



GA21-9242-1

File No. S34-15

IBM System/34
Installation Manual—
Physical Planning

INSTALLATION PHYSICAL PLANNING

Preface

This publication contains information of interest to anyone planning to install an IBM System/34. It contains physical, electrical, and environmental specifications and offers a few suggestions for preparing the data processing room for the system before the system actually arrives.

Careful planning lets you install the system with little or no interruption of the daily business routine. If you need additional assistance, IBM sales representatives, customer engineers, and installation planning representatives are available for consultation.

Second Edition (September 1977)

This is a major revision of, and obsoletes GA21-9242-0. Information has been added to support the second communication line.

Changes are periodically made to the information herein; any such changes will be reported in subsequent revisions or technical newsletters.

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PLANNING FOR THE INSTALLATION OF YOUR SYSTEM/34 1
Space Requirements 1
Relocation 2
Temperature and Humidity Considerations 2
Fire Protection 3
Electrical Requirements 3
 Power Supplies 3
 Power Distribution 4
 Grounding 4
 Lightning Protection 4
 Convenience Outlets 4

SYSTEM SPECIFICATIONS 5
Standard Symbols and Specifications. 5
5340 System Unit. 7
 Plan View 7
 Specifications 7
5211 Printer 8
 Plan View 8
 Specifications 8
5251 Display Station 9
 Plan View 9
 Specifications 9
5256 Printer 10
 Plan View 10
 Specifications 10
1255 Magnetic Character Reader Models 1 and 2 11
 Plan View 11
 Specifications 11
1255 Magnetic Character Reader Model 3 12
 Plan View 12
 Specifications 12

SYSTEM/34 CABLING 13
General Cabling Information 13
Work Station Configuration Cabling 14
 Inch to Centimeter Conversion Chart. 16

Prior to receiving your System/34, you will need to plan the physical facilities for your system. Some of the areas you will need to consider are:

- Space for installing and using the system as well as for storing supplies
- Temperature and humidity
- Fire protection
- Electrical requirements

Each of these areas is discussed in further detail in the following sections.

SPACE REQUIREMENTS

At the time you place your order for the system, prepare a preliminary layout of the data processing area and areas where work stations will be placed. Because of differing room sizes and shapes and different work requirements, we cannot publish a single floor plan that will satisfy everyone's requirements. Experience has taught us that you should prepare a floor plan of the proposed area showing location and arrangement of all equipment to be included.

IBM provides a clear acetate template (GX21-9280) of the system that you can use as you determine your floor plan. The template, which is scaled at 1 mm = 48 mm (1/4 inch = 1 foot), provides a floor view of the system and the minimum area that is required around the system for operator and customer engineering work space. When cut apart and used on a 1 mm = 48 mm scale drawing of the data processing area, the template can be moved about to help determine the best room arrangement.

As you plan the area, be sure to consider the following points:

- Space for people to work efficiently
- Space for the system unit, work stations, printers, desks, files, and miscellaneous equipment
- Space for servicing the equipment (service clearances shown on the specification pages are minimum clearances needed by the customer engineer)
- Storage space for supplies and documentation
- Aisle space
- Space for future expansion
- Weights and floor loadings
- Electrical requirements, including service, outlets, and communications facilities (telephone lines)
- The size of halls and doorways through which the system must be moved
- Elevator capacities and loading facilities that will be used while moving the system to the data processing area

If you need to make alterations or additions to existing facilities, be sure to schedule these to be completed before system delivery. In addition, customer supplied cables should be ordered so that they may be procured, installed, and tested prior to delivery of the work station units.

RELOCATION

The 5340 System Unit should not be moved without prior preparation by IBM customer engineering to avoid the possibility of destroying data on the file.

TEMPERATURE AND HUMIDITY CONSIDERATIONS

The system is designed to operate at altitudes from sea level up to 2134 meters (7,000 feet) above sea level. It is air cooled: fans bring cool air into the system, circulate the air, and exhaust the resulting heated air into the room.

However, the temperature and humidity of a data processing area are influenced by many factors:

- Heat produced by mechanical and electrical equipment
- The volume, temperature, and humidity of fresh air entering the room
- The amount of body heat introduced by personnel
- The amount of heat introduced or dissipated through walls, ceilings, and floors

You may need to control the heat and humidity by means of heating, cooling, and humidity-controlling equipment to maintain an acceptable and stable environment. (See the *System Specifications* section for temperature and relative humidity requirements.)

When air conditioning equipment is required because of extremes in temperature or humidity, it should be designed to maintain a temperature between 21° and 24°C (70° and 75°F) and relative humidity between 40% and 50%. This recommended range for temperature and humidity provides a reaction time if temperature and humidity leave the recommended range and begin to approach the permitted extreme. The operator can use this reaction time to take corrective measures.

Humidity-Associated Problems in the Data Processing Area

Avoid extremes in relative humidity. Humidity levels approaching the maximum limit can cause improper feeding and stacking of paper documents and continuous forms, operator discomfort, and condensation on windows and outside walls.

Humidity levels approaching the minimum limit aggravate problems associated with static electricity. Static charges, which are usually dissipated without any adverse effects, tend to build into significant charges when the humidity is low. This accumulation causes papers to cling together and can interfere with efficient paper feeding and paper stacking. High voltage static discharges from moving people, carts, furniture, paper, etc can be objectionable to operating personnel and can interfere with the correct operation of electronic equipment.

Temperature- and Humidity-Associated Problems in Diskette and Paper Document Storage Areas

Keep paper storage areas at the same relative humidity and temperature as the data processing room; otherwise, extreme humidity differences between the two areas may alter the size of the paper documents when they are moved into the working area. This rapid change can result in warpage, the most frequent cause of feeding and stacking problems.

