in program checking.

Industrial Sample
General Dynamics Corporation, Convair Division
Provisions are made for exponent overflow and underflow plus divide check.

General Motors Corporation, Research Staff
In addition to the above, system has off-line check of redundancy bits on a written tape.
Westinghouse Bettis Atomic Power Division
System utilizes lateral and longitudinal redundancy check on magnetic tape, check of sum to end from tape and drums and echo check to printer. All of these are used during input-output operations only.

### POWER, SPACE AND WEIGHT

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Weight (lbs.)</th>
<th>KVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Frame</td>
<td>2,890</td>
<td>46.3</td>
</tr>
<tr>
<td>Punch Card Recorder</td>
<td>530</td>
<td>0.7</td>
</tr>
<tr>
<td>Line Printer (Wheel type)</td>
<td>2,795</td>
<td>5.1</td>
</tr>
<tr>
<td>Magnetic Drum</td>
<td>1,480</td>
<td>10.4</td>
</tr>
<tr>
<td>Magnetic Core Frame</td>
<td>1,425</td>
<td>7.4</td>
</tr>
<tr>
<td>Cathode Ray Tube Display Unit</td>
<td></td>
<td>2.4</td>
</tr>
<tr>
<td>Power Frame No. 1</td>
<td>2,810</td>
<td>5.8</td>
</tr>
<tr>
<td>Power Frame No. 2</td>
<td>2,810</td>
<td>5.8</td>
</tr>
<tr>
<td>Power Distribution Unit</td>
<td>1,230</td>
<td>1.2</td>
</tr>
<tr>
<td>Magnetic Tape Unit</td>
<td>900</td>
<td>2.5</td>
</tr>
<tr>
<td>Magnetic Tape Control Unit</td>
<td>1,036</td>
<td>6.0</td>
</tr>
<tr>
<td>Power Factor: 0.5 &lt; Cos θ &lt; 0.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Space occupied: Machine including 10 tape units: 3,000 ft². Customer Engineering requirements: 400 ft². Air conditioning, overall, approximately 40 tons.

Industrial Sample
General Dynamics Corporation, Convair Division
System requires 69.6 kW, 96.4 kVA, 872.9 cu. ft., 169.2 sq. ft. (combined 15 separate frames). System weighs 25,320 lbs. and utilizes 60 Tons of air conditioning.

General Electric Aircraft Gas Turbine Division
System occupies 1,500 sq. ft. A 150-Ton air conditioning unit was installed to service two machines.

General Electric Company, Lynn Computations
System requires 60 kVA, occupies 36,000 cu. ft. and 3,400 sq. ft. Area is 60 by 60 by 70 by 12 ft. The air conditioner occupies approximately 27,000 cu. ft. and 1,600 sq. ft. Area is 40 by 40 by 22 ft. System requires 40 Tons of air conditioning, the unit is capable of 50 Tons with 100% stand-by capacity.

General Motors Corporation, Research Staff
Computer requires 71 kW, 101.4 kVA, 0.7 FP. The three peripheral units are extra. The system occupies 13,500 cu. ft., 1,350 sq. ft. plus 9,000 cu. ft. and 900 sq. ft. for 3 peripheral units. The system weighs 25,590 lbs. The air conditioner occupies 4,000 cu. ft. and 400 sq. ft. 72 Tons of air conditioning are available, approximately half of capacity is used on the average. Three 7-1/2-Ton units are for peripheral units and two 25-Ton units are for the computer.

Glenn L. Martin Company
System requires 100 kVA and 2,500 sq. ft. 60 Tons of air conditioning is utilized.

University of California Radiation Laboratory
Computer requires 77 kW, 149.2 kVA, 0.65 FP. Area occupied is 5,000 sq. ft. and computer weighs 30,000 lbs. Air conditioning occupies 2,000 sq. ft. and has a 60-Ton capacity.

Westinghouse Bettis Atomic Power Division
Computer requires 160 kW, 210 kVA, 0.75 FP. Central machine room is 2,450 sq. ft.

## PRODUCTION RECORD

Produced: 36
Operating: 33
On order: 75 (Estimate)
Delivery time: Special

## COST, PRICE AND RENTAL RATE

### Machine Purchase and Rental Policy

Direct Purchase (Ownership Plan)
Equipment currently being manufactured will be offered for sale. This plan will include installation of the machine; warranty; trade-in provisions of purchased IBM equipment; and maintenance by one of the following methods: (Contracts for the sale of new machines and the maintenance of machines will be proposed to the General Services Administration for use by the Federal Government).

Annual maintenance agreement contract with IBM.

Repair and maintenance service on a time and material basis from IBM.

User service own equipment.

Services other than IBM.

default

Options

For the user who prefers to lease IBM equipment with an option to purchase, IBM makes available a lease-purchase option for a two-year period.

Rental Rates Applicable to Purchase Price.

When a customer with an option agreement to purchase exercises his option, a percentage of the rentals paid on that machine, including extra shift charges, up to the effective date, will be credited against the purchase price of the machine. In the case of the type 704 the percentage of rental allowance against purchase depends upon the individual components comprising the system. For example: 704 - 55%; 711 and 721 - 40%; 735 - 60%; 737 or 738 - 60%.

Other Plans

IBM offers to sell, beginning January 1, 1957, any IBM punched card and/or electronic data processing machines which are at that time installed with its customers or may be installed at any time prior to July 25, 1958. This offer will continue to any machine only so long as it is installed, and will terminate on July 25, 1958.

