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Systems

# IBM 4300 Processors Installation Manual— Physical Planning

IBM

# Preface

This manual contains information necessary for you to plan and prepare the physical site for the installation of the IBM 4300 Processors. You should become familiar with the contents of this manual prior to beginning any installation planning.

Some IBM products listed herein may not be available in all countries. Including information about such products does not imply that these products will become available in all countries.

This manual is divided into the following sections:

**Section 1** contains information on floor planning, electrical, environmental, and structural requirements, and a list of abbreviations and definitions used.

**Section 2** gives detailed specifications and cabling information for the 4300 Processors.

**Appendix C** is a list of physical planning templates.

**Appendix G** is a checklist to be used as an aid in installation planning and scheduling. It may be copied as required.

**Note:** *This manual is intended for use with the companion manual* IBM Input/Output Equipment Installation Manual–Physical Planning for System/360, System/370, and 4300 Processors, *Order No. GC22-7064. The sections and appendixes that apply to your data processing installation may be combined in a single binder.*

**Associated Publications:**

- *IBM 4300 Processors Summary and Input/Output & Data Communications Equipment Configurator,* GA33-1523.
- *IBM 4300 Processors Principles of Operation for ECPS:VSE Mode,* GA22-7070.
- *IBM 4331 Functional Characteristics and Processor Complex Configurator,* GA33-1526.
- *IBM 4331 Physical Planning Template,* GX24-3728.
- *IBM 4341 Functional Characteristics and Processor Complex Configurator,* GA24-3672.
- *IBM 4341 Physical Planning Template,* GX24-3729.
- *Assembly of Coaxial Cable and Accessories and Attachment to IBM Products,* GA27-2805.
- *IBM 3270 Information Display Station Installation Manual–Physical Planning,* GA27-2787.
- *IBM 3790 Communication System Installation Manual–Physical Planning,* GA27-2769.
- *IBM Remote Multiplexers and Communications Terminals Installation Manual–Physical Planning,* GA27-3006.

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This is a major revision of, and obsoletes, GA24-3667-0.

# Contents



* See *Note* in the Preface.

# 1.0 Preinstallation Planning

The customer is responsible for all site preparation, including suitable space, floor layout design, and facilities for the equipment. The successful installation of a data processing equipment configuration requires long-range planning and continuous supervision to ensure that the plans are accomplished. You should schedule preinstallation activity so that the data processing room and supporting facilities are ready when the equipment is delivered.

Prepare a list of the equipment components, storage cabinets, work tables, and other furnishings. This is needed for planning the installation.

For large or complex installations, consider forming a preinstallation consulting and service group, familiar with the subjects covered in this manual.

## 1.1 Scheduling the Installation

IBM will provide a customized information package containing product specifications sheets, templates, and Installation Planning manuls for the equipment you have ordered. Refer any problems or questions you may have about your site preparation responsibilities to your IBM representative.

Data processing installations differ. However, you can use the following schedule as a guide (also see section 4.0 "Installation Planning Schedule and Checklist").

**Eight Months** before equipment delivery *(ten to twelve* months if structural alterations are required):

1. Verify the IBM equipment to be installed.
2. Determine the prospective location of the equipment. Make a preliminary layout of the proposed installation. Consider:
   - Room size
   - Physical layout of the equipment
   - Floor loading
   - Use of raised floor
   - Electrical power requirements
   - Air conditioning requirements
   - Data communications facilities
   - Channel priorities and optimization (sequence of attached devices)
   - Atmospheric contamination.
3. Make a survey to determine specific requirements for moving IBM equipment from the delivery area to the data processing room or area. For details, see section 1.2.1 "Space and Layout Requirements."
4. Advise IBM of any special security procedures, physical access restrictions, or other requirements.
5. Study availability and delivery quotations for power, air conditioning, cables not supplied by IBM, and other equipment to determine when each item must be ordered and delivered.

**Six Months** before equipment delivery:

1. Verify the air conditioning and power requirements and schedules.
2. Verify the delivery and installation schedule.

**Four Months** before equipment delivery:

1. Prepare the final layout and submit it to IBM for review. The cable order (prepared by IBM) is based upon the final layout. *This is a critical point in the schedule.* After these cables have been ordered, no layout changes that affect cable lengths should be made.
2. Equipment scheduled to be shipped later than three months *after* the original equipment shipment requires a separate cable order. These cables are shipped to coincide with arrival of the individual units.
3. When a unit requires external cables that must be installed through walls and/or floors, arrange for ordering, delivery, and installation with sufficient lead time to ensure availability for installation.
4. Arrange for common-carrier facilities to be installed for connection to the optional Remote Support Facility (RSF) and for any planned telecommunication equipment to ensure availability of equipment for installation.

**Two Weeks** before equipment delivery:

1. Cables are delivered. It is your responsibility to have the cables set in place. Under normal circumstances, IBM will set cables for IBM equipment in place at your request. However, if non-IBM personnel are selected, IBM will furnish, upon your request, a representative to designate which cable applies to each unit and, if applicable, printed information regarding the laying of cables. IBM has the responsibility to connect cables between IBM units.

   Cables are shipped with machines in some countries.
2. Place IBM customer engineering equipment, when delivered, in the CE service area according to the final layout.

**One Week** before equipment delivery:

1. If a raised floor is used, cut the cable holes in the raised floor panels (see "Specifications" pages). Take necessary safety precautions to prevent personnel injury because of exposed holes prior to installation of the equipment.
2. Have all air conditioning equipment installed, tested, and ready for operation. Balance the air conditioning system as soon as possible after the IBM equipment has been installed.
3. Complete painting, plastering, decorating, and the installation of floor ramps, lighting, and electrical and communication facilities (including any necessary communications lines, datasets, etc.).

## 1.2 Building Requirements

In selecting a location for the computer installation, consider the following:

1. Availability and location of proper and adequate power (including standby power where required).
2. Space for, and location of, air conditioning equipment (compressor, air handling equipment, and cooling tower or condenser).
3. Finished floor-to-ceiling height of 2.44 meters (8 feet) minimum (for environmental considerations).
4. Work flow to other areas.
5. Space for storage cabinets, card files, desks, communications facilities, etc., as well as for the daily storage of tapes, cards, and other supplies.
6. Floor loading capacity.
7. Proper safety and fire precautions.
8. Electromagnetic interference.
9. Excessive atmospheric contamination in the operating environment, such as from corrosive gases, dust, and radio-frequency interference.

   If the computer room is located above a manufacturing area, ensure that holes in the floor (such as around pipes and telephone lines) are sealed to prevent flammable, toxic, or corrosive gases from entering the computer area. The presence of odors from corrosive gases generally indicates an environment that may harm electronic equipment.
10. Access between the receiving dock and the computer area for movement of the equipment.