If working and storage areas cannot be kept at the same relative humidity and temperature, allow ample time for paper to achieve a moisture balance with the data processing room atmosphere before using the documents.

For detailed information about handling, storing, and shipping diskettes, refer to the IBM publication, *The IBM Diskette General Information Manual*, GA21-9182.

FIRE PROTECTION

In the interest of safety and fire prevention, selection of site, fire prevention equipment, electrical system and personnel training become important considerations.

Provide portable carbon dioxide extinguishers for use on electrical fires and portable pressurized-water extinguishers for use on ordinary combustible material (paper, etc) fires.

Fire protection around the outside of the data processing room (in adjoining rooms, the floor space above, and the floor space below) is almost as important to the safety of the system as fire protection within the room itself.

If local building codes or insurance regulations require sprinkler systems, consider using a preaction system that helps prevent accidental release of water.

ELECTRICAL REQUIREMENTS

The system will operate satisfactorily using the normal power supplied by most power companies. There are, however, many outside sources that can cause transient electrical noise signals or voltage level variations that can affect system operations.

Check the electric power environment for unusual loads that might induce excessive noise into the branch circuits for the system.

Some common sources of electrical noise are:

- Air conditioning devices
- Electric welders
- Electric furnaces
- Elevators
- Electrostatic copying machines
- Large brush-type motors

Switching heavy inductive loads or operating certain types of equipment near the system can cause problems, even though the source is on a different branch circuit. If you suspect such a condition, it may be advisable to provide a separate feeder for the system directly from the main building power. In extreme cases of severe electrical noise, it may be necessary to install an RF filter and/or an isolation transformer.

Excessive voltage level variations may require use of a constant voltage transformer. In either case, the filter and transformers must be capable of withstanding an in-rush current 11 times the rated system load while maintaining voltage within 25% of nominal.

If you need help determining whether you must alter your facilities to correct or prevent electrical noise, consult your IBM installation planning representative.

Power Supplies

The following statements apply to the power supplies:

- The system and attachments use single-phase power.
- Voltage must be maintained within $\pm 10\%$ of the rated system voltage (measured at the receptacle) when the system is operating. A transient-voltage condition must not exceed +15% or -18% of nominal and must return to within a steady-state tolerance of $\pm 10\%$ of the normal rated voltage within one-half second.
- Voltages available in the U.S.A. and Canada are shown on the unit specification pages, along with typical plugs, connectors, and receptacles.

50-hertz machines are normally shipped without plugs.

Voltages outside the U.S.A. and Canada are:

50 hertz 200/220/235 volts
60 hertz 200/208/230 volts

- Line frequency must be maintained within $\pm 1/2$ hertz (cycles per second).
- The maximum harmonic content of the power system voltage wave forms on the equipment feeder must not exceed $\pm 5\%$ when the equipment is not operating.

Power Distribution

The system requires no special power distribution; it can operate on the feeder that supplies other loads if there are no unusual loads, as discussed in the preceding text. Of course, all wiring should comply with local electrical codes.

Branch circuits should be protected by circuit breakers suitable for motor load application and should contain wiring that will handle the same load. The circuit breakers should be placed in an unobstructed and well-lighted area in the data processing room.

As a safety precaution, there should also be provisions for simultaneously disconnecting power to all data processing equipment in the room. The disconnecting means should be controlled from locations readily accessible to the operator and at designated exits from the data processing room.

Grounding

Power cords have a green-with-yellow-trace grounding conductor for equipment ground. The recommended branch-circuit receptacles have mating equipment ground. The customer-supplied branch circuits must have an insulated wire conductor, equal to the size of the phase conductor, for the purpose of grounding equipment. The branch circuit grounding wire must be tied to a common ground point at the distribution panel, and a single grounding wire must run from the distribution panel ground point to service ground or suitable building ground. *This is a dedicated ground, not a neutral.* Conduit must not be used as the only grounding means.

Lightning Protection

You should install lightning protection on your secondary power source if any of the following conditions apply:

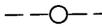
- The utility company installs lightning protectors on the primary power source.
- An overhead power service supplies power to the building.
- The area is subject to electrical storms or equivalent power surges.

Convenience Outlets

Provide a convenience outlet for use of the customer engineer at a maximum of 1.8 meters (6 feet) from the system. For 60-hertz installation, provide a 115-volt outlet; for 50-hertz installation, consult your customer engineer to determine what power must be provided by the convenience outlet. Provide additional outlets for use of maintenance personnel as needed. The general rules for the electric power environment apply to the wiring of the convenience outlets.

STANDARD SYMBOLS AND SPECIFICATIONS

Standard symbols used on the specifications page and physical planning template are:

-  Power cord exit (power cords are measured from power cord exit)
-  Cover swings
-  Gate swings
-  Service area boundary
-  Casters
-  Cable entry and exit in base of unit
-  CE service panel
-  Leveling pads or glides

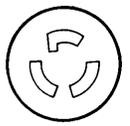
The following notes apply to the specification page:

1. Plan view dimensions are shown in inches. A chart at the back of the manual can be used for inch-centimeter conversion.
2. Power cord style shown applies to 50-hertz machines. IBM ships these cords without plugs. Cord specifications are shown in Figure 1.
3. Plug and receptacle specifications for 60-hertz machines are shown in Figure 2.

For plugs available outside the U.S.A., Canada, and Japan on the 5251 Display Station and 5256 Printer, see *IBM 5250 Information Display System Installation Manual—Physical Planning*, GA21-9277.