Rental Plans

For the user who prefers to lease, IBM continues to offer its equipment under its traditional machine service agreement, or in the case of the Federal Government, the provisions as specified in the USAA contract or separate contract.
### Monthly Charge

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Monthly Charge (Incl Maint.)</th>
<th>Purchase Price (Complete)</th>
<th>Monthly Maintenance Charges for prime shift Age 0-36 mos. (Contracted)</th>
<th>Additional Monthly Use and Maintenance Charges Per Additional Shift (40 hour work week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>704</td>
<td>Central Processing Unit with Floating Point Arithmetic</td>
<td>$9,700.00</td>
<td>$523,800.00</td>
<td>$2,414.50</td>
<td>$965.75</td>
</tr>
<tr>
<td>735</td>
<td>Power Frame No. 1 *</td>
<td>1,100.00</td>
<td>752,000.00</td>
<td>87.50</td>
<td>35.00</td>
</tr>
<tr>
<td>741</td>
<td>Power Frame No. 2 *</td>
<td>1,400.00</td>
<td>72,000.00</td>
<td>65.75</td>
<td>25.50</td>
</tr>
<tr>
<td>746</td>
<td>Power Distribution Unit *</td>
<td>1,300.00</td>
<td>67,600.00</td>
<td>38.75</td>
<td>15.50</td>
</tr>
<tr>
<td>711</td>
<td>Punched Card Reader (200 CPM)</td>
<td>800.00</td>
<td>50,000.00</td>
<td>173.25</td>
<td>73.25</td>
</tr>
<tr>
<td>716</td>
<td>Alphabetic Reader (150 LPM-120 char)</td>
<td>1,200.00</td>
<td>78,050.00</td>
<td>325.00</td>
<td>325.00</td>
</tr>
<tr>
<td>721</td>
<td>Magnetic Card Reader (200 CPM)</td>
<td>1,200.00</td>
<td>39,000.00</td>
<td>162.50</td>
<td>162.50</td>
</tr>
<tr>
<td>727</td>
<td>Magnetic Tape Unit (200 bits/in. 15,000 alphanumeric char/sec)</td>
<td>550.00</td>
<td>29,800.00</td>
<td>243.00</td>
<td>243.00</td>
</tr>
<tr>
<td>733</td>
<td>Tape Control Unit</td>
<td>2,500.00</td>
<td>140,250.00</td>
<td>562.75</td>
<td>210.30</td>
</tr>
<tr>
<td>733</td>
<td>Magnetic Drum Unit (8,192 words)</td>
<td>3,100.00</td>
<td>167,400.00</td>
<td>488.25</td>
<td>195.25</td>
</tr>
<tr>
<td>733</td>
<td>Magnetic Core Storage Unit (4,096 words)</td>
<td>3,500.00</td>
<td>189,000.00</td>
<td>551.25</td>
<td>220.00</td>
</tr>
<tr>
<td>733</td>
<td>Magnetic Core Storage Unit (Addl 4,096 words)</td>
<td>4,000.00</td>
<td>266,000.00</td>
<td>303.00</td>
<td>121.25</td>
</tr>
<tr>
<td>733</td>
<td>Magnetic Core Storage Unit (Addl 4,096 words)</td>
<td>3,200.00</td>
<td>193,000.00</td>
<td>273.25</td>
<td>159.25</td>
</tr>
<tr>
<td>740</td>
<td>CRT Output Recorder (7,000/sec)</td>
<td>2,700.00</td>
<td>168,000.00</td>
<td>227.50</td>
<td>91.00</td>
</tr>
<tr>
<td>740</td>
<td>Display Unit (7,000/sec.)</td>
<td>150.00</td>
<td>8,700.00</td>
<td>71.50</td>
<td>28.75</td>
</tr>
</tbody>
</table>

*All of these units are required for each 704 System.

### Machine Operating Policy

**Service Contracts for Purchasers.**

The IBM Maintenance Agreement offers purchasers maintenance and repair service on a flat-rate annual basis for a 40-hour work week plus additional charges for use of machines for regular overtime and additional shifts. See table above for maintenance charges. Charges are based on the age of the machine in months: 0-36, 37-72, 73-108.

**Warranty**

Warranty agreements are covered by a 12-month warranty providing for exchange of defective parts. In addition, the warranty provides for service at no additional charge for the first three months of this period. The 12-month warranty period providing exchange of defective parts will be reduced in direct proportion to the amount of usage exceeding 40 hours per week.

**Services performed**

Services rendered will include periodic preventive maintenance, cleaning, oiling and emergency repair.

**Time and Material Maintenance Services.**

Service on a time and material basis is service on a per-call basis, without a contract. IBM charges an hourly rate for time spent for service and a retail price for parts used.

**Maintenance by the Customer.**

Customers may have their employees to the IBM Service Engineering Training School on a payment of tuition. IBM will sell IBM manufactured parts and tools. Testing equipment will be also sold, if not available commercially. Parts catalogues and customer engineering manuals will be available for purchase by the customer.

**Service Arrangements for Renters.**

All existing services to lease customers will prevail. However, full maintenance and repair services will be based on a 40-hour work week for Electronic Data Processing Machines, and all uses beyond the normal working hours will be subject to maintenance charges for the average number of hours in excess of forty hours per week. A GSA contract...
covering IBM's EDPM equipment is being proposed and when issued will specify the terms and conditions of services in detail for the Federal Government.

Arrangements for Parts and Replacements.