### *1.2.1 Space and Layout Requirements*

Space and layout requirements differ for each equipment configuration and depend upon the intended applications, as well as the physical area available. A few general rules are:

1. The floor area required for the equipment is determined by the specific components to be installed, the location of columns, provision for future expansion, floor loading capacity, etc.
2. As a preliminary check for clearance problems, paper templates of the units (made to the scale of your building plans) can be used on the building plan itself. It may be convenient to make a rigid, full-scale template of the largest unit. Carry this template along the access route to check for potential clearance problems at doorways, around passageway corners, and in elevators.

   Discuss access-route clearance problems with your IBM representative. IBM equipment is usually shipped with the covers in place. If necessary, shipment without covers may be requested. Unless otherwise noted on individual "Specifications" pages, all IBM units can be reduced to at least 750 x 1525 millimeters (29.5 x 60 inches) for shipment.
3. Provide space for storage cabinets, card files, desks, communications facilities, etc., as well as for the daily storage of tapes, cards, and other supplies.
4. Store all combustible materials in properly designed and protected storage areas. (See sections 1.6 "Safety and Fire Precautions" and 1.7 "Storage of Data Recording Media.")
5. At the option of IBM, test equipment may be assigned to the installation to maintain the equipment. The test area should be located on the same floor level as the computing equipment. For detailed information, see section 1.10 "Customer Engineering Support Facilities."

### *1.2.2 Equipment Layout*

Before attempting to make a layout, assign priorities to the input/output channels and to the control units to be attached to the channels. (See "Channel Priority.")

Operational requirements determine the specific location of the various components in the computer room. Because the separate components are connected by cables of specified length, and because of space limitations, priority, and the necessity for maintaining clearances between units for servicing, work space, and aisles, you may need to prepare and analyze several tentative layouts before deciding upon the final plan.

If you plan to install the equipment in two or more stages, a separate layout should be prepared for each stage. Consider channel priority assignments and cable lengths for each stage.

To make a layout, an accurate drawing of the proposed area is necessary. For a precise layout, trans-

parent plastic templates are available from IBM. The templates show the space required for the weight distribution, and the clearances required to allow working room for operator and service personnel and for test equipment. Templates also show the radius of swinging gates and covers, and the location of casters and cable holes. Clearances shown on the templates may be overlapped as long as the larger clearance is maintained, except that the gate swing of an auxiliary unit must not interfere with the gate swing of its corresponding control unit.

Equipment must be located so that the length of connecting cables does not exceed the maximum limits. These limits vary for each unit. Refer to the "Specifications" pages and cable schematics for the appropriate limits.

The prepared layout must be accurate and to scale. IBM uses the layout to determine the appropriate cable lengths. The following configuration considerations must be made. Be sure to include the following items, as well as any other unique considerations, on the layout:

1. Service clearances required for each unit.
2. If the equipment is to be installed on a raised floor:
   a. Indicate the location of any obstruction or constriction that may affect cable routing.
   b. Indicate the height of the raised floor above the base floor.
3. If the equipment is *not* to be installed on a raised floor:
   a. Indicate the planned placement of cables for minimum obstruction.
   b. If cables are to be routed indirectly between units (such as along walls or suspended), indicate the amount of additional cable required.
4. Location of power receptacles.
5. The number of control units to be assigned to each channel.
6. The number of input/output units to be attached to each control unit.
7. Location of air conditioning equipment and controls.
8. Location of files cabinets, desks, and other office equipment.
9. Location of room emergency power-off controls.
10. Location of all entrances, exits, windows, and columns or pillars.

Also consider the following when planning the layout:

1. Flow of work and personnel within the area.
2. Operator access to units, as required.
3. If the equipment is *not* to be installed on a raised floor, consider:
   a. The maximum cable lengths.
   b. The need for mechanical protection, such as cable guards or ramps, for the safety of personnel and equipment.
4. The effect of channel sequence or priority on the physical layout of the units.
5. The visual access required between a control unit and at least one of its associated input/output devices. If a problem exists, contact your IBM representative.
6. Avoiding direct sunlight where display units are to be located. The recommended lighting level is 800 lux (75 foot-candles).
7. Location of any planned safety equipment.
8. Future expansion.

Review the final layout to ensure that cable limitations have not been exceeded, and that proper clearances have been maintained.

Note that cables are ordered four months prior to equipment installation. Notify IBM immediately of any layout changes that affect cable lengths. Changes in the cable specifications requested within three months of the scheduled shipment date may subject you to an additional charge.

### *1.2.3 Floor Construction*

The floor must be capable of supporting the equipment. The weight of each unit is listed on its "Specifications" page.

IBM considers the following factors in determining floor loading:

1. If three or more units are placed side by side (abutted), no allowance can be taken for side clearance at the ends of the units.
2. Regardless of the actual service clearances required, the total area used in floor loading computations cannot extend more than 760 millimeters (30 inches) in any direction from the unit.
3. 98 kg/$m^2$ (20 pounds/$foot^2$) of service area used in the calculation must be applied as "live load" in floor loading computations.
4. If a raised floor is used, 50 kg/$m^2$ (10 pounds/$foot^2$) of total area must be used as the raised floor load in the floor loading computations.
5. The weight of cables has been considered as part of the unit weight.
6. Most office building floors rated at 250 kg/$m^2$ (50 pounds/$foot^2$) have an additional allowance of 125 kg/$m^2$ (25 pounds/$foot^2$) for partitions.

The local building code authority should be contacted about using this partition allowance in determining the floor loading capacity.

### 1.2.3.1 Use of Raised Floors

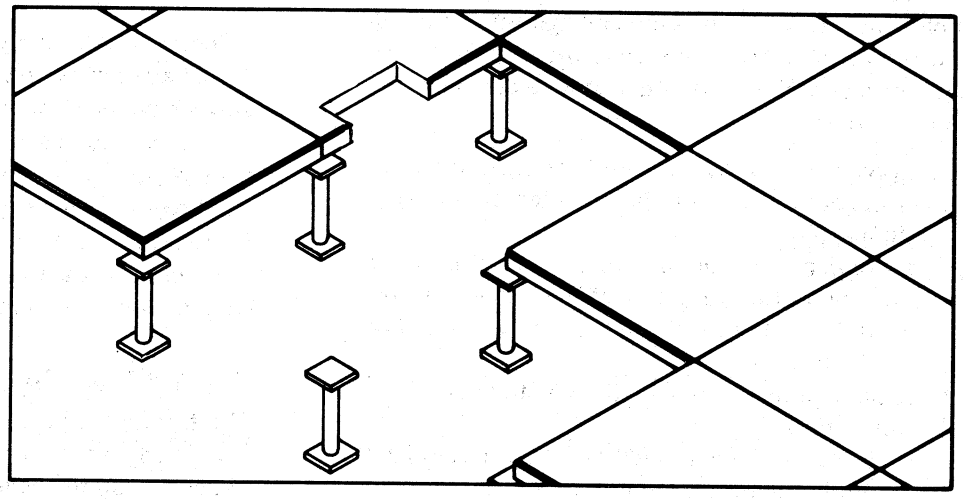
A raised floor accomplishes the following major objectives:

1. Allows for future layout flexibility with minimum reconstruction cost
2. Protects the interconnecting cables and power receptacles
3. Provides personnel safety
4. Permits the space between the original floor and the raised floor to be used to supply air to the equipment and/or area.

