

Systems Reference Library

IBM 1620 Data Processing System Installation Manual—Physical Planning

This publication contains physical planning information for installing a 1620 Model 1 or Model 2 Data Processing System. Included is a discussion of physical requirements and site selection; a proposed planning schedule; a brief description of each system unit, accompanied by pertinent notes and layout drawings; an explanation of environmental, electrical, and signal requirements and system cable diagrams which are related to associated Tables of cabling information. Photographs and drawings are used throughout the text, and summary tables of physical planning specifications are provided at the end.

This publication (Form C26-5501-3) is a reprint of the former edition (C26-5501-2) incorporating changes released in IBM Technical Newsletter N26-0070 Dated March 10, 1964.

Copies of this and other IBM publications can be obtained through IBM Branch Offices.

This manual was prepared by the IBM Systems Development Division,
Product Publications, Dept. 455, Bldg. 014, San Jose, California 95114.
Send comments concerning the contents of this manual to this address.

INTRODUCTION

The successful installation of a 1620 Data Processing System requires careful physical installation planning, which should start at the time it is decided to order the system. The foremost requirement is to provide suitable space and environmental conditions for the components ordered. Consideration should be given not only to the requirements of the system but to other equipment, such as storage cabinets, work tables, chairs, desks, and to personnel requirements. IBM Sales Representatives, Customer Engineers, and Physical Planning Engineers are available for consultation and assistance.

The following IBM publications are available to facilitate planning and installation:

1620 System Templates (Form X26-5502-2)

Physical Planning General Information Manual
(Form F24-1052-0)

1620 Model 2 Cable Order Form (Form 120-0720)

PHYSICAL REQUIREMENTS AND LOCATION

Operational requirements should determine the specific location of the components of the system. Connection of the components by cables of specific length, space limitations, and the necessity for maintaining clearances for servicing, work space, storage, and aisles require the customer to analyze several tentative layouts before deciding upon a final one. It is particularly important that he plan the location and arrangement of the 1620 Data Processing System in advance.

Consideration should also be given to possible future expansion of the system or installation. Additional machines or equipment that may become necessary can then be added to the initial installation without radical revision.

The weight of the 1620 System does not exceed the floor loading capacity of most buildings. If there is concern that the floor loading capacity may be exceeded, the customer should refer the matter to his engineering staff or consultants.

The following items should be considered in determining space requirements and location. Although some of them do not affect the amount of

space required, they should be considered in choosing a location.

- Cable length
- Service clearance
- Work space
- Storage space
- Heat dissipation
- Desk space
- Aisle space
- Future expansion
- Weight and floor loading
- Electrical requirements
- Doorway sizes, elevator capacities, and loading facilities used in getting the machines to their location.

Table 3 contains a summary of the physical characteristics of all of the units of the 1620 Data Processing System. The summary includes required service clearances for proper servicing of the equipment by IBM Customer Engineers

In addition to the space requirements specified in Table 4, 28 square feet (4 x 7) of floor space should be provided for storage of Customer Engineering documents and test equipment.

SCHEDULING

The design and implementation of a physical planning schedule will assure machine room readiness when the system is delivered. Because each 1620 installation differs in some respect from every other installation, it is not possible to provide a precise schedule. However, the following schedule may be modified to meet the specific needs of a given installation:

Six months before machine delivery:

1. Determine the machine units desired and review the order.
2. Review this Physical Planning Installation Manual.
3. Determine the prospective location of the system, initiate design criteria for facilities and make a preliminary layout of the proposed installation.

Four months before delivery of the 1620 System.
This is a **CRITICAL POINT IN THE SCHEDULE** — the final layout should be determined and approved

by the customer and IBM Branch Manager. All drawings and specifications for building modification should be complete and ready for bid so that new construction or alteration can begin. No further changes that will affect cable lengths should be made in the layout. For 1620 Model 2 systems, a cable order form must be processed at this time.

One week before machine delivery. All environmental and power requirements should be reviewed and tested. Lighting, floor ramps, painting, plastering, decorating, etc., should also be completed at this time.

Installation and testing of all early delivery items should be completed.

ENVIRONMENTAL REQUIREMENTS

Ambient Air Conditions

All 1620 units use air for internal cooling. Cool air is introduced through the bottom or side of each unit, internally circulated by fans or natural convection, and exhausted to the room from the top. The following limits should be maintained for ambient air to ensure normal operation of the system:

Temperature	60° F to 90° F
Relative Humidity	20% to 80%

The heat dissipation of the 1620 System is given in Table 4.

Dust and Dirt Control

Normally, the amount of contamination in the office atmosphere will not interfere with the operation of the 1620 System. However, every effort should be made to keep dust, dirt, and other foreign matter away from the machine area.

Dust or dirt on the disk surface of the 1311 Disk Storage Drive can become wedged between the surfaces and the read/write heads, and thus cause permanent damage to the heads and disks. To prevent dirt accumulations inside the disk pack, the cover of the disk pack should always be closed, except when changing packs. Filtered air is circulated inside the disk pack to keep dirt away from the disks. When disks are removed from the 1311, they should always be covered to protect them from dirt or damage. A special cover is provided for this purpose.

Fire Protection Equipment

Portable, carbon-dioxide fire extinguishers of suitable size should be provided in the data processing system area, subject to local building code and fire insurance requirements. A nonwetting fire-extinguishing agent for electrical equipment (Class C Hazard) is recommended. If local building codes, ordinances, and/or insurance regulations require automatic water sprinklers, one of the following measures is suggested if it is in agreement with local codes and regulations.

Preaction Sprinkler System. High temperatures actuate heat-sensitive devices which open a control valve. The valve, located outside the room, admits water into the sprinkler piping before the sprinkler heads operate. This type of system minimizes the possibility of accidental discharge of water because of failure or mechanical breakage of the automatic sprinkler heads.

Higher Temperature Sprinkler Heads. Replace sprinkler heads with high-rated ones, preferably those with heat ratings in the intermediate range of 175°F to 212°F.