Power Cord Style	Cable OD (Nominal)	Number of Shields	Conductors		
			Quantity	Nominal O D	AWG Number
A	14.2 mm (0.56 in.)	0	3	1.6 mm (0.064 in.)	14
B	10.2 mm (0.40 in.)	0	3	1.3 mm (0.051 in.)	16
E	13.0 mm (0.51 in.)	1	3	1.6 mm (0.064 in.)	14

Figure 1. Power Cord Specifications

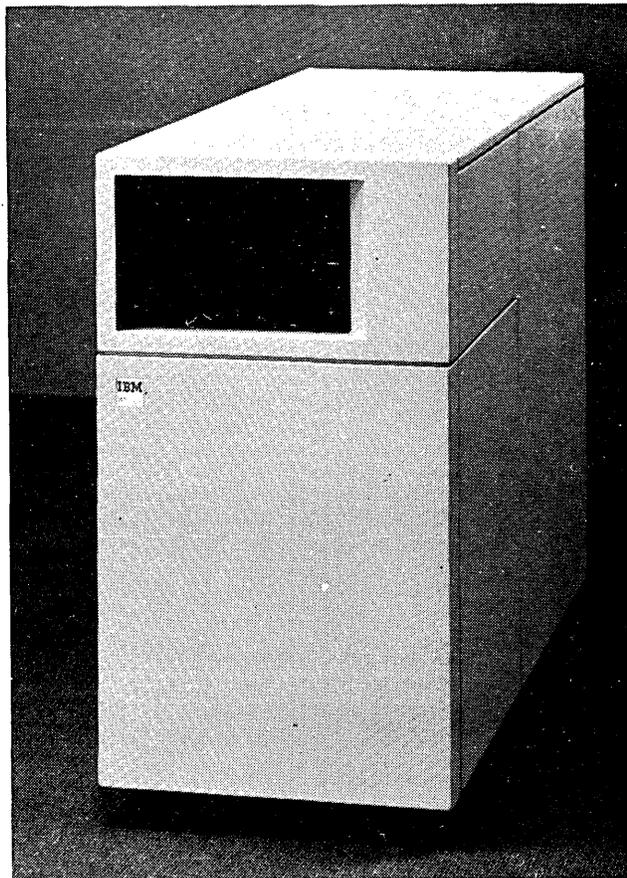
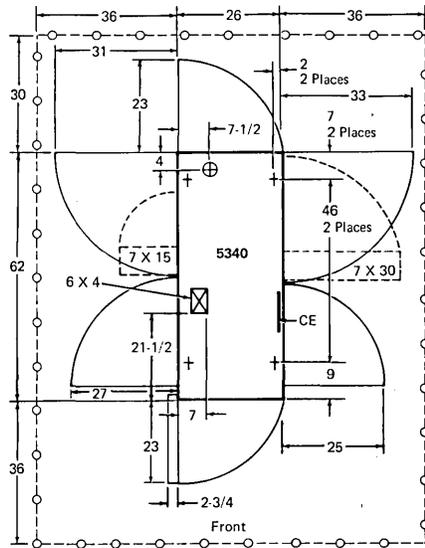
Plug Type	Volts	Amps	Lock/ Nonlock	Plug Cap ¹	Connector/ Receptacle ¹	Receptacle Configuration
H	115	15	Nonlock	5-15P	5-15R	
J	115	15	Lock	L5-15P	L5-15R	
K	208/230	15	Nonlock	6-15P	6-15R	
L	208/230	15	Lock	L6-15P	L6-15R	
Q	208/230	20	Lock	L6-20P	L6-20R	

¹The type numbers shown are National Electrical Manufacturer's Association (NEMA) configuration numbers.

Figure 2. Plug and Receptacle Specifications

5340 SYSTEM UNIT

Plan View



Specifications

Dimensions:

	Width	Depth	Height
Centimeters	66	157*	122
Inches	26	62*	48

Service Clearances:

	Front	Rear	Right	Left
Centimeters	92	76	92	76
Inches	36	30	36	30

Weight:

400 kg (884 lb)

Heat Output:

1000 watts (3400 Btu/hr)

Airflow/min:

165 L/s (350 ft³/min)

Power Requirements:

Voltage	208/230 ± 10%
kVA	1.3
Phases	1

Plug type**

Q

Power cord style**

A

(The power cord is 2.4 meters [8 ft] long.)

Operating Environment:

Temperature	15° to 38°C (60° to 100°F)
Relative humidity	8% to 80%
Maximum wet bulb	23°C (73°F)

Nonoperating Environment:

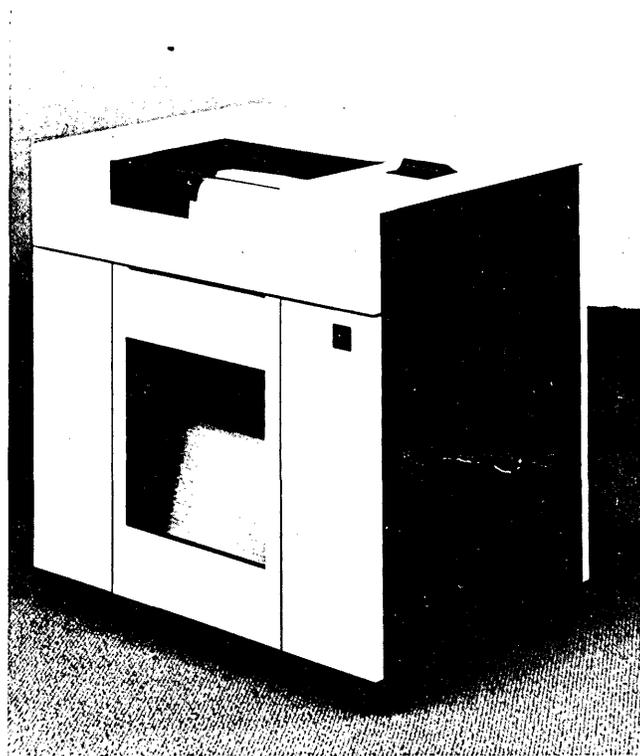
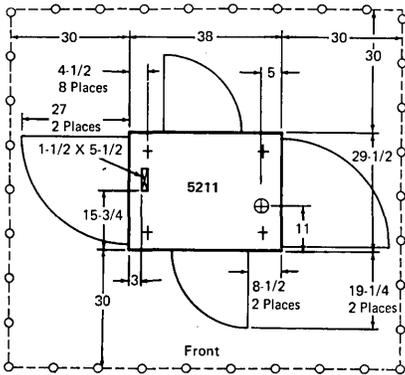
Temperature	10° to 43°C (50° to 110°F)
Relative humidity	8% to 80%
Maximum wet bulb	27°C (80°F)

* Bezel and front cover may be removed to reduce overall length by 5.1 cm (2 in.) if required for installation.

** See Figures 1 and 2 for specifications.

5211 PRINTER

Plan View



Specifications

Dimensions:

	Width	Depth	Height
Centimeters	97	75	100
Inches	38	29-1/2	39-1/2

Service Clearances:

	Front	Rear	Right	Left
Centimeters	76	76	76	76
Inches	30	30	30	30

Weight: 242 kg (533 lb)

Heat Output: 530 watts (1,800 Btu/hr)

Airflow/min: 9 L/s (19 ft³/min)

Power Requirements:

Voltage	208/230 ± 10%
kVA	0.7
Phases	1

Plug type* L
 Power cord style* B
 (The power cord is 4.3 meters [14 ft] long.)

Operating Environment:

Temperature	15° to 38°C (60° to 100°F)
Relative humidity	8% to 80%
Maximum wet bulb	23°C (73°F)

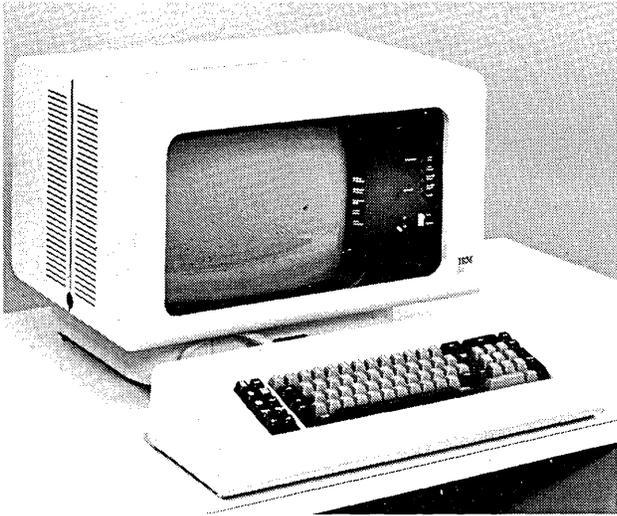
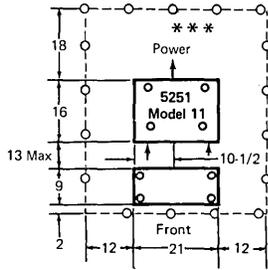
Nonoperating Environment:

Temperature	10° to 43°C (50° to 110°F)
Relative humidity	8% to 80%
Maximum wet bulb	27°C (80°F)

* See Figures 1 and 2 for specifications.

5251 DISPLAY STATION, MODEL 11

Plan View



Specifications

Dimensions:*

	Width	Depth	Height
Centimeters	53	40	40
Inches	21	16	16

Service Clearances:

	Front	Rear	Right	Left
Centimeters	46	46	30	30
Inches	18	18	12	12

Weight: 34 kg (75 lb)

Heat Output: 125 watts (425 Btu/hr)

Airflow/min: 47 L/s (100 ft³/min)

Power Requirements:

Voltage	115
kVA	0.2
Phases	1

Plug type ** H or J

Power cord style** B

(The power cord is 2.4 meters [8 ft] long.)

Operating Environment:

Temperature	10° to 41°C (50° to 105°F)
Relative humidity	8% to 80%
Maximum wet bulb	27°C (80°F)

Nonoperating Environment:

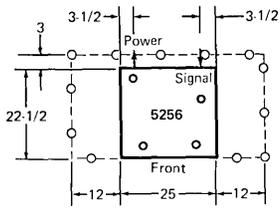
Temperature	10° to 52°C (50° to 125°F)
Relative humidity	8% to 80%
Maximum wet bulb	27°C (80°F)

* Keyboard is 53 cm (21 in.) by 23 cm (9 in.) by 10 cm (4 in.) and weighs 5 kg (12 lb). Keyboard may be moved to service console.

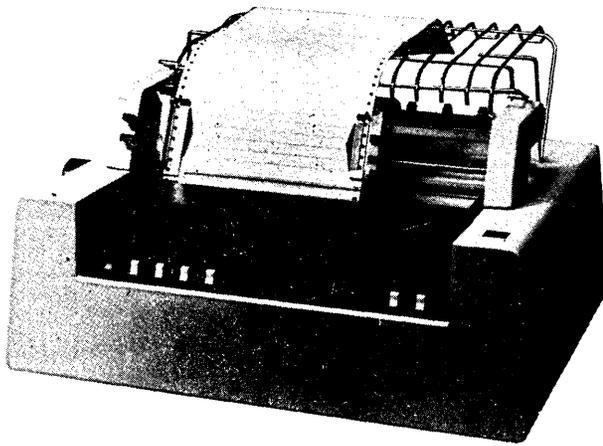
** See Figures 1 and 2 for specifications.