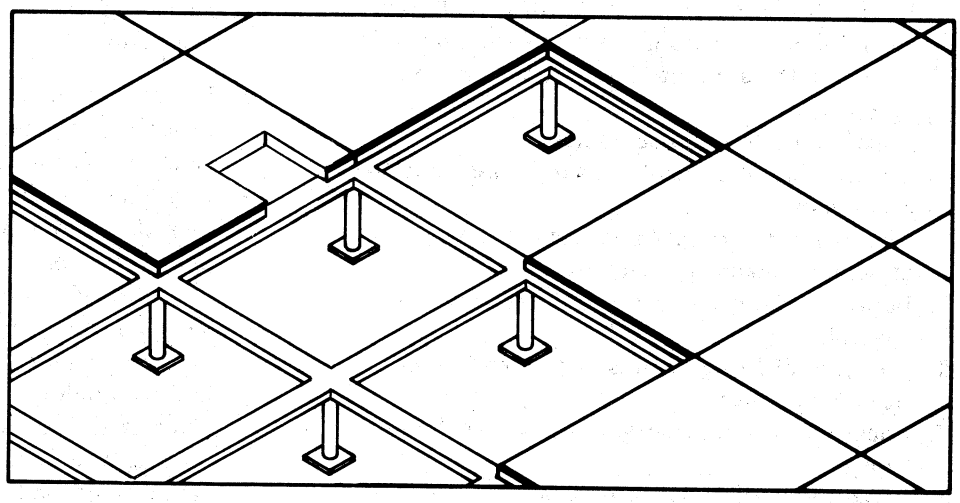
A raised floor can be constructed of steel, aluminum, or fire-retardant wood or other noncombustible material. The two general floor types are shown in Figure 1-1.

If a raised floor is not used, cable guards or ramps should be provided for safety of personnel.

Free-Access Floor:
Pedestal Supported Panels
Panels Removable
Cutouts in Panels



Free-Access Floor:
Subframing Supported Panels
Panels Removable
Cutouts in Panels



*Note:* A raised-floor-panel lifter should be made readily available in the computer room at a convenient location.

Figure 1-1. Types of Raised Floors

#### 1.2.3.2 Raised Floor Recommendations

In the construction of raised floors, the following recommendations should be followed:

1. Where a metallic raised floor is used, ensure that no metal is exposed to the walking surface. Such exposure could constitute an electrical safety hazard.

   Providing a conductive path from a metalic raised floor structure to ground is necessary to minimize static buildup.
2. The raised floor height should be 300 millimeters (12 inches).

   The raised floor clearance should be adequate to accommodate piping, power distribution, etc., with an additional minimum of 110 millimeters (4.5 inches) allowed for passage of cables and connectors over or under these or other obstacles.
3. When a raised floor panel is cut for cable entry, air register, etc., additional panel support may be required to restore structural integrity.
4. Protective covering should be used to prevent damage to floor tiles, carpeting, and panels while equipment is being installed or relocated.
5. Sharp edges must be removed from all floor cutouts through which cables pass.
6. Concrete subfloors may require treatment to prevent the release of dust.

#### 1.2.3.3 Floor Covering Recommendations

Floor covering material can contribute to the buildup of high static electrical charges caused by the motion of people, carts, etc. Abrupt discharge of these static charges can cause discomfort to personnel, and may cause malfunction to electronic equipment. This static buildup and discharge can be minimized by:

1. Ensuring that the floor surface resistance is as low as possible but not lower than 150,000 ohms (for safety reasons) and not higher than $2 \times 10^{10}$ ohms. The resistance is measured between the floor surface and the building ground (or applicable ground reference). Use the procedure outlined in NFPA No. 56A, Chapter 462, Section 4628 (or applicable local or national equivalent).

   Any floor covering should have antistatic properties. If antistatic agents are used, the effective antistatic life may be short and require frequent retreatment. Maintenance of all antistatic floor coverings (carpet, tile, etc.) should be in accordance with the individual supplier's recommendations.

   Vacuuming equipment used in the computer area should have a nonconductive hose and nozzle assembly. This safety precaution minimizes the possibility of static discharge or electrical shock.
2. Maintaining the room humidity within control limits as defined in section 1.3.2 "Temperature and Humidity Design Criteria."

### *1.2.4 Furniture*

Furniture can provide a source of high static charge. Ensure that seat covers, etc. are made of materials that resist static buildup. Many plastics permit the buildup of high static charges. Cloth covered chairs are normally less susceptible to generating static charges. Casters, mats, pads, etc. made of rubber or other insulating materials should be avoided, unless they contain conductive material. If casters, ball bearings, etc. are used, a graphite or other conductive lubricant should be used.

The resistance of furniture parts that touch the floor (such as casters and feet) should be less than $10^9$ ohms measured from the metal in the furniture frame to a metal test surface upon which the furniture sample is placed.

### *1.2.5 Acoustical Treatment of the Area*

Acoustical treatment of the computer room is recommended to provide for more efficient and comfortable operation. Proper acoustic design of a computer room may require the services of an acoustical specialist.

The total environmental noise level of a computer room is affected by all noise sources in the room, the physical arrangement of the noise sources, and the sound reflective (or absorptive) characteristics of the room surfaces.

The noise level in an installation can be reduced by proper spacing and orientation of mechanical equipment. Sufficient space should be provided around such units. The farther apart they can be placed, the lower the overall room noise will be. When possible, place the noisier units so that operating personnel are not constantly working between them. Consider placing the quieter electronic units between the mechanical units. An effective method is to place these units at an angle to an aisle or an open work area.

Air conditioning blowers and other external noise sources, if not properly installed, can contribute substantially to the overall noise level. Duct work may conduct noise to or from other rooms. This can be reduced by acoustical treatment of the ducts.

Using absorptive materials reduces the overall sound level throughout an installation. For effective and economical sound reduction, use a sound absorptive ceiling. Satisfactory results can be expected from a false (dropped) ceiling. For large rooms, using absorptive material (such as carpet floor coverings) should result in further reduction of the sound level. To prevent computer room noise from reach-

ing adjacent office areas, the walls should be constructed from the structural floor to the structural ceiling, and be properly sealed. Doors should also have a good seal.