ELECTRICAL REQUIREMENTS

AC Power Supply Characteristics

(1) 208 or 230 volts AC, $\pm 10\%$ single-phase, three-wire (two phase wires and grounding wire), $60 \pm 1/2$ cycle per second. (2) 195, 220, or 235 volts AC, $\pm 10\%$, single-phase, three-wire (two phase wires and grounding wire), $50 \pm 1/2$ cycles per second.

Power Distribution

Units of the 1620 System requiring primary power are equipped with heavy duty attachment cord and plug assemblies. Mating branch circuits and receptacles are provided by the customer. Plug ratings and vendor catalogue numbers are shown in the specification summaries in Tables 1 and 2.

All power to the 1620 System should be supplied through a single feeder. This feeder should be protected by a mainline circuit breaker. Individual branch circuits from the distribution panel should be protected by circuit breakers suitable for motor

load application and derated according to manufacturer's specifications.

The distribution panel should be located in an unobstructed and well lighted area within the computer room. As a safety precaution, a remote circuit breaker, which can remove all power to the computer system, should be provided in the machine room.

Grounding

A green wire grounding conductor is supplied in each attachment cord. Each customer supplied branch circuit should provide a wire conductor for equipment grounding purposes. All branch circuit grounding wires should be tied to a common ground point at the distribution panel. A single grounding wire should be run from the distribution panel to the nearest building or transformer grounding station. Conduit must not be used as the only grounding means.

Lightning Protection

It is recommended that the customer install lightning protection on his secondary power source when:

1. The utility company installs lightning protectors on the primary.
2. Primary power is supplied by an overhead power service.
3. The area is subject to electrical storms or equivalent power surges.

A recommended type of service protector to be installed is the G.E. Pellet-Type Protector, Model 9LA15A1 or Model 9LA15A4, or equivalent.

CABLES

IBM provides the necessary inter-unit and power cables for proper connection of the 1620 System. Figures 1 and 2 are diagrams of the cables used in the 1620 Model 1 and Model 2 systems, respectively. Tables 1 and 2 list additional pertinent cable information.

The cable lengths specified in Table 1 are the only lengths available for the 1620 Model 1 System. Requests for cable lengths other than those specified will be considered on an RPQ basis.

Cables for the 1620 Model 2 System are custom cut to the lengths required for each installation. The custom cables are ordered by completing the cable order form.

When ordering cables, all measurements are made in accordance with the approved system layout. Each cable is identified by part number and key number, and is ordered by filling in the desired length. Cable lengths are determined by measuring the distance along the cable route from the floor-level point of entry of a unit to the point of entry of the connecting unit. When a raised or raceway floor is used, twice the height of the floor must be added to the measured length. Cable lengths should be kept as short as is practical.

The completed cable order form must be submitted, 120 days prior to machine delivery, to the IBM plant where the equipment is on order. If no form is submitted, maximum length cables (see Table 1) will be shipped. Orders that are received with less than 90 day lead time, or that require cables which exceed maximum lengths, must be submitted with an approved RPQ.

So they do not present a safety hazard, and are not readily damaged, interconnecting cables should be protected. This protection can consist of "ramping," raceways with removable covers, or a false floor.