For purchasers with a maintenance agreement contract with IBM, services will be provided to keep the machines in good working order, including replacement of unserviceable parts. Parts will be furnished on an exchange basis under which replaced parts become the property of IBM, and parts will be new or equivalent to new if new parts are not available. It will not include furnishing plates, supplies or accessories, painting or refinishing the machines, making specification changes or adding or removing accessories, attachments or other devices.

For purchasers electing to use IBM services on a time and material basis, new parts will be furnished and billed to the customer.

Customers who own and maintain their own equipment may buy repair and replacement parts from IBM.

Installation Requirements.

 outright purchase.

Machines will be furnished and installed ready for use by the customer. All requirements, such as power, air conditioning, space, etc. are to be furnished by the customer. Transportation, rigging and draining charges are to be paid by the customer. IBM will install machines and place them in good working order at no extra charge. Machines are covered by a 12-month warranty providing for exchange of defective parts. In addition, the warranty provides for service at no charge for the first three months of this period.

Rental.

IBM will install machines and place them in good working order at no extra charge. All requirements as to space, power, air conditioning, etc. are to be furnished by the customer. Transportation, rigging, and draining charges are to be paid by the customer.

Industrial Sample

General Dynamics Corporation, Convair Division
Rental rates for basic system is $29,000/month. Additional equipment is $2,800/month. Basic system includes type 704 Analytical Control, Type 711 card reader, Type 716 Printer and Type 737 core storage. Additional equipment includes 6 tape units and 1 drum unit.

General Motors Corporation, Research Staff
Rental rates for basic system is $34,600/month. Card-to-Tape, Tape-to-Card, and Tape-to-Printer converters are $2,950, $1,600 and $2,350 per month, respectively.

Glenn L. Martin Company
Total rental rate for basic system is $243,000/month. Additional equipment is $2,800/month. University of California Radiation Laboratory
One card reader, one card punch, one set of drums, two 4,996-wordp magnetic core units, one tape control unit, and 7 tape units are rented at $255,370 per month for one shift. The CRT output unit is $2,050/month and the card-to-tape (plus tape unit) is $2,930/month.

PERSONNEL REQUIREMENTS

Government Sample
Army Ballistic Missile Agency
Three 8-hour shifts require 5 engineers and 6 technician-operators. One person operates card-to-tape and tape-to-printer equipment. Components include 4,096 word core storage, floating point arithmetic, 8,192 drum storage, 7 tape units, printer, card reader, card punch, peripheral card reader and punch.

Industrial Sample
General Dynamics Corporation, Convair Division
Approximately 40 engineers and 5, 5 and 7 technician-operators for 1, 2 and 3 shift operations, respectively, are associated with the system. This does not include people required for key punching, and standard card equipment processors.

General Electric Aircraft Gas Turbine Division
Approximately 40 engineers and 35 technician-operators are associated with the system. Machine is operated on a closed shop basis.

General Motors Corporation, Research Staff
One 8-hour shift: 5 Engineers 5 Tech-Operators
Two 8-hour shifts: 7 Engineers 7 Tech-Operators
Glenn L. Martin Company
One 8-hour shift: 2 Engineers 3 Tech-Operators
Two 8-hour shifts: 4 Engineers 6 Tech-Operators
Three 8-hour shifts: 5 Engineers 9 Tech-Operators

Approximately 50-60 programmer-analysts are utilized.

Midwestern Universities Research Association
One 8-hour shift: 3 Engineers 2 Tech-Operators

Standard Oil Company of California
One 8-hour shift: 11 Engineers 3 Tech-Operators
To fill proposed staff on installation of system in August 1957.

University of California Radiation Laboratory
One 8-hour shift: 3 Engineers 3 Tech-Operators
Two 8-hour shifts: 5 Engineers 5 Tech-Operators
Three 8-hour shifts: 7 Engineers 7 Tech-Operators

16 manufacturer engineers maintain two type 704 systems. 16 operators operate two 704's 24 hours/day 7 days/week.

United Aircraft Corporation Research Department
System is operated on a 24 hour six-day a week basis.

Westinghouse Electric Corporation, Analytical Department
One 8-hour shift: 21 engineers and 3 Tech-operators are associated with the system. About 100 programmers throughout Westinghouse Electric Corporation prepare work for the system. System consists of 1 magnetic core storage unit, 10 tape units, 1 drum unit, 1 tape-to-printer and 1 card-to-tape unit.

RELIABILITY AND OPERATING EXPERIENCE

Government Sample
Army Ballistic Missile Agency
Good time 1,454.77 hours
Attempted run time 1,487.79 hours
Operating ratio (Good/Attempted to run) 0.9775
Figures based on period 17 June 1956 to 1 December 1956.
Acceptance test 17 June 1956.

Industrial Sample
General Electric Aircraft Gas Turbine Division
Good time 1,100 hours
Operating ratio (Good/Attempted to run) 0.98
Figures based on period January 1956 to September 1956.
Acceptance test January 1956.

scheduled maintenance 1/2 of "on" time.
unscheduled maintenance 1/4 of "on" time.