### *1.2.6 Electromagnetic Compatibility*

Planned data processing installations may occasionally be in areas having a high electromagnetic field environment. This condition results when the equipment is near a radio-frequency (rf) interference source (such as radio, TV, and RADAR transmitting antennas, or medical treatment equipment), and certain industrial equipment (such as rf induction heaters, rf arc welders, and insulation testers). Under such conditions, IBM should be consulted to determine whether any special installation or product considerations are advisable to ensure normal operation and maintenance.

### *1.2.7 Lighting*

Illumination of 540 to 800 lux (50 to 75 footcandles), measured 760 millimeters (30 inches) above the floor, should be maintained.

Direct sunlight should be avoided because lower levels of illumination are needed to properly observe the various console and signal lamps. Also, direct sunlight may cause malfunction of devices that employ light sensing. General illumination should be sectionally controlled by switches so that portions of the lighting can be turned off as desired. Lights should not be powered from the computer power panel (see section 1.5 "Power Distribution System").

Provision should be made for emergency lighting. See section 1.6 "Safety and Fire Precautions" and section 1.6.6 "Supporting Facilities."

### *1.2.8 Vibration*

Vibration common to an office building environment will not affect equipment operation.

## 1.3 Air Conditioning

In determining the air conditioning capacity necessary for an installation, consider the following factors:

Equipment heat dissipation
Personnel heat dissipation
Latent load
Lighting
Fresh air introduction
Possible reheat
Heat conduction through outer walls
Ceiling
Floors
Door openings
Partitions
Glass wall area

Computer room cooling is basically a sensible (as opposed to a latent) cooling operation. *(Sensible* heat is defined as the transfer of thermal energy to or from a substance resulting in a change in temperature. *Latent* heat is the thermal energy absorbed or evolved in a process, other than change of temperature.)

Most IBM equipment is aircooled by internal blowers. Most units are designed for updraft air flow. A few are designed for downdraft air flow. This must be considered when planning the air conditioning system, and when laying out the floor plan for adjacent units. Unless noted on the individual "Specifications" pages, *updraft* airflow is used.

A separate air conditioning system is recommended for the data processing installation. Because of the amount of heat dissipated while the equipment is operating, the air conditioning system must provide year-around temperature and humidity control. Heat dissipation ratings are given on the "Specifications" page for each unit.

Air conditioning units should not be powered from the computer power panel. The feeder for the air conditioning system and the computer room power should not be in the same conduit.

### *1.3.1 Air Distribution and Types of Systems*

The heat load of the computer equipment is concentrated in relatively small areas. For this reason, give attention to the method of air distribution to eliminate areas of excessive air motion.

The air conditioning system should use recirculated air with the introduction of a fixed minimum of fresh air for personnel. This fresh air permits pressurization of the area so that air leakage is always outward to help prevent entry of dust from adjacent areas.

Several types of air conditioning systems can be designed to satisfy the temperature and humidity requirements. The following are the most common types of systems, with a brief description of each.

#### 1.3.1.1 Overhead System

In this system, the entire heat load of the room (including the heat generated by the computer) is absorbed by the air supplied to the room. The air is generally supplied from either an overhead duct and diffuser system or by a ceiling plenum.

The return air to the air conditioner is drawn from either ceiling return registers above the heat producing units, or a fixed pattern of returns in the ceiling and/or in the walls around the room.

The temperature control system should consist of temperature and humidity controls placed in a representative location. A temperature and humidity recorder should be mounted adjacent to the controls to monitor the room conditions (see section 1.3.5 "Temperature and Humidity Recording Instruments").

#### 1.3.1.2 Underfloor System

In this system, the space between the building floor and the raised floor carries the supply of conditioned air. All air is discharged into the room through floor registers or perforated floor panels. The air returns by ceiling registers.

This system allows a higher air-return temperature without affecting the design conditions of the overall room. This system takes into account a heat transfer factor through the raised floor.

The system must have air temperature controls for the underfloor supply system to prevent uncomfortably cold floor surfaces. Air entering the data processing equipment through cable openings must be within stated specifications.

#### 1.3.1.3 Overhead/Underfloor System (Two Air Conditioning Systems)

One system with separate controls supplies conditioned and filtered air to the area under the raised floor. The air is discharged into the room through the floor panels or registers. This air absorbs most of the heat generated by the data processing units while they are in operation. Relative humidity of the air supplied to the units should be maintained within the range given on the "Specifications" pages for the units installed. Temperatures should be controlled to prevent condensation on or within the units.

The second air handling system supplies air directly to the room through overhead ducts. This system should be large enough to absorb the remaining heat load in the computer area. It should be capable of maintaining room temperature and relative humidity as specified for the computer units when normal machine power is off, and give year-around air conditioning, ventilation, and heating.

### *1.3.2 Temperature and Humidity Design Criteria*

The data processing equipment can tolerate a considerable range of temperature and humidity, as described on the "Specifications" pages for each unit. An air conditioning system should be designed to maintain 24°C (75°F), and 50 percent relative humidity at altitudes up to 2 150 meters (7,000 feet). This design criteria provides for the largest buffer in terms of available computer operating time in case of air conditioning failure. In geographic areas where a design criteria of 50 percent relative humidity is not practical, use the value of 45 percent.

If the air conditioning system fails, the computer can be operated until it reaches its specified limits. This increases the time available to repair the air conditioning system before the computer must be shut down. The design criteria has also proven to be a generally acceptable comfort level for personnel.

If deviations in either direction from the recommended design criteria are maintained for extended periods, the data processing equipment will be exposed to malfunction from external conditions. This exposure increases as the deviation becomes larger. High relative humidity levels may cause improper feeding of cards or paper, as well as operator discomfort and condensation on windows and walls when the outside temperature falls below the room dew point. Low relative humidity levels alone will not cause static discharge. However, in combination with certain types of floor construction, floor coverings, furniture, etc., static charges generated by the movement of people, paper, or equipment are more readily stored. These charges may be high enough if discharged by contact with another person or object to be quite objectionable to operating personnel. If discharged to or near data processing equipment, these charges can cause intermittent machine malfunction.

Because temperature and humidity deviations over only a few hours can permit the retention of static charge, the air conditioning system should be automatically controlled and provided with a high/low alarm or a continuously recording device with appropriate limits marked.

In some areas, adding moisture to the room air is necessary to meet the design criteria. Some means of adding moisture are: steam grid or jets, steam cup, and water atomizers. To avoid contamination of the air, water treatment may be necessary in areas with high mineral content in the water.

In localities where the outside temperature drops below freezing, single-glazed windows permit condensation to form. If outside temperatures are considerably below freezing, the outside walls of the

building should be waterproofed or vapor sealed on the inside. Otherwise, structural damage to the outside walls may occur.

See sections 1.2.3 "Floor Construction" and 1.2.4 "Furniture" for related information on the reduction of static electricity.

## *1.3.3 Operating Limits*

Individual units have varying operating limits. Refer to the "Specifications" pages for each unit to determine the operating limits for the complete equipment installation.