5256 PRINTER

Plan View



Note: Cables plug into the back of the unit.



Specifications

Dimensions:

	Width	Depth	Height
Centimeters	64	49	34
Inches	25	19	13-1/2

Service Clearances:

	Front	Rear	Right	Left
Centimeters	0	8	30	30
Inches	0	3	12	12

Weight: 36 kg (78 lb)

Heat Output: 185 watts (630 Btu/hr)

Airflow/min: 21 L/s (45 ft³/min)

Power Requirements:

Voltage	115
kVA	0.2
Phases	1

Plug type* H or J
 Power cord style* B
 (The power cord is 2.4 meters [8 ft] long.)

Operating Environment:

Temperature	10° to 41° C (50° to 105° F)
Relative humidity	8% to 80%
Maximum wet bulb	27° C (80° F)

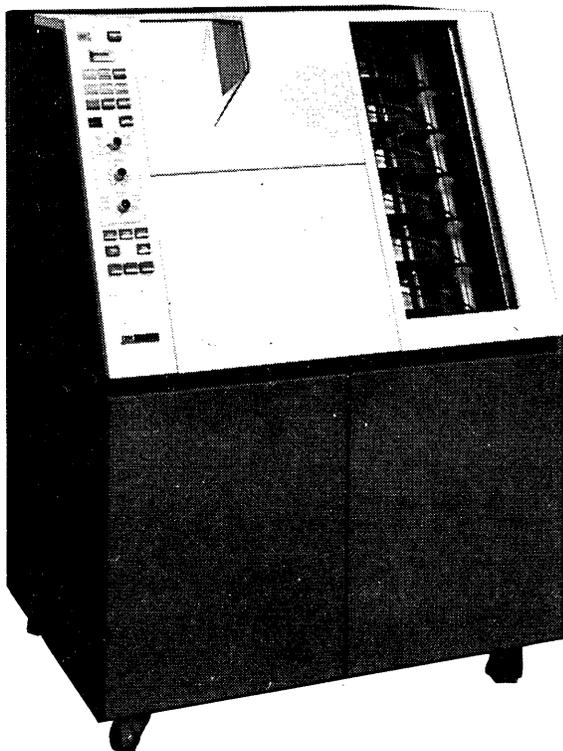
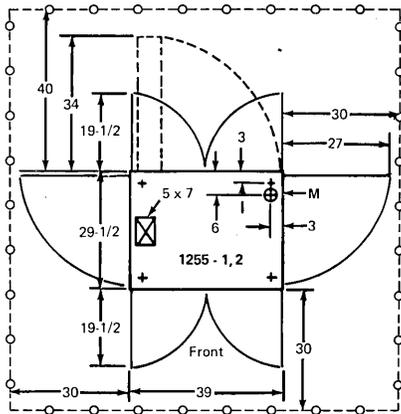
Nonoperating Environment:

Temperature	10° to 52° C (50° to 125° F)
Relative humidity	8% to 80%
Maximum wet bulb	27° C (80° F)

* See Figures 1 and 2 for specifications.

1255 MAGNETIC CHARACTER READER, MODELS 1 AND 2

Plan View



Specifications

Dimensions:

	Width	Depth	Height
Centimeters	99	75	140
Inches	39	29-1/2	55

Service Clearances:

	Front	Rear	Right	Left
Centimeters	76	102	76	76
Inches	30	40	30	30

Weight: 255 kg (560 lb)

Heat Output: 750 watts (2,600 Btu/hr)

Airflow: 150 L/s (300 ft³/min)

Power Requirements:

Voltage	208/230
kVA	1.0
Phases	1

Plug type* K or L

Power cord style* E

(The power cord is 2.4 meters [8 ft] long.)

Operating Environment:

Temperature	16° to 32°C (60° to 90°F)
Relative humidity	20% to 80%
Maximum wet bulb	26°C (78°F)

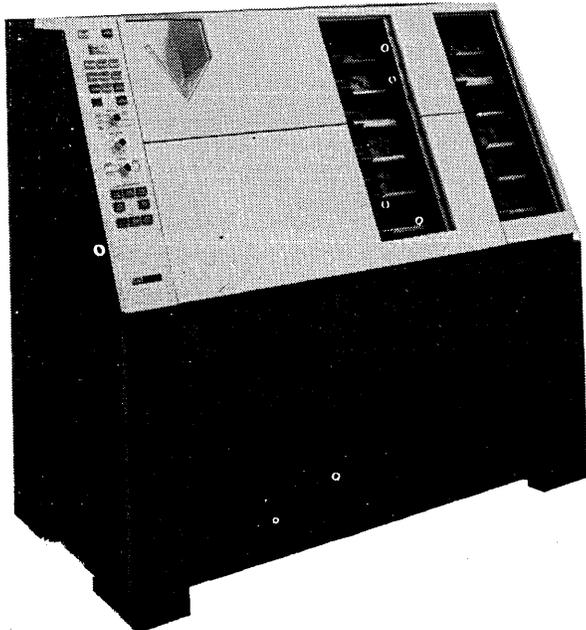
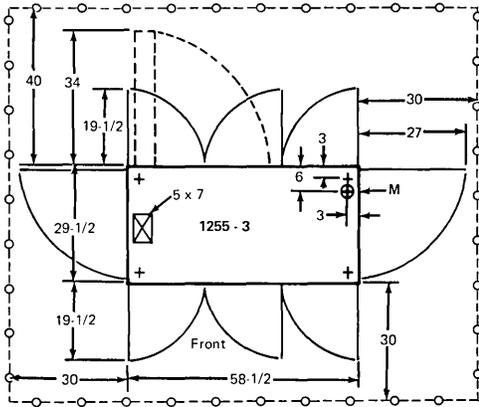
Nonoperating Environment:

Temperature	10° to 43°C (50° to 110°F)
Relative humidity	8% to 80%
Maximum wet bulb	27°C (80°F)

* See Figures 1 and 2 for specifications.