G General Motors Corporation, Research Staff
Good time 1,499.44 hours
Attempted run time 4,318.15 hours
Operating ratio (Good/Attempted to run) 0.912
Figures based on period 1 May 1956 to 1 October 1956
Acceptance test 1 May 1956.
The Glenn L. Martin Company  
Acceptance test 5 December 1956.  
Lockheed Aircraft Corporation, System No. 1  
Average error-free running period 4 hours  
Good time 1,127.26 hours  
Attempted to run time 1,156.98 hours  
Operating ratio (Good/Attempted to run) 0.974  
Figures based on period 1 September 1956 to 1 December 1956.  
Acceptance test September 1956.  
Lockheed Aircraft Corporation, System No. 2  
Average error-free running period 4 hours  
Good time 768.43 hours  
Attempted to run time 774.26 hours  
Operating ratio (Good/Attempted to run) 0.99  
Figures based on period 1 April 1956 to 1 September 1956.  
Acceptance test April 1956.  
Midwestern Universities Research Association  
Acceptance test 1 November 1956.  
North American Aviation  
Operating ratio 0.85 (Good time)  
Maintenance time 0.15  
United Aircraft Corporation Research Department  
Good time 2,969 hours  
Attempted to run time 3,725 hours  
Operating ratio 0.79  
Acceptance Unit No. 1 18 January 1956  
Acceptance Unit No. 2 17 August 1956  
University of California Radiation Laboratory  
Average error-free running period 17.9 hours  
Good time 1,036.2 hours  
Attempted to run time 1,024.0 hours  
Operating ratio (Good/Attempted to run) 0.983  
Figures based on period September 1956 to October 1956.  
Acceptance test February 1956 (First machine)  
Acceptance test July 1956 (Second machine)  

Average error-free running period, above, does not include satisfactory re-reads of tape and total hours based on available computing time.

**FUTURE PLANS**

Government Sample  
Army Ballistic Missile Agency  
Second Type 704 System to be delivered in September 1957.  
Edwards Air Force Base, Flight Test Center  
Type 704 System to be acquired in December 1957.  
Naval Ordnance Test Station, China Lake  
Plan to obtain a Type 704 System.  
U. S. Naval Ordnance Laboratory  
Type 704 System to be acquired in October 1957.  
Industrial Sample  
Douglas Aircraft Company, Incorporated, Santa Monica Division  
Type 704 System to be acquired in July 1957.  
Douglas Aircraft Company, Incorporated, El Segundo Division  
Type 704 System to be acquired in July 1957.  
General Electric Aircraft Gas Turbine Division  
Type 704 System to be acquired in July 1957.  
General Electric Company, Lynn Computations  
Type 704 System to be acquired in July 1957.  
General Motors Corporation, Research Staff  
Planning acquisition of:  
740 CRT Display Unit. 8,300 points/sec.  
500 Line/min. Printer  
32,768-word Core Storage Unit  

Lockheed Aircraft Corporation, California Division  
New components and modifications include:  
Type 740 Cathode Ray Tube Output Recorder May 1957.  
A third IBM Type 704 Electronic Data Processing System is to be acquired in November 1957.  
A 32,768-word magnetic core storage unit is to be acquired in 1958.  

Gulf Research and Development Company  
Planning acquisition of Type 704 or 709 System.  
Lockheed Aircraft Corporation, Missile Systems Division  
An IBM 704 with 8,192-word core memory and 8,192-word drum memory is scheduled for delivery May 1957.  
A 32,768-word magnetic core storage unit is to be acquired in 1958.  

New York University  
Acquisition of system on a one-shift rental basis expected 1 April 1957.  
University of California Radiation Laboratory  
Plan to increase storage capacity to 32,768 words.  
Type 704 Model III (Including buffer and additional instructions to be obtained).  
Westinghouse Electric Corporation, Analytical Department  
Plan to acquire one Type 704 for the Aviation Gas Turbine Division.  
Plan to acquire one Type 704 for the Air Arm Division.  
A 32,768-word core storage unit is on order for 1958.  

Westinghouse Battis Atomic Power Division  
A large auxiliary drum storage and special purpose instructions are to be added in 1957.  
The drum unit will store 256 blocks of 2,048 words each and read or write in 5 milliseconds per block.  
The core storage unit is to be increased to 16,384 words in April 1957 and to 32,768 words in July 1957.

**INSTALLATIONS**

Existing and planned installations  
Government Sample  
Army Ballistic Missile Agency, Computation Laboratory, Huntsville, Alabama  
Edwards Air Force Base, Air Force Flight Test Center, California  
U. S. Naval Ordnance Test Station, Computing Branch, China Lake, California  
U. S. Naval Ordnance Laboratory, White Oak, Maryland  
National Advisory Committee for Aeronautics, Langley Field, Virginia  
Industrial Sample  
Aerojet-General Corporation, Sacramento, California  
Boeing Airplane Company, Seattle, Washington  
Douglas Aircraft Company, Incorporated, El Segundo, California  
Douglas Aircraft Company, Incorporated, Santa Monica, California  
General Dynamics Corporation, Convair Division, Fort Worth, Texas  
General Electric Company, Aircraft Gas Turbine Division, Cincinnati 15, Ohio  
General Electric Company, Schenectady, New York  
General Electric Company, Temple, Arizona  
General Electric Company, West Lynn, Massachusetts  
General Motors Corporation, Research Staff, Detroit, Michigan  
The Glenn L. Martin Company, Baltimore, Maryland  
International Business Machines Corporation, 580 Madison Avenue, New York 22, New York  
Lockheed Aircraft Corporation, California Division, Burbank, California  
Lockheed Aircraft Corporation, Missile Systems Division, Sunnyvale, California
The arithmetic unit operation times are given as follows for fixed point arithmetic:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Add time</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>Mult time</td>
<td>240</td>
<td>228</td>
</tr>
<tr>
<td>Div time</td>
<td>240</td>
<td>228</td>
</tr>
</tbody>
</table>

For floating-point arithmetic operations:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Add time</td>
<td>84</td>
<td>72</td>
</tr>
<tr>
<td>Mult time</td>
<td>204</td>
<td>192</td>
</tr>
<tr>
<td>Div time</td>
<td>216</td>
<td>204</td>
</tr>
</tbody>
</table>

If extent of shift is greater than 10, add 12 microseconds for each 13 additional shifts to addition time. If dividend is 0, only 36 microseconds are required for division.