When conditioned air is supplied near the base of any unit by a duct or underfloor supply, the absolute maximum relative humidity of that air must not be greater than 80 percent. Air temperature in this duct or underfloor supply should be kept above the room dew point temperature to prevent condensation within or on the units.

The "nonoperating range" specifies a satisfactory environment when normal machine power is turned off, such as during off-shift hours.

**Note:** *The air entering the units must be within the indicated ranges before power is turned on. Under no circumstances may the air entering the unit exceed the minimum or maximum operating temperature and humidity limits for any unit.*

*Certain units, such as the 4300 Processors, have downdraft cooling. You should adhere to the recommended clearances and floor space requirements when locating a unit with updraft cooling adjacent to a unit with downdraft cooling. Air conditioning vents must not be directed into the base of any units.*

## *1.3.4 Air Filtration*

A high-efficiency filter, rated according to the mechanical and electrostatic filter specifications given below, should be installed to filter all air supplied to the computer room. Because mechanical and electrostatic air cleaners operate on different principles, a different rating is specified for each type. Ratings are determined by using the test methods outlined in the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard No. 52-76 (or local or national equivalent).

Special air filtration is necessary where installations are exposed to corrosive gases, salt air, or unusual dirt or dust conditions.

### 1.3.4.1 Mechanical Air Filters

Mechanical air filters must be rated at a minimum of 20 percent efficiency. This rating applies to a clean filter and must be maintained throughout the life of the filter.

### 1.3.4.2 Electrostatic Plate Filter

Electrostatic plate filters must be rated at a minimum of 85 to 90 percent efficiency.

Electrostatic air cleaners are designed to operate at 85 to 90 percent efficiency at a given *face velocity.* As the face velocity through the filter increases, its efficiency decreases. Therefore, an electrostatic filter operated at increased face velocities or below 85 percent efficiency would allow a greater number of particles charged by the ionizing wires to pass through the plate section and enter the room. This would increase what is known as *space charge.* As the space charge increases, a greater voltage differential occurs between the positive charged particles and the negative surfaces in the room. This causes dust to accumulate rapidly on all surfaces, and defeats the purpose of a high-efficiency filter.

## *1.3.5 Temperature and Humidity Recording Instruments*

Temperature and humidity recording instruments are desirable and may be installed to provide a continuous record of temperature and humidity conditions in the area. If air conditioning requirements are not met, a record may then be available to indicate the extent and duration of abnormal conditions.

It may be necessary to stabilize the equipment within the specified environmental limits before resuming operation.

The record of temperature and humidity conditions can be used to:

1. Ensure that the air conditioning system is operating properly.
2. Determine whether a mandatory temperature/humidity conditioning period is necessary. (See section 1.7 "Storage of Data Recording Media.")

A visual or audible signal device should be included to indicate that temperature and/or humidity conditions are approaching the maximum limits. Taking timely corrective action may allow continuous operation.

Direct-reading instruments with a seven-day charting feature should be used for all installations to monitor the ambient room conditions. The recorder should be at a convenient location and adjacent to the air conditioning and humidity controls.

A remote indicating instrument is recommended for monitoring underfloor air conditions. This should also be a seven-day charting device and can be the wet and dry bulb or electronic type. The recording instrument can be on the computer room wall, in the mechanical equipment room, or in any location that is convenient to personnel responsible for maintaining air quality.

## 1.4 Power Requirements

A three-phase, five-wire power distribution system should be provided for flexibility in your data processing installation. However, depending on the types of equipment installed, a single-phase distribution system may be sufficient. The use of five wires will enable you to provide power for three-phase or single-phase equipment. The five wires consist of three *phase* wires, one *neutral* wire and one *insulated equipment ground* wire (green, or green with yellow trace).

Refer to the individual "Specifications" pages to determine which voltage options are available for each unit.

The total power demand depends upon the equipment configuration, as well as upon the type of operation. A power summary can be derived by adding the kVA values shown on the individual unit "Specifications" pages. A more detailed analysis of power system requirements can be obtained by using the IBM System Power Profile analysis. IBM can provide this analysis, which is based upon your equipment configuration showing the quantity, type, and model of each unit. This report shows the power requirements, as well as heat dissipated per hour.

### *1.4.1 Voltage Limits*

The line-to-line, *steady-state* voltage tolerances when the equipment is operating must be maintained within plus 6 percent and minus 8 percent of the normal rated voltage, measured at the receptacle.

A *transient* voltage condition must not exceed plus 15 percent or minus 18 percent of nominal and must return to within a steady-state tolerance of plus 6 percent and minus 8 percent of the normal rated voltage within 30 cycles.

Individual product specifications pages should be reviewed to determine the voltage tolerance for a specific system configuration. The steady-state transient limits given above cover most combinations of attachable IBM I/O equipment.

### *1.4.2 Frequency Limits*

The line frequency must be maintained at 60 or 50 ±1/2 Hz (depending upon the rating of the equipment).

### *1.4.3 Line-to-Line Voltage Imbalance*

In a three-phase system, any three line-to-line equipment voltages must not differ by more than 2.5 percent from the average of the three voltages. All three line-to-line voltages must be within the limits specified (see section 1.4.1 "Voltage Limits").

### *1.4.4 Harmonic content*

The maximum total harmonic content of the power system voltage waveforms on the equipment feeder, when the computer equipment is not operating, must not exceed 5 percent.

## 1.5 Power Distribution System

This section addresses the requirements for electrical power distribution systems.

### *1.5.1 Primary Computer Power Service*

For maximum reliability, the computer power panel should connect to feeders *that serve no other loads.* Electrical noise producing devices, such as accounting equipment, card punch machines, typewriters, and desk calculators, should be connected to panels that are separate from those feeding the computer units.

### *1.5.2 Branch Circuits*

The computer branch circuit panel should be in an unobstructed, well-lighted area in the computer room.

The individual branch circuits on the panel should be protected by suitable circuit breakers properly rated according to manufacturer's specifications and applicable codes. Each circuit breaker should be labeled to identify the branch circuit it controls.

The grounding wire of the branch circuit must be insulated and equal in size to the neutral and phase conductors.

Terminate branch circuits as close as possible to the unit they supply: within 3 meters (10 feet). Run branch circuits in either rigid or nonrigid metallic conduit (or in compliance with local or national standards). The conduit system should be continuous, uninterrupted, and connected to the building or transformer ground (Figure 1-2).

The diagram shows the elements involved in providing reliable design for the power source supplying a computer system. While the voltages shown represent commercial power commonly available in Canada and the U.S., the basic principles can be adapted to commercial power sources world-wide.