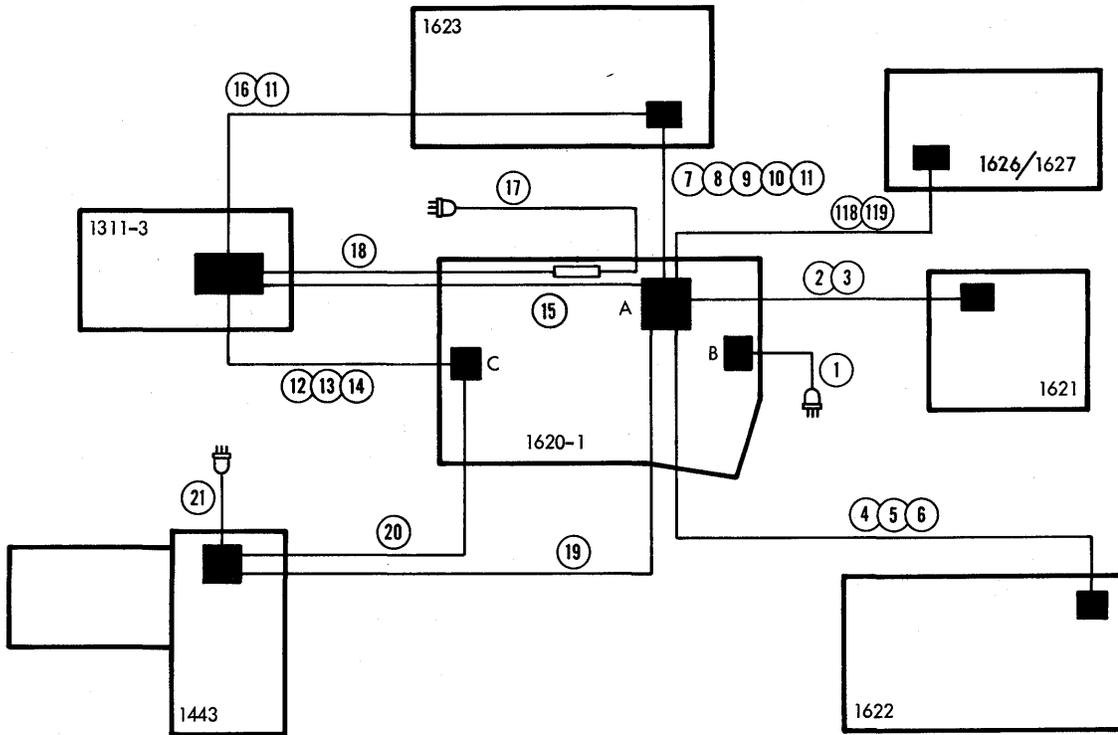


Figure 1. 1620 Model 1 Cable Diagram

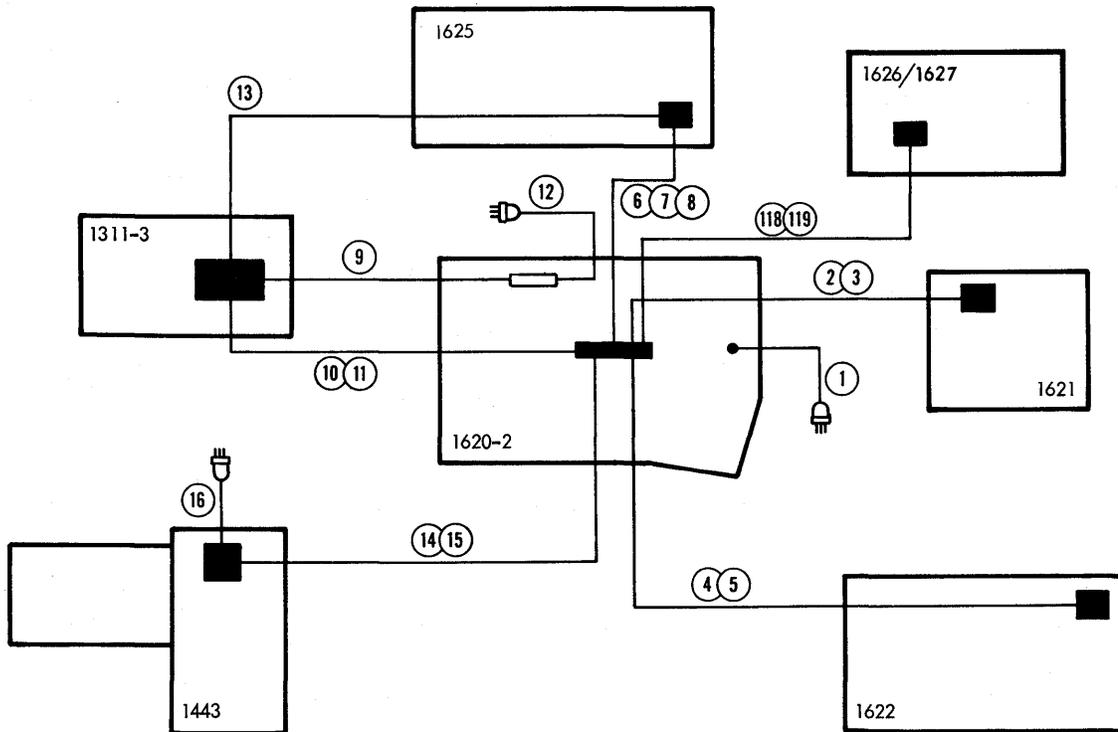


Figure 2. 1620 Model 2 Cable Diagram

Table 1. 1620 Model 1 System Cable Summary

Key	From	To	Function	Length (Feet)	Diameter (Inches)	Bending Radius (Inches)	Floor Cutout 1620 Mod 1	Part No.	Plug
1	1620-1	Receptacle	AC Power	10	13/16	3	B	2129309	A
2	1620-1	1621	AC Power	10	13/16	3	A	2125759	
3	1620-1	1621	Signal	10	27/32	7	A	2129307	
4	1620-1	1622	AC Power	20	13/16	3	A	615037	
5-6	1620-1	1622	Signal	20	27/32	7	A	615036	
7	1620-1	1623	AC Power	20	13/16	3	A	2125997	
8-11 (1)	1620-1	1623	Signal	20	27/32	7	A	2125563	
12	1620-1	1311-3	DC Power	25	3/4	4	C	2154890	
13 (2)	1620-1	1311-3	Signal	20	1- 1/8	5	C	2161838	
14 (2)	1620-1	1311-3	Signal	20	1- 1/8	5	C	2161845	
15	1620-1	1311-3	Signal	20	1- 1/8	5	C	2161837	
16	1623	1311-3	Signal	20	27/32	7	A	2125563	
17 (3)	1620-1	Receptacle	AC Power	12	3/4	4	A	2162233	B
18	1620-1	1311	AC Power	25	3/4	4	A	2162604	
19	1620-1	1443	Signal	20	13/16	4	A	2162479	
20	1620-1	1443	Sequence	20	3/4	4	C	2159004	
21	1443	Receptacle	AC Power	14	9/16	2		2162477	C
118	1620-1	1626	Signal	15	27/32	7	A	2162213	
119	1620-1	1626	Power	15	13/16	3	A	2162207	

NOTES: 1. Four cables are used to connect 1620 to 1623 if 1311-3 is not installed. If 1311-3 is installed, three cables connect 1620 to 1623 and one cable (Key 11) connects 1623 to 1311-3.

2. Part # 2161838 is used for 1620's Serial # 11550 and above. Part # 2161845 is used for 1620's Serial # 11549 and below.

3. Cable 17 supplied with feature code 3339 for attachment of 1311-3.

Plug Connector	Size
A - Hubbell # 7977	50 ampere, 250 volt, 3 wire
B - Hubbell # 3331G	30 ampere, 250 volt, 3 wire
C - Russell & Stoll # 3720	10 ampere, 250 volt, 3 wire

Table 2. 1620 Model 2 Cable Summary

Key	From	To	Function	Length (Feet) ^①	Diameter (Inches)	Bending Radius	Part No.	Plug
1	1620-2	Receptacle	AC Power	10	7/8	4	2158849	A
2	1620-2	1621	Power	10	7/8	4	2158844	
3	1620-2	1621	Signal	10	3/4	4	2158839	
4	1620-2	1622	Power	20	7/8	4	2158845	
5	1620-2	1622	Signal	20	13/16	4	2158840	
6	1620-2	1625	Power	20	1	5	2158846	
7	1620-2	1625	Signal	20	1- 1/4	6	2158837	
8	1620-2	1625	Signal	20	1- 1/4	6	2158838	
9	1620-2	1311-3	Power	20	3/4	4	2162604	
10	1620-2	1311-3	Sequence	20	3/4	4	2158847	
11	1620-2	1311-3	Signal	20	1- 1/8	5	2158841	
^② 12	1620-2	Receptacle	Power	14	3/4	4	2162233	B
13	1625	1311-3	Signal	40	1- 1/8	6	2158843	
14	1620-2	1443	Power	20	3/4	4	2159004	
15	1620-2	1443	Signal	20	13/16	4	2158933	
16	1443	Receptacle	Power	14	9/16	2	2162477	C
118	1620-2	1626	Signal	15	3/4	4	2158786	
119	1620-2	1626	Power	15	7/8	4	2158785	

NOTES: 1. Cables are custom cut to lengths specified on Cable Order Form. Maximum length cables are shipped if Cable Order Form is not submitted 90 days prior to machine delivery. (AC power cables to receptacle are fixed length.)