The checking features in use include:

- Fixed:
  - Accumulator overflow
  - Multiplier - Quotient overflow
  - Divide check
  - Read-Write check
  - Tape redundancy indicator
  - Optional:
    - Trapping mode

Mathematical or balancing where applicable

Power requirements are:

- 70 kW, 98.6 KVA, 0.718 FF.
- The system weighs 25,200 lbs.
- The air conditioners are: 95 by 84 by 28 in., weight 1,800 lbs, 25 Tons. 131 by 173 by 36 in., weight 3,800 lbs, 40 Tons.

There are two of the latter.

The rental rates are:

- $26,000/month for System No. 1 (no floating point) and $30,000/month for System No. 2 (with floating point).
- For peripheral equipment and tape units, System No. 1 is $3,950/month and System No. 2 is $5,300/month.

The personnel requirements are:

- System No. 1: Engineers: 5, Tech-Operators: 6
- Two 8-hour shifts: 9
- Three 8-hour shifts: 7

The six technician-operators perform the following on the first shift:

- One supervises
- One schedules
- One operates peripheral equipment
- Two operate computer
- One trainee

The three additional persons for second shift:

- Two operate computer
- One operates peripheral equipment

- System No. 2: One 8-hour shift requires two computer operators, two peripheral equipment operators, two supporting equipment operators, and 1 expeditor.

Additional features of the system include the utilization of three 15-bit B-boxes and the use of the trapping mode for selective tracing on transfer instructions.

University of California Radiation Laboratory

3 index registers for ADR modification and cycle count.

Logical operations:

- Automatic return address setting for subroutines
- Magnetic tapes compatible with peripheral card reader to printer conversion.
IBM 705
International Business Machines Type 705 Electronic Data Processing Machine

MANUFACTURER
International Business Machines Corporation

APPLICATIONS

Commercial, may be used for scientific.

Government Sample
Department of Health, Education and Welfare, Social Security Administration
Data processing for maintaining earnings records of all persons covered by Title II of the Social Security Act.

Navy Department Ships Parts Control Center
One of the major uses of the system is the maintenance of perpetually current inventory records for approximately 189,000 items of ships repair parts. Master inventory records are updated through the media of transaction or situation reports. The transaction reporting system was implemented shortly after installation of the new machine in August 1956. An analysis of items having experienced any type of action during the current week is processed and provides the tool for improved stock positioning and more effective management control. The machine is also being used to develop component and item population data; in the preparation of shipboard allowance lists; budgeting and inventory analysis and in the automatic maintenance of voluminous technical engineering data files.

The Army Signal Supply Agency
Contract status accounting, computation of requirements, inventory management, processing of requisitions, inventory control of 162,500 items. The system, consisting of 20,000 positions of magnetic core storage, a magnetic drum, ten tape units, a card punch, and a 150 line/min. printer, performs the following functions:

- Assimilates and memorizes 8,000,000 different facts on more than 150,000 different electronic items required to keep the Army's global communication system in operation.
- Makes 27,500 changes to these facts per day within 24 hours after the change occurs, regardless of where the change occurs.
- Uses these facts to process 6,000 orders for supplies received each day from troops maintaining communications and electronics equipment throughout the world.
- Orders shipment of supplies quickly after receipt of order and considers distance to the consumer in choosing the shipping point, thus reducing transportation costs and shipping time.
- Remembers all orders received when stocks were not available, and automatically ships such orders as soon as stocks are received.
- Reviews the stored 8,000,000 facts each day to determine which items are in short supply, and triggers action to place approximately 150 orders per day with manufacturers of such supplies in time to be received before stocks are exhausted.
- Reviews orders placed with manufacturers to assure supplies are still needed, and if not necessary, because of diminished requirements, may recommend cancellations.
- Practices management by exception by making thousands of routine decisions per day, and by printing out special data for management control when unusual supply conditions exist.
Has the capacity for memorizing and storing millions of additional facts, and processing thousands of additional orders - thereby greatly increasing the Army's readiness for mobilization in the event of an emergency.

Effects a major saving in the cost of supply control and supply management and insures Signal Supplies are delivered at the right place, in the right quantities and at the right time.

U. S. Department of Agriculture, Commodities Stabilization Service

The first application for the system is Cotton Loan Accounting (this embodies loan making and liquidation, reconditioning and producers settlements) consisting of approximately six to seven million bales per year. Following this application, conversion activities such as inventory accounting and management activities, and other type financial accounting will be surveyed with the view of including them in the system, thereby making possible the release of the present conventional equipment except key punch and verifiers.

This system is to consist of: one 705 central Processing Unit, three 714-759 Card Reader and Control Units, one 722-758 Card Punch and Control Unit, four 760 Control and Storage Units, four 730 Printers (1,000 lines per minute), twelve Magnetic Tape Units, two 777 Tape Record Coordinators, and one 774 Tape Data Selector.

Industrial Sample
Consolidated Edison Company of New York Payroll and general accounting.
Farmers Insurance Group
Accounting, statistical, and premium billing.
The Prudential Insurance Company of America
Record keeping, accounting, premium notices, and commission statements.