Power cords are supplied in 4.3-meter (14-foot) lengths, unless otherwise noted on the "Specifications" pages. The length is measured from the

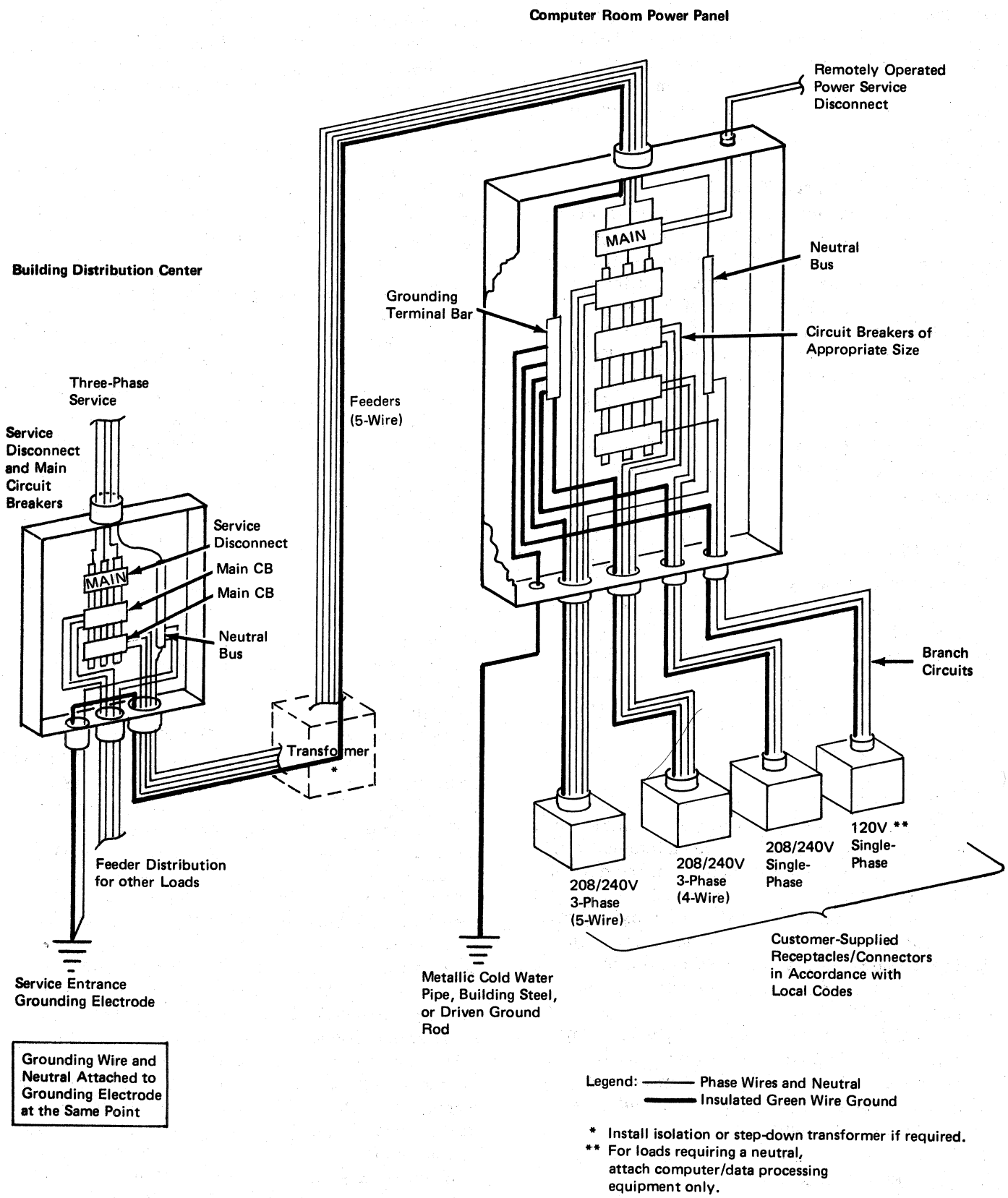



Figure 1-2. Power Distribution Systems

" ⊕ " symbol on the plan views. Power plugs furnished by IBM for 4300 processors are watertight and can be located under the raised floor. Your receptacle should also be watertight and can be either an inline or a fixed type.

**Note:** *The service ratings for the branch circuit connections are given in* IBM Input/Output Equipment Installation Manual–Physical Planning for System/360, System/370, and 4300 Processors, *GC22-7064.*

### *1.5.3 Grounding*

All IBM units are provided with an equipment ground wire (green or green with yellow trace). At the branch circuit panel, the green wire ground from all units must be connected to one main grounding conductor. This insulated equipment grounding wire is a dedicated ground, not a neutral, and must be carried back to service ground or suitable building ground. Conduit must not be used as the only grounding means.

### *1.5.4 Phase Rotation*

The three-phase power receptacles for the computer (if required) must be wired for correct phase rotation. When looking at the face of the receptacle and counting counterclockwise from the ground pin, the sequence is phase 1, phase 2, and phase 3.

### *1.5.5 Computer Room Emergency Power-Off Controls*

As a safety precaution, room emergency power-off controls should be provided for disconnecting the main service wiring supplying the computer equipment. These controls should be located both convenient to the operator and next to main exit doors.

### *1.5.6 Lightning Protection*

Installing lightning protection devices is recommended on the computer power source when:

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

You are responsible for the selection and installation of lightning protection devices.

### *1.5.7 Convenience Outlets*

A suitable number of convenience outlets should be installed in the computer room and the CE area for use by building maintenance personnel, service representatives, etc. Convenience outlets should be on the lighting or other building circuits, not on the computer power panel or feeder. For detailed requirements, see section 1.10 "Customer Engineering Support Facilities."

Under no circumstances are the service outlets on IBM units to be used for any purpose other than normal servicing.

### *1.5.8 Primary Power Problem Areas*

IBM equipment operates satisfactorily on the normal power supplied by most power companies. However, many outside variables exist over which neither the power company nor IBM has any control. To guard against possible computer malfunctions caused by outside (radiated or conducted) transient electrical noise signals being superimposed on the power to the computer, power distribution design should comply with the specified IBM equipment requirements.

Failures caused by the power source are basically of two types:

1. Power outages: This includes short duration dips in voltage as well as prolonged outages. If the frequency of such power failures is not acceptable for your operation, installing standby and/or buffered power may be necessary.
2. Transient electrical noise superimposed on power lines: This may be caused by a variety of industrial, medical, communications, or other equipment in the vicinity of the power company's distribution lines, or within or adjacent to the computing facilities. Motor operated devices on the same power source as the computer may, under certain conditions, cause intermittent electrical disturbances.

## 1.6 Safety and Fire Precautions

Safety is a vital factor in planning a computer installation. This should be reflected in the choice of a computer location, building materials used, fire detection and protection equipment, air conditioning and electrical systems, and personnel training.

### *1.6.1 Emergency Lighting*

You should make provision for emergency lighting. Requirements for emergency lighting may be found in NFPA No. 75-1976 (or the local or national equivalent).