1255 MAGNETIC CHARACTER READER, MODEL 3

Plan View



Specifications

Dimensions:

	Width	Depth	Height
Centimeters	149	75	140
Inches	58-1/2	29-1/2	55

Service Clearances:

	Front	Rear	Right	Left
Centimeters	76	102	76	76
Inches	30	40	30	30

Weight:

320 kg (700 lb)

Heat Output:

750 watts (2,600 Btu/hr)

Airflow:

150 L/s (300 ft³/min)

Power Requirements:

Voltage	208/230
kVA	1.0
Phases	1

Plug type*

K or L

Power cord style*

(The power cord is 2.4 meters [8 ft] long.)

Operating Environment:

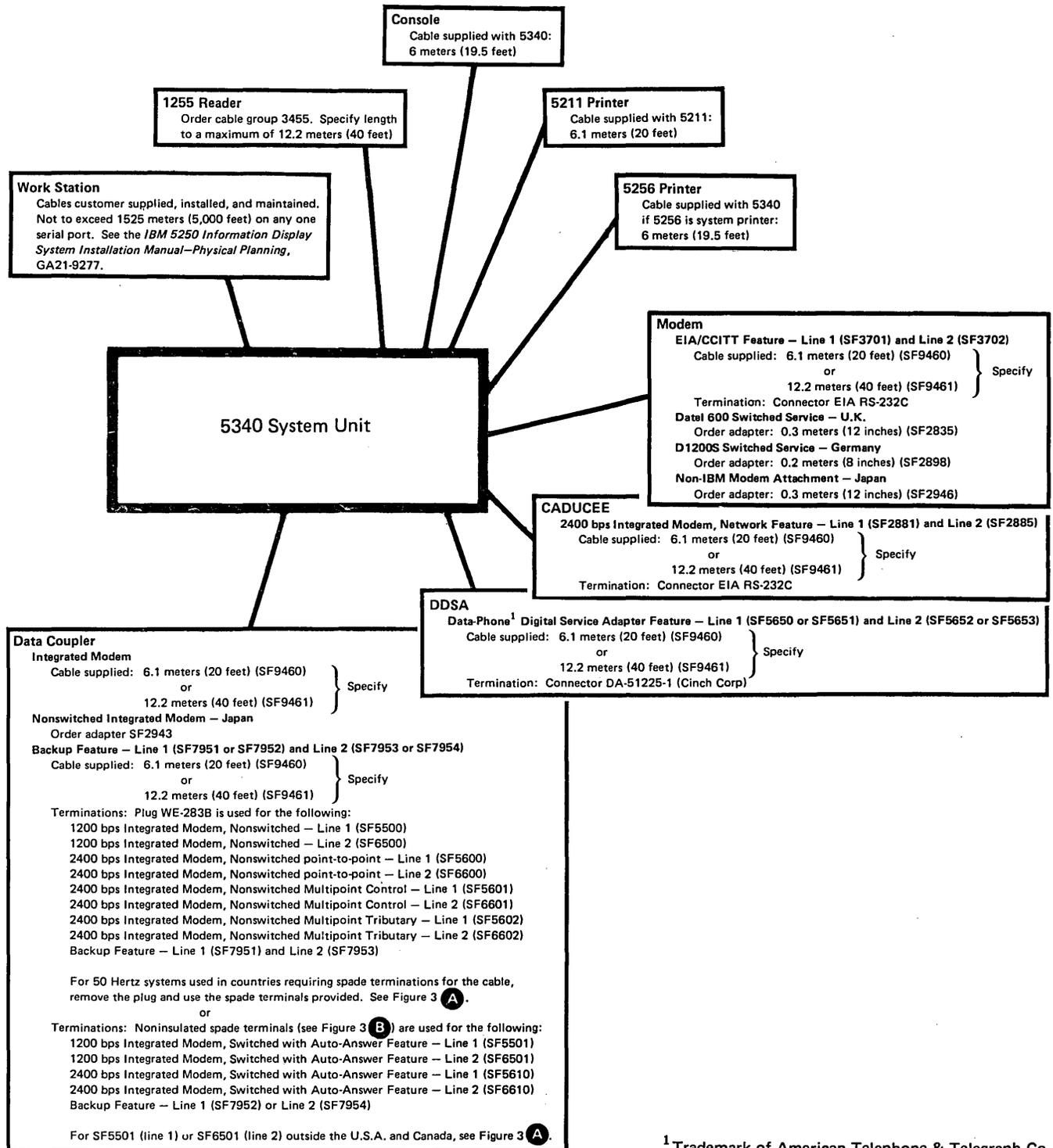
Temperature	16° to 32°C (60° to 90°F)
Relative humidity	20% to 80%
Maximum wet bulb	26°C (78°F)

Nonoperating Environment:

Temperature	10° to 43°C (50° to 110°F)
Relative humidity	8% to 80%
Maximum wet bulb	27°C (80°F)

* See Figures 1 and 2 for specifications.