NUMERICAL SYSTEM
Internal number system Binary coded decimal and alphabetic

<table>
<thead>
<tr>
<th>Characters per instruction</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructions decoded</td>
<td>35</td>
</tr>
<tr>
<td>Instructions used</td>
<td>35</td>
</tr>
<tr>
<td>Arithmetic system</td>
<td>Fixed point</td>
</tr>
<tr>
<td>Instruction type</td>
<td>One address</td>
</tr>
<tr>
<td>Number range</td>
<td>Variable</td>
</tr>
</tbody>
</table>

The 705 is not a fixed word length system. It is possible to have both variable field and variable record lengths. Consequently there are no words. The characters are alphanumerical. Five characters are required to make up an instruction. Each character of a record is individually addressable.

**ARITHMETIC UNIT**

**Time**
Add (excl. stor. access) 17 Microseconds
Vacuum tubes and cores
Construction 16 storage registers, including 1k at 16 positions, 1 at 32 positions, 1 at 256 positions.
Rapid access word registers
Basic pulse repetition rate 1 Me/sec
Arithmetic mode Serial
Timing Synchronous for central processing unit
Asynchronous for input-output devices
Operation Sequential for internal data handling in the central processing unit and concurrent in the use of the tape record coordinator or when doing simultaneous reading while writing without the use of the tape record coordinator.

**Multiply time**

\[
17 \left[ N_p \left( N_c + \frac{1}{2} \right) + 2 \right] \text{ microsec}
\]

\[ N_p = \text{number of digits in multiplier (accumulator 0\text{0})} \]

\[ N_c = \text{number of digits in multiplicand storage} \]

**Divide time**

\[
17 \left[ 11 + N_d \left( N_d - N_r \right)(7.5 N_r + 15) \right] \text{ microsec}
\]

\[ N_d = \text{number of digits in dividend} \]

\[ N_r = \text{number of digits in divisor} \]
STORAGE

<table>
<thead>
<tr>
<th>Media</th>
<th>Alphanumeric/char</th>
<th>Microsec Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetic Core</td>
<td>40,000</td>
<td>17</td>
</tr>
<tr>
<td>Magnetic Drum</td>
<td>60,000</td>
<td>(8,000–40,000)/char</td>
</tr>
<tr>
<td>Magnetic Tape</td>
<td>5,760,000</td>
<td>(10,000–67,000)/char</td>
</tr>
</tbody>
</table>

N above is the number of characters. There are 300 sections of 200 characters each on the magnetic drum.

INPUT

<table>
<thead>
<tr>
<th>Media</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetic Tape</td>
<td>75 in/sec</td>
</tr>
<tr>
<td>Punched Cards</td>
<td>250 cards/min</td>
</tr>
</tbody>
</table>

Industrial Sample
Farmers Insurance Group
Card reader operates at 250 cards/min on 80 column cards. Magnetic tape speed is 15,000 char/sec. Ten units are connected to the main frame.

OUTPUT

<table>
<thead>
<tr>
<th>Media</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Punched Card</td>
<td>100 cards/min</td>
</tr>
<tr>
<td>Magnetic Tape</td>
<td>75 in/sec or 15,000 char/sec</td>
</tr>
<tr>
<td>Printer</td>
<td>150 lines/min, 120 print positions</td>
</tr>
</tbody>
</table>

500 lines/min, 120 print positions
1,000 lines/min, 60 or 120 print positions
60 characters/min

CIRCUIT ELEMENTS ENTIRE SYSTEM

<table>
<thead>
<tr>
<th>Tubes</th>
<th>1,700 in Central Processing Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube Types</td>
<td>10</td>
</tr>
<tr>
<td>Crystal diodes</td>
<td>4,600 in Central Processing Unit</td>
</tr>
<tr>
<td></td>
<td>8,300 in peripheral equipment</td>
</tr>
<tr>
<td>Magnetic elements</td>
<td>155,000</td>
</tr>
</tbody>
</table>

CHECKING FEATURES

Fixed
Instruction: verifies the character code and also checks the correct interpretation of the operation.
Machine: checks the character coding of instructions when data are transferred from accumulator or auxiliary storage or memory.
Read - Write: Checks the transmission of data from all input units to memory. It also checks the transmission of all output data from memory to the drum tape unit, card punch record storage, printer record storage, and typewriter.
Record: This indicator reflects any error when information is punched in a card or when printed on the printer.
Overflow: The overflow check indicator is turned on during an add or subtract operation when the number of digits in the result is greater than the number of digits in the longer of the two fields. An overflow is indicated as a result of a round operation, if a carry-over is made out of the high-order position of the accumulator storage field. The indicator is turned on by a divide instruction when the divisor does not have a greater absolute value than an equal number of digits taken from the left end of the dividend. When the error switch for this indicator is turned to AUTOMATIC, an error stops the machine during the execution of the instruction.

Sign: The indicator turns on when a field addressed by an arithmetic instruction does not have plus or minus zoning over the right hand digit.