### *1.6.2 Computer Location*

1. The computer area should be in a noncombustible or fire-resistive building or room.
2. The computer room should not be above, below, or adjacent to areas where hazardous materials or gases are stored, manufactured, or processed. If it must be located near such an area, take extra safeguard precautions.

### *1.6.3 Fire Prevention Considerations*

1. Walls enclosing a computer area should be of noncombustible materials (minimum of one hour fire resistance rating). These walls should extend from the structural floor to the structural ceiling.
2. Where a false (dropped) ceiling is to be added, it should be constructed of noncombustible or fire-resistant material. All ducts and insulating materials should be noncombustible and nondusting. If combustible materials are used in the space between the structural ceiling and the false ceiling, provide appropriate fire protection.
3. A raised floor, installed over the structural floor, should be constructed of noncombustible or fire-retardant materials. If the structural floor is of combustible material, it should be protected from the ceiling below, preferably by water sprinklers.

   **Note:** *Before the computer is installed, the space between the raised and the structural floors should be cleared of debris. This space should be periodically checked after installation to keep it free of accumulated dust and debris.*

4. The roof or floor above the computer and recorded media storage areas should be watertight.
5. Drainage for the subfloor space should be provided. In buildings where the computer room structural floor is recessed and the raised surface is on the level of adjacent areas, proper drainage must be installed under the raised floor as a precaution against flooding or water accumulation.

### *1.6.4 Computer Area Fire Prevention Equipment*

1. An early-warning detection system should be installed to protect the computer and recorded media storage areas. It should actuate an audible alarm in the computer room and at a monitored central station.
2. Portable carbon dioxide fire extinguishers of suitable size and number should be provided for use on the electrical equipment.
3. Portable, pressurized water extinguishers should be provided for ordinary combustible material, such as paper.
4. Extinguishers should be readily accessible to individuals in the area. Extinguisher locations should be visibly marked overhead.
5. Where portable cylinders are used as the primary extinguishing agent, a standpipe or hose unit should be located within effective range of the computer areas (as a secondary or backup extinguishing agent).
6. If a Halon 1301* (or equivalent) gas room flooding system is installed, see NFPA No. 12A (or applicable local or national equivalent). When the room is occupied, an appropriate time delay (from the time of detection to the time of discharge) should be installed in conjunction with a manual override switch. The time delay should be sufficient for the evacuation of all personnel from the area.
7. Where automatic water sprinklers are required because of building conditions, automatic on/off sprinklers should be considered if they satisfy local fire protection codes. This type of system minimizes the quantity of water discharged that could otherwise cause additional damage.
8. Waste material containers should be of metal construction with a flame-suppressant lid.

### *1.6.5 Data Storage*

1. Any data stored in the computer room, whether in the form of magnetic tape, paper tape, cards, paper forms, etc., should be limited to the minimum needed for safe, efficient operation. When not in use, this data media should be stored in metal cabinets or fire-resistant containers.
2. For security purposes and for protection against fire, a separate storage room is recommended. The room should be constructed of fire-resistant material (minimum two-hour fire resistance rating). The preferred type of fire prevention equipment is a sprinkler system, or a gas room flooding system.

### *1.6.6 Supporting Facilities*

Consider air conditioning and electrical systems when planning for safety and fire protection.

#### 1.6.6.1 Air Conditioning Systems

1. When the computer area is supplied by a *dedicated* air conditioning system, it should be controlled by the room emergency power-off controls.

   When the regular building air conditioning sys-

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* Registered Trademark of E. I. du Pont de Nemours & Co., Inc.

tem is used with *supplemental* units in the computer area, the supplemental units should be controlled by the room emergency power-off switches.

Emergency power-off switches for the room should be placed near the operator's console and next to the main exit doors.

2. Air ducts serving other areas but passing through the computer room should have fusible-link dampers as prescribed by local code.
3. The air filters should be of noncombustible or self-extinguishing material.

**1.6.6.2 Electrical Systems**

1. Where continuity of operation is essential, a standby and/or buffered power source should be installed.
2. An automatic battery-operated lighting system should be installed in case of power or lighting circuit failure. These units are controlled by the lighting circuit.
3. Watertight connectors should be used under raised floors.

### *1.6.7 Preplanning to Continue Operation in an Emergency*

Continued operation depends on the information stored on cards, tapes, disks, drums, and so forth, and the on equipment used to process the information. Arrangements should be made for emergency use of other equipment and the transportation of personnel, data, and supplies to a temporary location. Duplicates of master records should be maintained in a remote area.

### *1.6.8 General Precautions and Personnel Training*

1. The computer room, air conditioning equipment room, and data storage room should be monitored continuously.
2. Plumbing above the false ceiling should be inspected periodically.
3. Emergency exit doors should be provided in the computer area and be clearly identified. The number of doors depends on the size and location of the area, and on local fire codes.
4. Personnel should be trained in emergency measures, such as:
   a. Method and sequence of shutting off all electrical power
   b. Shutting off air conditioning systems
   c. Calling fire company
   d. Handling fire extinguishers and small diameter fire hoses
   e. Evacuating records
   f. Evacuating personnel
   g. Administering first aid.

### *1.6.9 Additional Reference Material*

Consult NFPA Standard No. 75, Protection of Electronic Computer/Data Processing Equipment (or applicable local or national equivalent).

## 1.7 Storage of Data Recording Media

This section describes provisions to safeguard data recording media.

### *1.7.1 Magnetic Tape*

Storage conditions for magnetic tape should be maintained within the following limits:

Temperature: 4 to 32°C (40 to 90°F)
Relative Humidity: 20 to 80 percent with a maximum wet bulb temperature of 27°C (80°F)

Tape must be conditioned by placing it in the operating environment for 24 hours before use. The operating environment for tape is:

Temperature: 16 to 32°C (60 to 90°F)
Relative Humidity: 20 to 80 percent with a maximum wet bulb temperature of 26°C (78°F)

The individual machine Specifications pages should be reviewed because some units may require special considerations and have more or less restrictive requirements.

The tape should be stored in a vertical position in a dustproof container and should never come in contact with magnetic material at any time. Magnetic fields of greater than 40 A/cm (50 oersteds) can cause loss of information or introduction of noise.

When shipping magnetic tape, each reel should be sealed in a plastic bag and packed individually in a stiff cardboard shipping box.

For more detailed handling, storage, and operating information about magnetic tape, see:

- *Tape Specifications for IBM One-Half Inch Tape Units at: 556, 800, 1600 and 6250 bpi,* Order No. GA32-0006

### *1.7.2 Disk Pack, Disk Cartridge, Data Cell, and Data Modules*

Storage facilities for these data media should be maintained within the following limits:

Disk Pack, Disk Cartridge, and Data Module Storage-

Short-Term Storage
Temperature: 16 to 32°C (60 to 90°F)
Relative Humidity: 10 to 80 percent

Intermediate-Term Storage
Temperature: 4 to 66°C (40 to 150°F)
Relative Humidity: 10 to 80 percent

Data Cell Storage-
Temperature: 10 to 43°C (50 to 110°F)
Relative Humidity: 8 to 80 percent
Maximum Wet Bulb: 27°C (80°F)

Any such media exposed to conditions outside these limits must be conditioned by placing them in the operating environment for a period equivalent to the exposure. (It is not necessary to condition these media for more than two hours.)