GENERAL CABLING INFORMATION



¹Trademark of American Telephone & Telegraph Co.

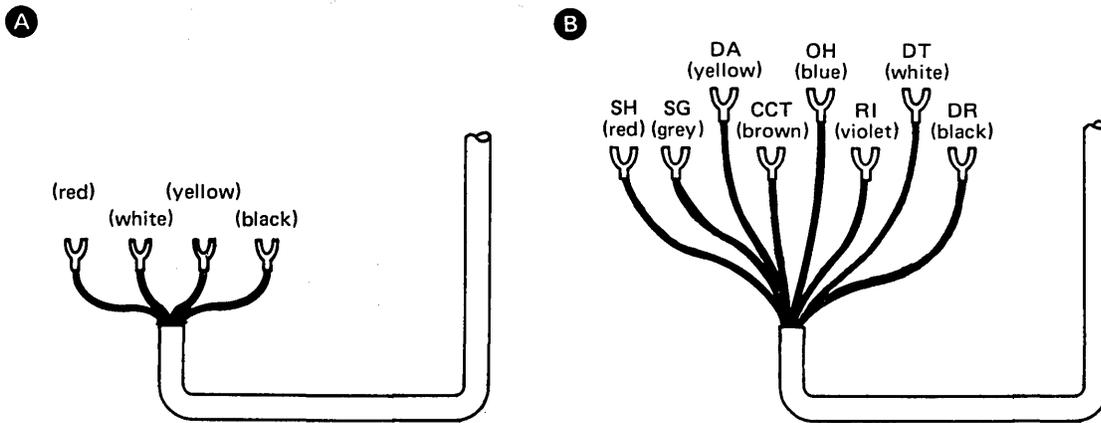


Figure 3. Terminal Designations

WORK STATION CONFIGURATION CABLING

In work station cabling, the following information applies:

- Only the console terminal can be connected to the first serial port (0).
- A total of eight terminals can be installed (including console).
- If a 5256 is installed as the system printer, it occupies one of the eight permitted terminal positions and one of the four serial ports.
- Total cable length on any one of the serial ports cannot exceed 1525 meters (5,000 feet).
- In the example shown (Figure 4), work stations 1, 2, 4, and 6 must have Cable Thru feature (SF2680). Work stations 3, 5, and 7 do not have SF2680 and must therefore have address position 0. Other work stations on a line can have address positions 1 through 6. No two terminals on the same line can have the same address position.