2. Cable 12 supplied with feature code 3340 for attachment of 1311-3.

Plug Connector	Size
A - Hubbell # 7977	50 ampere, 250 volt, 3 wire
B - Hubbell # 3331G	30 ampere, 250 volt, 3 wire
C - Russell & Stoll # 3720	10 ampere, 250 volt, 1 phase, 3 wire



NOTES

1. Dimensions:
 1311-3 43" wide, 24" deep, 38" high.
 1311-2 30" wide, 24" deep, 38" high.
2. Maximum weight:
 1311-3 700 lb
 1311-2 390 lb
3. Service clearances:
 36" both front and rear for both models.

One 1311 Model 3, which is the larger of the two models, and up to three Model 2's can be attached to the System. Both models have a random-access storage capacity of two million numerical characters. Thus, the total on-line disk storage capacity for the System is eight million numerical characters. Unlimited storage capacity is realized through the interchangeability of the disk packs.

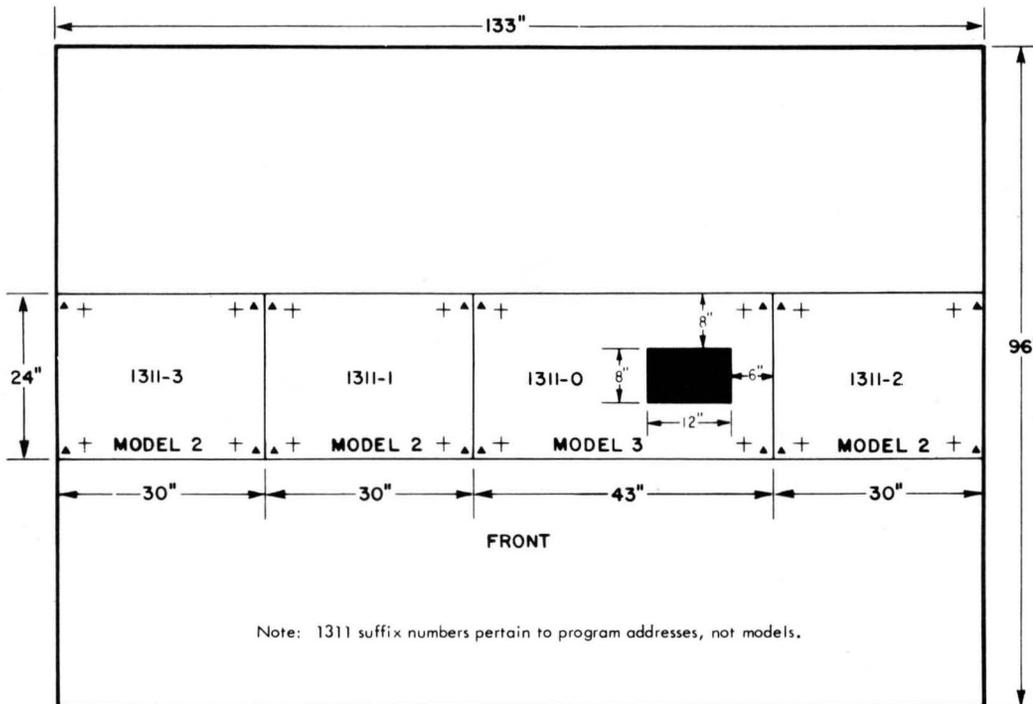
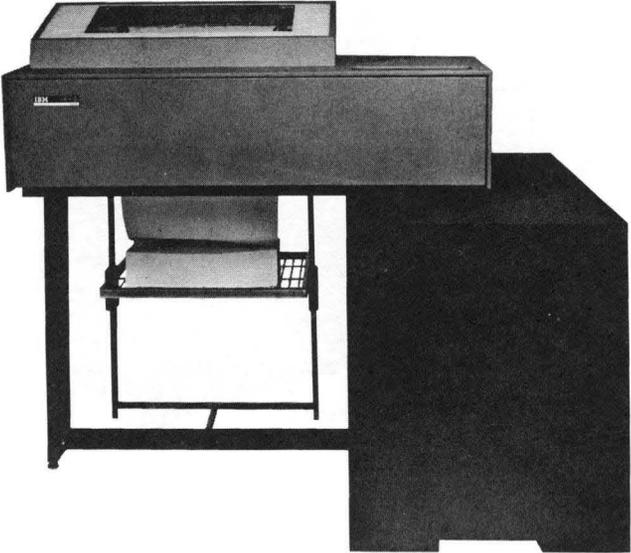


Figure 3. 1311 Disk Storage Drive

NOTES



1. Dimensions:
56" wide, 43" deep, 46" high.
2. Maximum weight:
825 lb
3. Service clearances:
Front, rear, and right side 36".
4. Forms stand projects 17 7/8" to rear of print unit.
5. For shipment, forms stand is removed and print unit is rotated over cabinet, shipping dimensions are 24" x 48 1/4" x 46".

The 1443 is an output unit which prints from 150 to 600 lines per minute, 120 or 144 characters per line.