### POWER, SPACE AND WEIGHT

<table>
<thead>
<tr>
<th>Type</th>
<th>Name</th>
<th>Qty</th>
<th>K.W.</th>
<th>B.T.U.</th>
<th>(lbs.)</th>
<th>Width</th>
<th>Length</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>705</td>
<td>Central Processing Unit</td>
<td>1</td>
<td>25.0</td>
<td>85,325</td>
<td>5,291</td>
<td>147</td>
<td>139</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Main Power Unit</td>
<td>1</td>
<td></td>
<td></td>
<td>2,961</td>
<td>34</td>
<td>61</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>Console</td>
<td>1</td>
<td></td>
<td></td>
<td>508</td>
<td>35</td>
<td>61</td>
<td>46</td>
</tr>
<tr>
<td>714</td>
<td>Card Reader</td>
<td>1</td>
<td>4.75</td>
<td>16,320</td>
<td>1,053</td>
<td>43</td>
<td>28</td>
<td>49</td>
</tr>
<tr>
<td>759</td>
<td>Card Reader Control Unit</td>
<td>1</td>
<td>7.46</td>
<td>25,500</td>
<td>1,712</td>
<td>27</td>
<td>57</td>
<td>64</td>
</tr>
<tr>
<td>717</td>
<td>Printer</td>
<td>1</td>
<td>5.76</td>
<td>19,680</td>
<td>1,176</td>
<td>25</td>
<td>53</td>
<td>50</td>
</tr>
<tr>
<td>757</td>
<td>Printer Control Unit</td>
<td>1</td>
<td>6.9</td>
<td>23,580</td>
<td>1,775</td>
<td>27</td>
<td>57</td>
<td>64</td>
</tr>
<tr>
<td>722</td>
<td>Card Punch</td>
<td>1</td>
<td>11.3</td>
<td>38,640</td>
<td>9,110</td>
<td>26</td>
<td>24</td>
<td>66</td>
</tr>
<tr>
<td>758</td>
<td>Card Punch Control Unit</td>
<td>1</td>
<td>8.4</td>
<td>28,870</td>
<td>1,656</td>
<td>27</td>
<td>57</td>
<td>64</td>
</tr>
<tr>
<td>734</td>
<td>Drum Unit</td>
<td>1</td>
<td>1.3</td>
<td>38,640</td>
<td>9,110</td>
<td>26</td>
<td>24</td>
<td>66</td>
</tr>
<tr>
<td>744</td>
<td>Drum Power Supply</td>
<td>1</td>
<td></td>
<td></td>
<td>1,646</td>
<td>27</td>
<td>40</td>
<td>64</td>
</tr>
<tr>
<td>727</td>
<td>Tape Unit</td>
<td>10</td>
<td>11.3</td>
<td>38,640</td>
<td>9,110</td>
<td>26</td>
<td>24</td>
<td>66</td>
</tr>
<tr>
<td>754</td>
<td>Tape Control Unit</td>
<td>1</td>
<td>8.4</td>
<td>28,870</td>
<td>1,656</td>
<td>27</td>
<td>57</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>257,615</strong></td>
<td><strong>18,644</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Approximately one ton of air conditioning required for 12,000 B.T.U./hour.
Industrial Sample
Farmers Insurance Group
Computer utilizes 30.7 KVA at a 0.9 PF. Total space required is 26,000 cu. ft. or 2,500 sq. ft. The computer weighs 50,000 lbs. Entire system requires 35 Tons of air conditioning.

PRODUCTION RECORD

Produced 47
Operating 42
Delivery time Special

COST, PRICE AND RENTAL RATE

<table>
<thead>
<tr>
<th>Type</th>
<th>Name</th>
<th>Monthly Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>705</td>
<td>Central Processing Unit --</td>
<td>$34,000</td>
</tr>
<tr>
<td></td>
<td>With Core Memory</td>
<td></td>
</tr>
<tr>
<td>714-759</td>
<td>Card Reader and Card Reader</td>
<td>2,100</td>
</tr>
<tr>
<td></td>
<td>Control Unit</td>
<td></td>
</tr>
<tr>
<td>717-757</td>
<td>Printer and Printer Control</td>
<td>1,500</td>
</tr>
<tr>
<td></td>
<td>Unit</td>
<td></td>
</tr>
<tr>
<td>722-758</td>
<td>Card Punch and Card Punch</td>
<td>1,050</td>
</tr>
<tr>
<td></td>
<td>Control Unit</td>
<td></td>
</tr>
<tr>
<td>727</td>
<td>Magnetic Tape Unit</td>
<td>550</td>
</tr>
<tr>
<td>734</td>
<td>Tape Control Unit</td>
<td>2,000</td>
</tr>
<tr>
<td>735</td>
<td>Magnetic Drum Storage Unit</td>
<td>2,800</td>
</tr>
<tr>
<td>760</td>
<td>Storage Unit for Printers and</td>
<td>1,800</td>
</tr>
<tr>
<td></td>
<td>Tapes</td>
<td></td>
</tr>
<tr>
<td>719</td>
<td>Printer, 1,000 lines per/min</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>730</td>
<td>Printer, 1,000 lines per/min</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>777</td>
<td>Tape Record Coordinator</td>
<td>3,000</td>
</tr>
</tbody>
</table>

Rental rates include customer engineering maintenance and parts.
There is no predetermined grouping of equipment.
Combinations are based on customers needs.
Rates are subject to change.

Government Sample
Department of Health, Education and Welfare,
Social Security Administration
Basic system consists of one Type 705, one Type 754
Tape Control Unit, two Type 760 Control Units and
eleven Type 727 Tape Units. Rental rate is $25,750/
month for one shift.
Additional equipment consisting of four Type 720
printers with control and tape units, four Type 741
card readers with control and tape units, and four
Type 722 card punchers with control and tape units.
Rental rate is $33,400/month for one shift.
Basic system refers to the computer and attached
components.