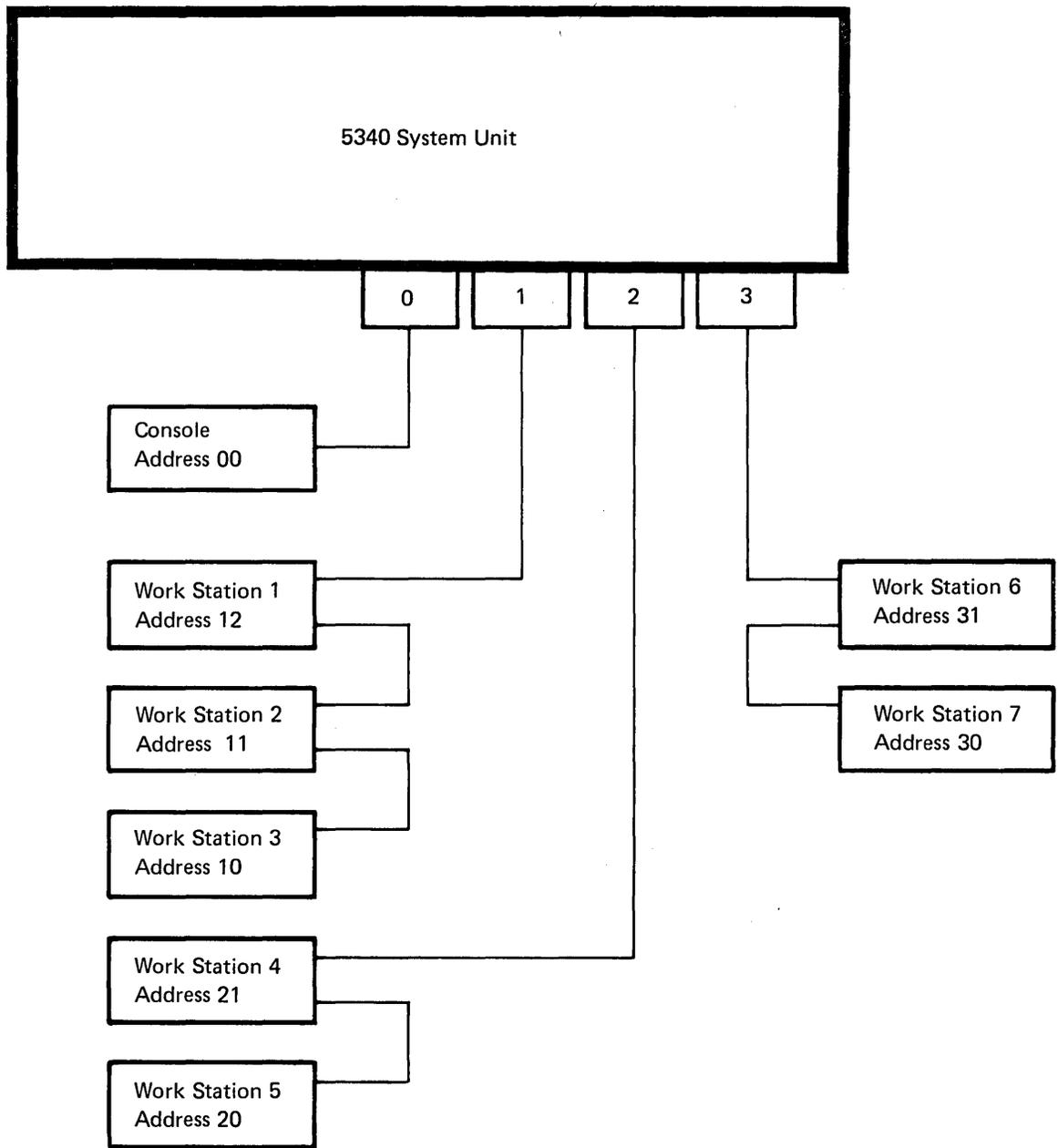


Figure 4. Work Station Cabling Configuration Example

Inch to Centimeter Conversion Chart

Inches ↓	Centimeters				Inches ↓	Centimeters			
	0	1/4	1/2	3/4		0	1/4	1/2	3/4
0	0	0.6	1.3	1.9	50	127.0	127.6	128.3	128.9
1	2.5	3.2	3.8	4.4	51	129.5	130.2	130.8	131.4
2	5.1	5.7	6.4	7.0	52	132.1	132.7	133.3	134.0
3	7.6	8.3	8.9	9.5	53	134.6	135.3	135.9	136.5
4	10.2	10.8	11.4	12.1	54	137.2	137.8	138.4	139.1
5	12.8	13.3	14.0	14.6	55	139.7	140.3	141.0	141.6
6	15.2	15.9	16.5	17.1	56	142.2	142.9	143.5	144.1
7	17.8	18.4	19.1	19.6	57	144.8	145.4	146.0	146.7
8	20.3	21.0	21.6	22.2	58	147.3	148.0	148.6	149.2
9	22.9	23.5	24.1	24.8	59	149.9	150.5	151.1	151.8
10	25.4	26.0	26.7	27.3	60	152.4	153.0	153.7	154.3
11	27.9	28.6	29.2	29.8	61	154.9	155.6	156.2	156.8
12	30.5	31.1	31.7	32.4	62	157.5	158.1	158.8	159.4
13	33.0	33.7	34.3	34.9	63	160.0	160.7	161.3	161.9
14	35.6	36.2	36.8	37.5	64	162.6	163.2	163.8	164.5
15	38.1	38.7	39.4	40.0	65	165.1	165.7	166.4	167.0
16	40.6	41.3	41.9	42.5	66	167.6	168.3	168.9	169.5
17	43.2	43.8	44.4	45.1	67	170.2	170.8	171.4	172.1
18	45.7	46.4	47.0	47.6	68	172.7	173.4	174.0	174.6
19	48.3	48.9	49.5	50.2	69	175.3	175.9	176.5	177.2
20	50.8	51.4	52.1	52.7	70	177.8	178.4	179.1	179.7
21	53.3	54.0	54.6	55.2	71	180.3	181.0	181.6	182.2
22	55.9	56.5	57.1	57.8	72	182.9	183.5	184.1	184.8
23	58.4	59.1	59.7	60.3	73	185.4	186.1	186.7	187.3
24	61.0	61.6	62.2	62.9	74	188.0	188.6	189.2	189.9
25	63.5	64.1	64.8	65.4	75	190.5	191.1	191.8	192.4
26	66.0	66.7	67.3	67.9	76	193.0	193.7	194.3	194.9
27	68.6	69.2	69.9	70.5	77	195.6	196.2	196.8	197.5
28	71.1	71.8	72.4	73.0	78	198.1	198.8	199.4	200.0
29	73.7	74.3	74.9	75.6	79	200.7	201.3	201.9	202.6
30	76.2	76.8	77.5	78.1	80	203.2	203.8	204.5	205.1
31	78.7	79.4	80.0	80.6	81	205.7	206.4	207.0	207.6
32	81.3	81.9	82.6	83.2	82	208.3	208.9	209.6	210.2
33	83.8	84.5	85.1	85.7	83	210.8	211.5	212.1	212.7
34	86.4	87.0	87.6	88.3	84	213.4	214.0	214.6	214.3
35	88.9	89.5	90.2	90.8	85	215.9	216.5	217.2	217.8
36	91.4	92.1	92.7	93.3	86	218.4	219.1	219.7	220.3
37	94.0	94.6	95.2	95.9	87	221.0	221.6	222.2	222.9
38	96.5	97.1	97.8	98.4	88	223.5	224.2	224.8	225.4
39	99.1	99.7	100.3	101.0	89	226.1	226.7	227.3	228.0
40	101.6	102.2	102.9	103.5	90	228.6	229.2	229.9	230.5
41	104.1	104.8	105.4	106.0	91	231.1	231.8	232.4	233.0
42	106.7	107.3	108.0	108.6	92	233.7	234.3	235.0	235.6
43	109.2	109.9	110.5	111.1	93	236.2	236.9	237.5	238.1
44	111.8	112.4	113.0	113.7	94	238.8	239.4	240.0	240.7
45	114.3	114.9	115.6	116.2	95	241.3	241.9	242.6	243.2
46	116.8	117.5	118.1	118.7	96	243.8	244.5	255.1	255.7
47	119.4	120.0	120.6	121.3	97	246.4	247.0	247.7	248.3
48	121.9	122.6	123.2	123.8	98	248.9	249.6	250.2	250.8
49	124.5	125.1	125.7	126.4	99	251.5	252.1	252.7	253.4
					100	254.0			

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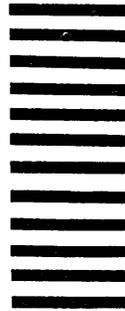
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