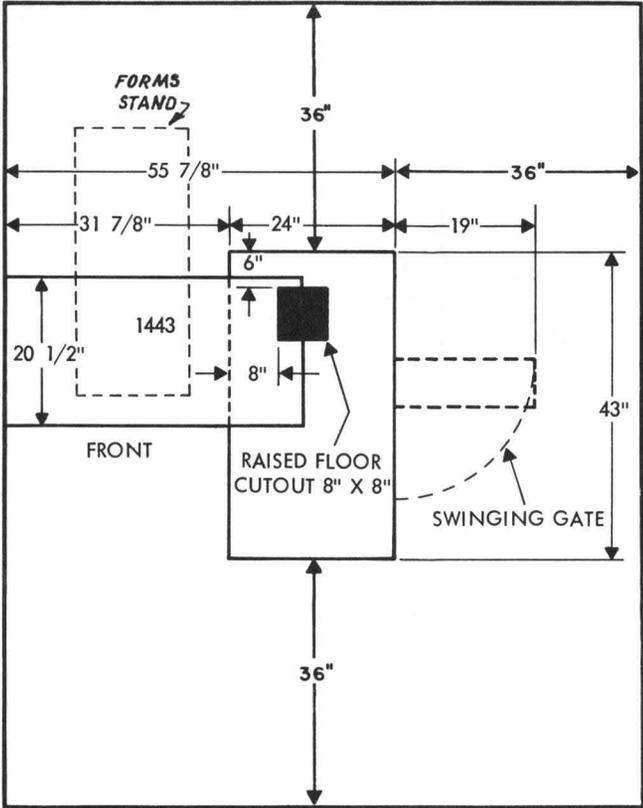
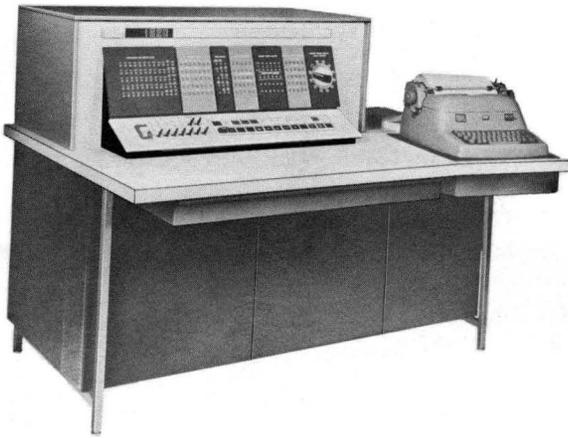


Figure 4. 1443 Printer



NOTES

1. Dimensions:
63" wide, 44" deep, 44" high.
Depth includes 3" angular extension for typewriter.
With reading table removed, 1620-1 is 60" wide and 29" deep.
2. Maximum weight:
1165 lb
3. Service clearances:
Each side and front, 30", rear 48".

The 1620-1 Central Processing Unit is itself a basic system; it has 20,000 positions of core storage memory, a computer and associated console, and an input-output typewriter for communication between the operator and the computer.

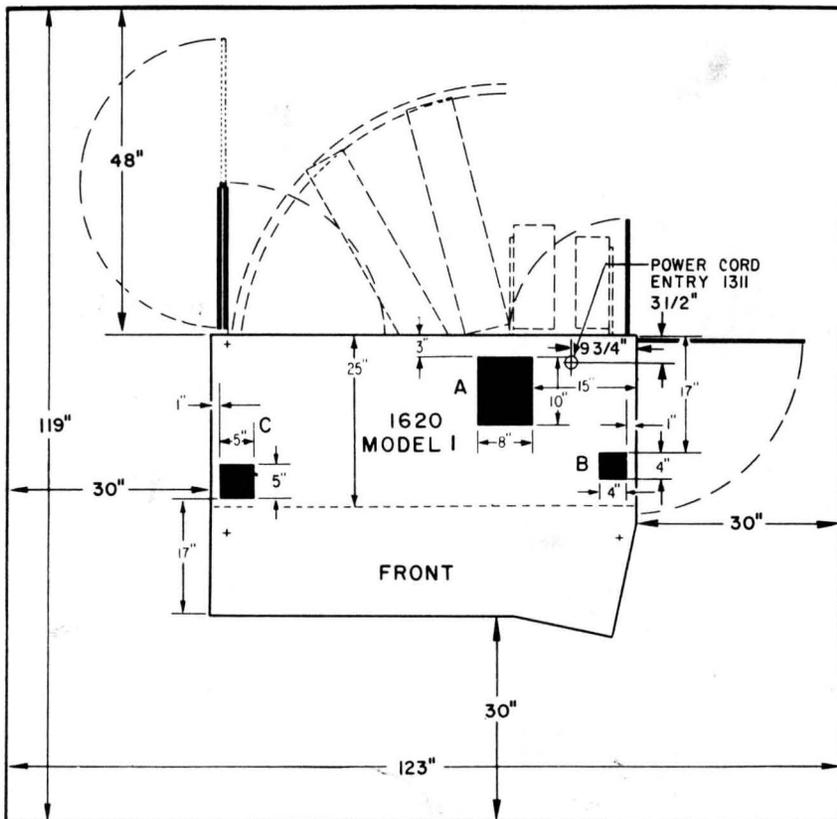


Figure 5. 1620 Central Processing Unit, Model 1



NOTES

1. Dimensions:
63" wide, 44" deep, 44" high.
Depth includes 3" angular extension for typewriter.
With reading table removed, 1620-2 is 60" wide and 29" deep.
2. Maximum weight:
1200 lb
3. Service clearances:
Each side and front, 30", rear 48".

The 1620-2 Central Processing Unit is similar to the 1620-1, but with increased programming and computing capabilities.