Navy Department Ships Parts Control Center
Prime最小 rental amounts to $29,200 per month for a
central processing unit with 20,000 positions of core
memory, one (1) Card Reader and Control Unit,
two (2) Printers and Printer Control Units (150 line
per minute), one (1) Card Punch and Control Unit
(equipped with validity checking device), twelve
(12) Magnetic Tape Units, and one (1) Tape Control
Unit.

Industrial Sample
Farmers Insurance Group
Rental rate for basic system is $25,000/month.
Rental rate for additional equipment is $11,000/
month.

PERSONNEL REQUIREMENTS

<table>
<thead>
<tr>
<th>Daily Operation</th>
<th>Engineers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-8 Hour shift</td>
<td>4</td>
</tr>
<tr>
<td>2-6 Hour shifts</td>
<td>7</td>
</tr>
</tbody>
</table>

One console operator and 2 floor operators on each

shift. Programmers vary from 4 to over 30, depending
on number of applications on system.

Government Sample
Department of Health, Education and Welfare,
Social Security Administration
System is operated three 8 hour shifts/day, 7 days/
week, and the additional equipment is operated
three 8 hour shifts/day, 5 days/week. The total
personnel requirements is 17 engineers and 62
technician-operators.

Industrial Sample
Farmers Insurance Group
One 8 hour shift requires 4 engineers and 3 techno-

nicians-operators.

RELIABILITY AND OPERATING EXPERIENCE

Government Sample
Department of Health, Education and Welfare,
Social Security Administration
Based on 168 hours/week, 82% utilization was
obtained, 16.3% preventive maintenance, and 1.7%
other maintenance, primarily due to tape failure.
Figures based on period 1 September 1956 to 15
October 1956. System accepted March 1957.

Navy Department Ships Parts Control Center
The machine is operated on a two shift, six day
week basis. All preventive maintenance is performed
before the start of the prime shift and between the
prime and second shifts. Less than 4% down time
on the Central Processing Unit has been experienced.

Industrial Sample
Farmers Insurance Group
Average error-free running period 8 to 12 hours
Good time 6 to 7 hours
Attempted to run time 8 hours
Operating ratio (Good/Attempted to run) 0.90-0.95
Figures based on period 27 July 1956 to 20 January
1957.
Acceptance test 25 September 1956.

Above figures are approximate and on a daily basis.

FUTURE PLANS

Government Sample
Department of Health, Education and Welfare,
Social Security Administration
Expect to acquire 20,000 additional storage positions
and a tape record coordinator, Type 777 in July
1957. Two Type 730 printers to replace four Type
720 printers when former are available.

United States Department of Agriculture,
Commodity Stabilization Service
System to be installed in 1957-1958 at New Orleans
Commodity Office on a rental basis.

U. S. Navy Aviation Supply Office
System to be installed, in addition to Type 702 in
July 1957.

Industrial Sample
American Telephone and Telegraph Company
Three systems are on order.

Commonwealth Edison Company of Chicago
Delivery of system expected in March 1957.

Consolidated Edison Company of New York
Auxiliary equipment to be added as required.

The Prudential Insurance Company of America
System on order for use at South-Central Home
Office in Jacksonville, Florida.

The Texas Company
System will be installed in March 1957.
INSTALLATIONS

Present and near future installations:
Government Sample
Department of Health, Education and Welfare,
Social Security Administration, Bureau of Old-Age
and Survivors Insurance, Candler Building, Baltimore
2, Maryland
Navy Department, Ships Parts Control Center,
Mechanicsburg, Pennsylvania
The Army Signal Supply Agency, Philadelphia 3,
Pennsylvania
United States Department of Agriculture,
Commodity Stabilization Service, Washington 25, D. C.
U. S. Navy Aviation Supply Office, Philadelphia
11, Pennsylvania
Industrial Sample
American Telephone and Telegraph Company,
New York 7, New York
Boeing Aircraft Company, Seattle, Washington
Commonwealth Edison Company of Chicago, Chicago
90, Illinois
Consolidated Edison Company of New York, New York
3, New York
Esso Standard Oil, Baton Rouge, Louisiana
Farmers Insurance Group, Los Angeles 6, California
International Harvester Company, Chicago 1,
Illinois
The Prudential Insurance Company of America,
South Central Home Office, Jacksonville, Florida
The Prudential Insurance Company of America,
Home Office, Newark, New Jersey
The Texas Company, Houston 1, Texas
Westinghouse Electric Corporation, Pittsburgh 30,
Pennsylvania

ADDITIONAL FEATURES AND REMARKS

The following assistance is available:

Special Representatives
This group offers overall consulting service in connection with the study of possible uses.

Educational Program
One-week classes conducted for executives at IBM educational departments in Endicott and Poughkeepsie,
New York. Comparable classes are available in several major cities across the country. These courses are designed to acquaint executives with the organization, operating characteristics, capacities, and applications of the 705. Customers who complete this course are better able to evaluate the advantages, economies and wide business applications
of the 705. In addition to the executive class, courses are available to qualified methods personnel.
These classes are of longer duration and provide knowledge of programming and necessary operating
details.

Programming Service
Personnel are available for consultation with field representatives and customers. A library of program
common to many problems is available for adoption
as sub-routines by customer. Automatic coding
techniques similar to the 702 Autocoder System are
being prepared. Symbolic coding methods and assembly
programs are available.

Sales Engineering
Engineers are available to assist in preparing the
site for physical installation. This assistance
begins twelve months in advance of delivery.