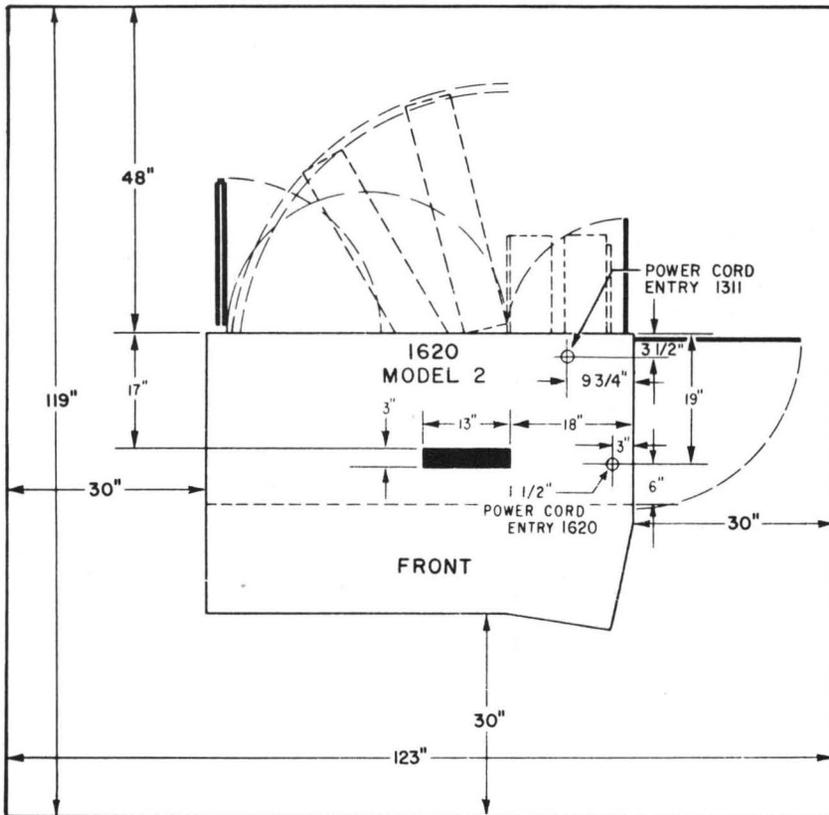


Figure 6. 1620 Central Processing Unit, Model 2



NOTES

1. Dimensions:
31" wide, 26-1/2" deep, 44" high.
When attached, paper tray adds 12" to depth.
2. Maximum weight:
372 lb
3. Service clearances:
Left side, 36"
Right side, front, and rear, 30".

The 1621 reads 8-track paper tape at the rate of 150 characters per second.
The 1624, which is installed inside the 1621, punches 8-track paper tape at the rate of 15 characters per second.

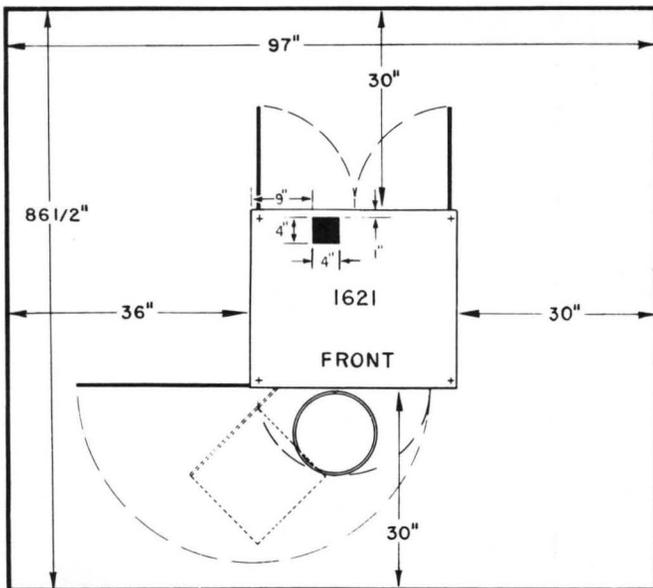


Figure 7. 1621 Paper Tape Reader and 1624 Tape Punch



NOTES

1. Dimensions:
57-1/2" wide, 30" deep, 45-1/2" high.
2. Maximum weight:
1350 lb
3. Service clearances:
Each side and front, 36", rear 42".
4. Signal and power cables from the 1620 are permanently attached to the 1622.

The 1622 reads and punches 80-column cards. The read and punch feeds are individually buffered so that reading, punching, and computing can occur simultaneously.

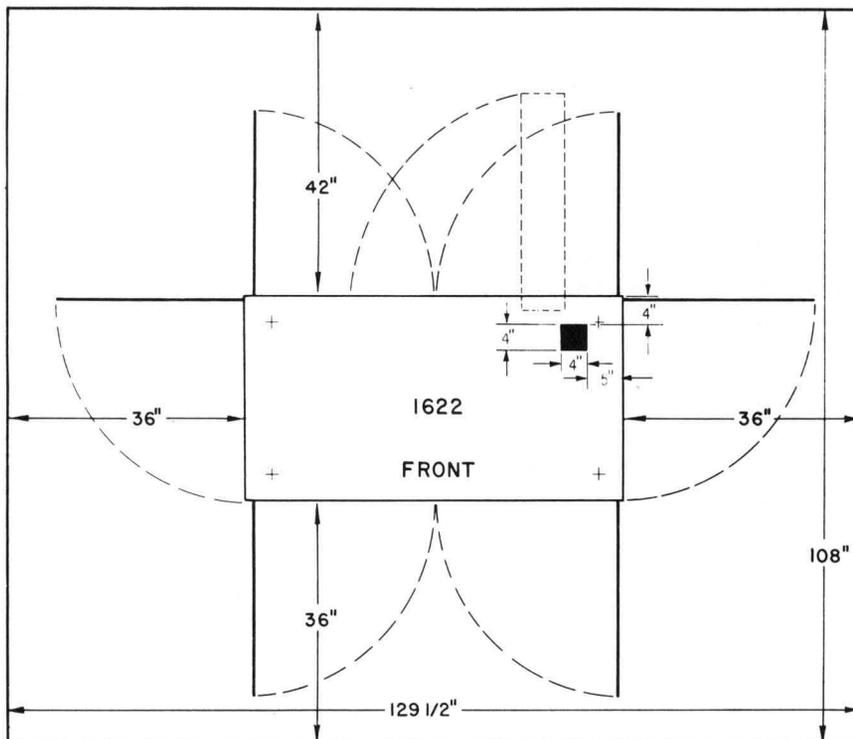
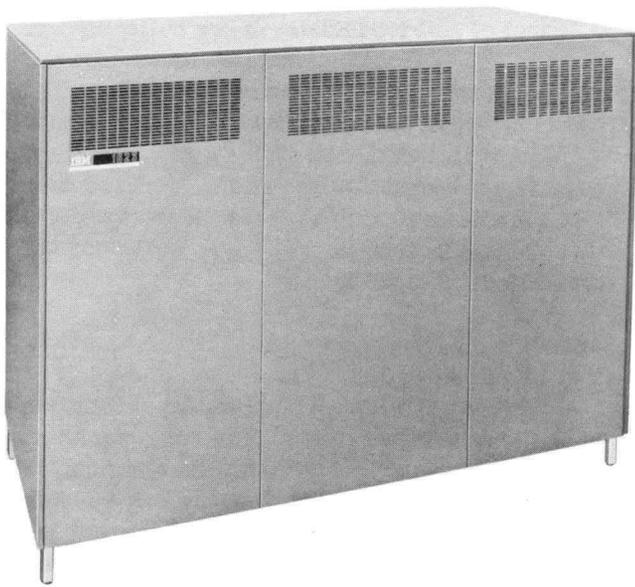


Figure 8. 1622 Card Read-Punch

NOTES

1. Dimensions:
60" wide, 27" deep, 44" high.
2. Maximum weight:
Model 1 830 lb
Model 2 950 lb
3. Service clearances:
Each side and front, 30", rear 44".



The 1623 is a core storage memory unit to be used with the 1620 Model 1 Central Processing Unit. The 1623 is designated Model 1 or 2 depending on whether it contains 20,000 or 40,000 positions of core storage.

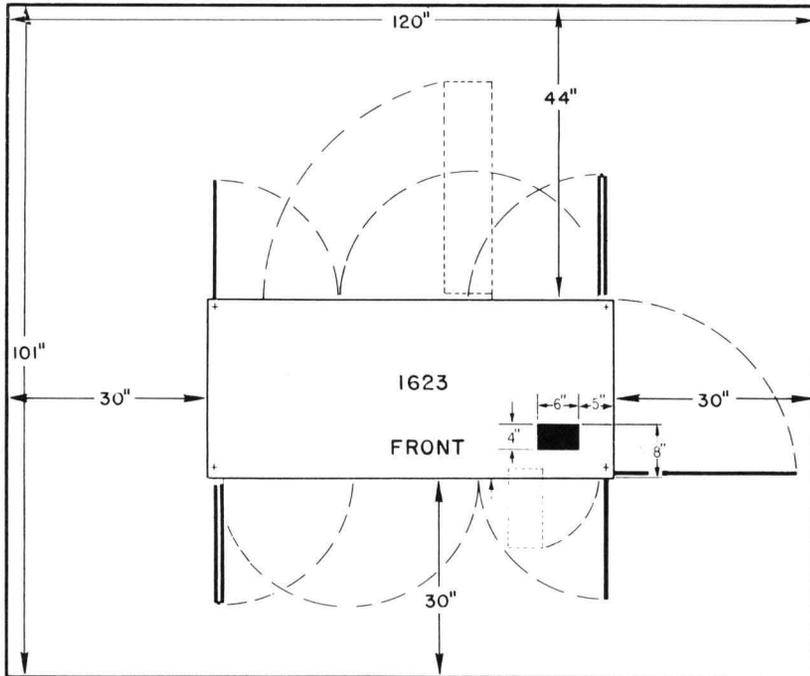
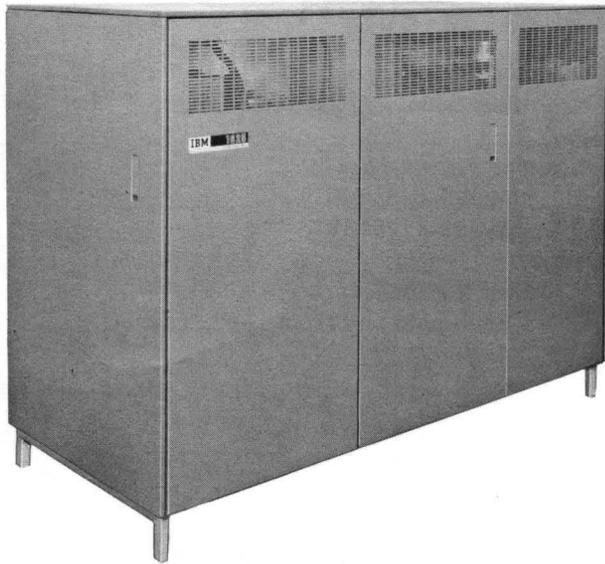


Figure 9. 1623 Core Storage



NOTES

1. Dimensions:
60" wide, 27" deep, 44" high.
2. Maximum weight:
Model 1 1000 lb
Model 2 1050 lb
Model 3 1100 lb
3. Service clearances:
Each side, 30"
Front, 41"
Rear, 44"

The 1625 is a core storage memory unit designed for use with the 1620 Model 2 Central Processing Unit.

- Model 1 contains 20,000 positions of core storage
- Model 2 contains 40,000 positions of core storage
- Model 3 contains 60,000 positions of core storage.

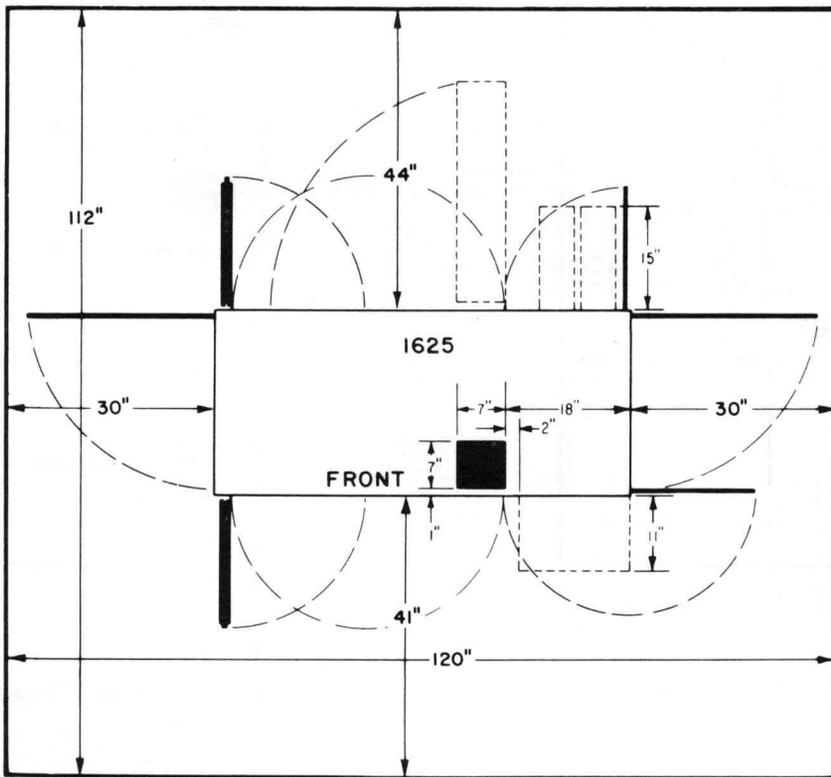
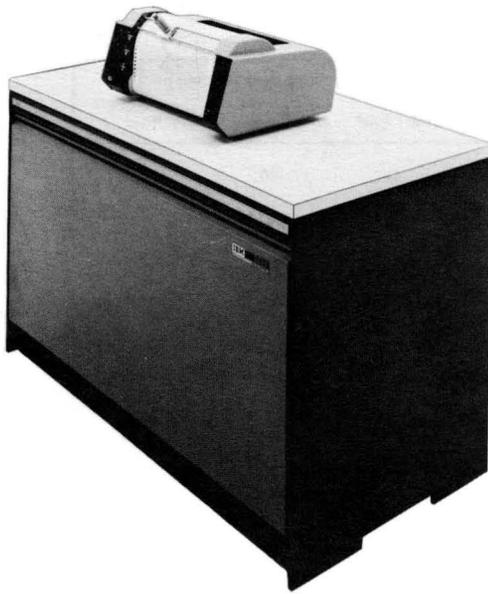


Figure 10. 1625 Core Storage



NOTES

1. Dimensions:
 - 1626 43" wide, 24" deep, 33" high.
 - 1627 Model 1 18" wide, 15" deep, 10" high.
 - 1627 Model 2 40" wide, 15" deep, 10" high.
2. Maximum weight:
 - 1626 200 lb
 - 1627 Model 1 33 lb
 - 1627 Model 2 55 lb
3. Service clearances:
 - 1626 Front and rear, 36".
4. 1627 is installed on top of 1626. Units are shipped separately.

The 1627 Plotter is capable of illustrating digital information in any desired graphical form. The 1627 Model 1 operates at 18,000 steps per minute and has a plotting width of 11 inches. The 1627 Model 2 operates at 12,000 steps per minute and has a plotting width of 29-1/2 inches. The 1626 is the control unit for both models.

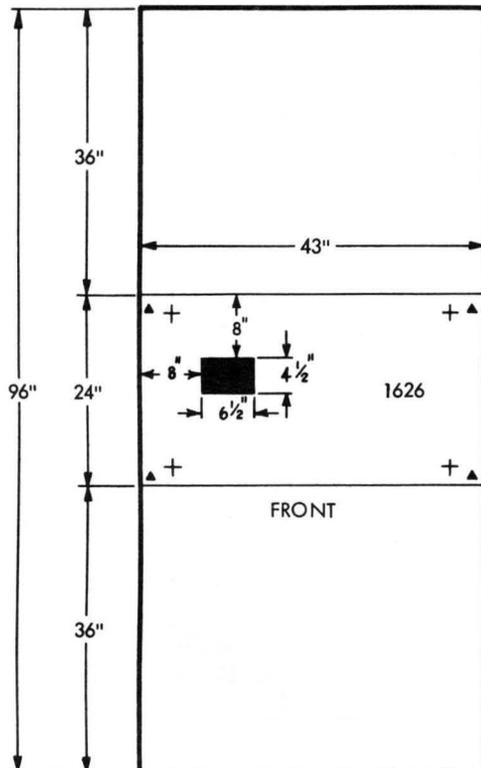


Figure 11. 1627 Plotter and 1626 Plotter Control

Table 3. Summary of Physical Specifications

Unit	Weight	Length (Inches)	Width (Inches)	Height (Inches)	Service Clearance Required (Inches)			
					Left End	Right End	Front	Rear
1311 Model 2	390	30	24	38	0	0	36	36
1311 Model 3	700	43	24	38	0	0	36	36
1443	825	56	43	46	30	36	36	36
1620 Model 1	1165	63	44	44	30	30	30	48
1620 Model 2	1200	63	44	44	30	30	30	48
1621	372	31	27	44	36	30	30	30
1622	1350	58	30	46	36	36	36	42
1623 Model 1	830	60	27	44	30	30	30	44
1623 Model 2	950	60	27	44	30	30	30	44
1624		Housed in 1621 Unit						
1625 Model 1	1000	60	27	44	30	30	41	44
1625 Model 2	1050	60	27	44	30	30	41	44
1625 Model 3	1100	60	27	44	30	30	41	44
1626	200	24	43	33	0	0	36	36
1627 Model 1	33	10	18	15	Mounted on top of 1626			
1627 Model 2	55	10	40	15				

Table 4. Summary of Heat and Power Specifications

Unit	KVA	Amperes	BTU/HR	Air Flow CFM	Temperature °F	Relative Humidity %
1311 Model 2	.75	3.6	2500	100	60 to 90	20 to 80
1311 Model 3	1.2	5.6	4000	400	60 to 90	20 to 80
1443	1.2	5.5	2450	416	60 to 90	20 to 80
1620 Model 1	1.9	9.0	6000	840	60 to 90	20 to 80
1620 Model 2	2.5	12.0	5000	1120	60 to 90	20 to 80
1621	.4	1.5	1300	Conv.	60 to 90	20 to 80
1622	1.3	6.2	4200	280	60 to 90	20 to 80
1623 Model 1	.9	4.4	3000	420	60 to 90	20 to 80
1623 Model 2	1.2	5.8	3900	700	60 to 90	20 to 80
1624		Included with 1621			60 to 90	20 to 80
1625 Model 1, 2 or 3	1.2	6.0	4000	960	60 to 90	20 to 80
1626/1627 Model 1 and 2	.15	.7	500	Conv.	60 to 90	20 to 80

IBM

**International Business Machines Corporation
Data Processing Division
112 East Post Road, White Plains, N.Y. 10601
[USA Only]**

**IBM World Trade Corporation
821 United Nations Plaza, New York, New York 10017
[International]**