These media have dustproof covers which should be left in place, except when installed in the drive. Storage should be in fire-resistant cabinets away from magnetic fields. Magnetic fields of greater than 40 A/cm (50 oersteds), or 20 A/cm (25 oersteds) for 3348 Data Module Model 70F, can cause loss of information or introduction of noise.

Additional information concerning handling, operation, device dimensions, flammability characteristics, shipping requirements, and housekeeping is in:

- *IBM Disk Pack and Cartridge Handling and Operating Procedures,* GA26-5756
- *IBM Data Cell Handling Guide,* GA26-3633
- *IBM Data Module Handling and Operating Procedures,* GA26-1625.

### *1.7.3 Data Cartridge*

The data cartridge is normally stored within the IBM 3851 Mass Storage Facility. Storage conditions at the 3851 air input, or in supplemental (nonoperating) storage areas, should be maintained within the following limits:

Temperature: 4 to 32°C (40 to 90°F)
Relative Humidity: 8 to 80 percent
Maximum Wet Bulb: 21°C (70°F)

Exposure of the cartridge to elevated temperatures for extensive periods can cause physical deformation of the medium. Exposure of the cartridge to temperatures between 32 and 49°C (90 and 120°F), below 16°C (60°F), or to other conditions outside the above limits necessitates conditioning before use.

This medium exposed to conditions outside these limits must be conditioned by placing it in the operating environment for a period equivalent to the exposure. (It is not necessary to condition this medium for more than 24 hours.)

Your storage facilities should be fire-resistant enclosures located away from magnetic fields. Magnetic fields of greater than 24 A/cm (30 oersteds) can cause loss of data or introduction of noise.

Additional information concerning handling, operation, device dimensions, flammability characteristics, shipping requirements, and housekeeping is in the *Component Description* publications for data cartridge devices, and in:

- *IBM Disk Pack and Cartridge Handling Procedures,* Order No. GA26-5756

## 1.8 Channel Priority

Performance can usually be improved by prioritizing channel attached input/output equipment. Channel priority is beyond the scope of this manual. It is mentioned as a reminder that this important task must be addressed together with other physical planning considerations. Consult your IBM representative.

## 1.9 Cables

IBM supplies the necessary cables for the initial installation as shown on the "Specifications" pages. Cables must be ordered by starting at the unit most remote from the processor. Cables are then specified from unit-to-unit, back to the processor. The proper sequence must be observed to ensure receiving the proper length cables. Because cables are custom-made to the lengths required, they must be measured in accordance with the approved layout. The group number, and channel where required, along with the required cable length must be submitted for each cable in the equipment layout. The required cable length is defined as the center-to-center distance between unit cable entry holes measured along the intended route of the cable as projected on the floor or other mounting surface.

When units are mounted on a raised floor, twice the height of the raised floor should be included in the required cable length. IBM makes allowance for the portion of each cable that is from the floor or mounting surface into the unit. For the best electrical design and computer performance, all cable lengths should be kept as short as possible. External interconnecting cables should be installed under the raised floor. Where a raised floor is not used, cables should be protected from mechanical damage, and installed in a manner that does not present a safety hazard.

Requests for cables that exceed the maximum lengths specified for the equipment must be approved by IBM and may result in extra charges. See section 1.1 "Scheduling the Installation" for timing considerations regarding cable ordering.

When a unit requires external cables which must be installed through walls and/or floors, the ordering and installation arrangements should be made with sufficient lead time to permit the cable facilities to be available to the computer equipment at installation time. This pertains to such units as display stations and communication devices.

### *1.9.1 Cables Related to Initial Installations*

One cable or one cable group within standard specifications in accordance with an approved layout (required to install units being delivered from IBM) is supplied by IBM at no charge, unless non-IBM supplied or a chargeable basis is indicated. Orders for cables which are *not* within the standard specifications must be approved by IBM, and may be subject to an additional charge.

Changes in cable-order specifications requested within three months of the scheduled shipment date (or as the result of any non-IBM-caused deferment) may be subject to charge. If cables (of the type provided at no charge for an initial installation) are changed to accommodate the installation of additional IBM units, these cables are supplied by IBM at no charge. An explanation of why the cables are required must accompany the cable order. All replaced IBM cables must be returned to IBM.

### *1.9.2 Other Cable Requests*

Cables requested for other reasons (for example, additional or replacement cables for rearrangement not caused by installation of units being delivered from IBM, and cables to connect IBM and non-IBM equipment) may be subject to an additional charge.

## 1.10 Customer Engineering Support Facilities

The need for a service area and for on-site test equipment must be negotiated between you and the local IBM Branch Office. These facilities vary according to the size of the complete IBM installation and the number of IBM service personnel required.

IBM will provide a scaled layout to assist in locating the equipment, receptacles, lights, and so forth in the service area. This area should contain a convenience outlet (which should not be powered from the computer power panel).

The *IBM Physical Planning Template: Field Engineering Furniture and Test Equipment,* GX22-6925, is available to assist in planning this space.

## 1.11 Remote Support Facility

The optional Remote Support Facility (RSF), enabled only with customer authorization, provides a means of controlling the 4300 Processors from a remote location for maintenance purposes.

If this facility is to be installed, it is the customer's responsibility to provide a 1200-bit-per-second, binary synchronous coded, manual answer, switched network line and a telephone handset.

In Canada and the United States, a telephone with Data Access Arrangement (DAA) CDT coupler series 1000A (or equivalent), with the appropriate plug and socket, is required. Outside the United States and Canada, the connection of this feature differs for each country.

A 10-meter (33-foot), fixed-length interface cable (7.6 m [25 ft] useable length) is shipped with the processor. For convenience, the RSF telephone handset should be installed adjacent to the display console. See your IBM representative for more information.

## 1.12 Standard Shipping Dimensions and Environmental Specifications

Unless otherwise noted on individual "Specifications" pages:

1. All IBM units can be reduced to at least 750 x 1525 millimeters (29.5 x 60 inches) for shipment.
2. The following shipping and environmental specifications apply:

   Temperature: -40 to 60°C (-40 to 140°F)
   Relative Humidity: 5 to 100 percent (no condensation or rain)
   Wet Bulb Range: 1 to 29°C (33 to 85°F)

## 1.13 Metric Conversions

Values expressed in metric notation use a space to separate hundreds from thousands, thousands from millions, etc., and a period to separate whole numbers from decimal fractions. For example, two thousand one hundred kilograms is expressed as 2 100 kg, and one-half kilogram is 0.5 kg.

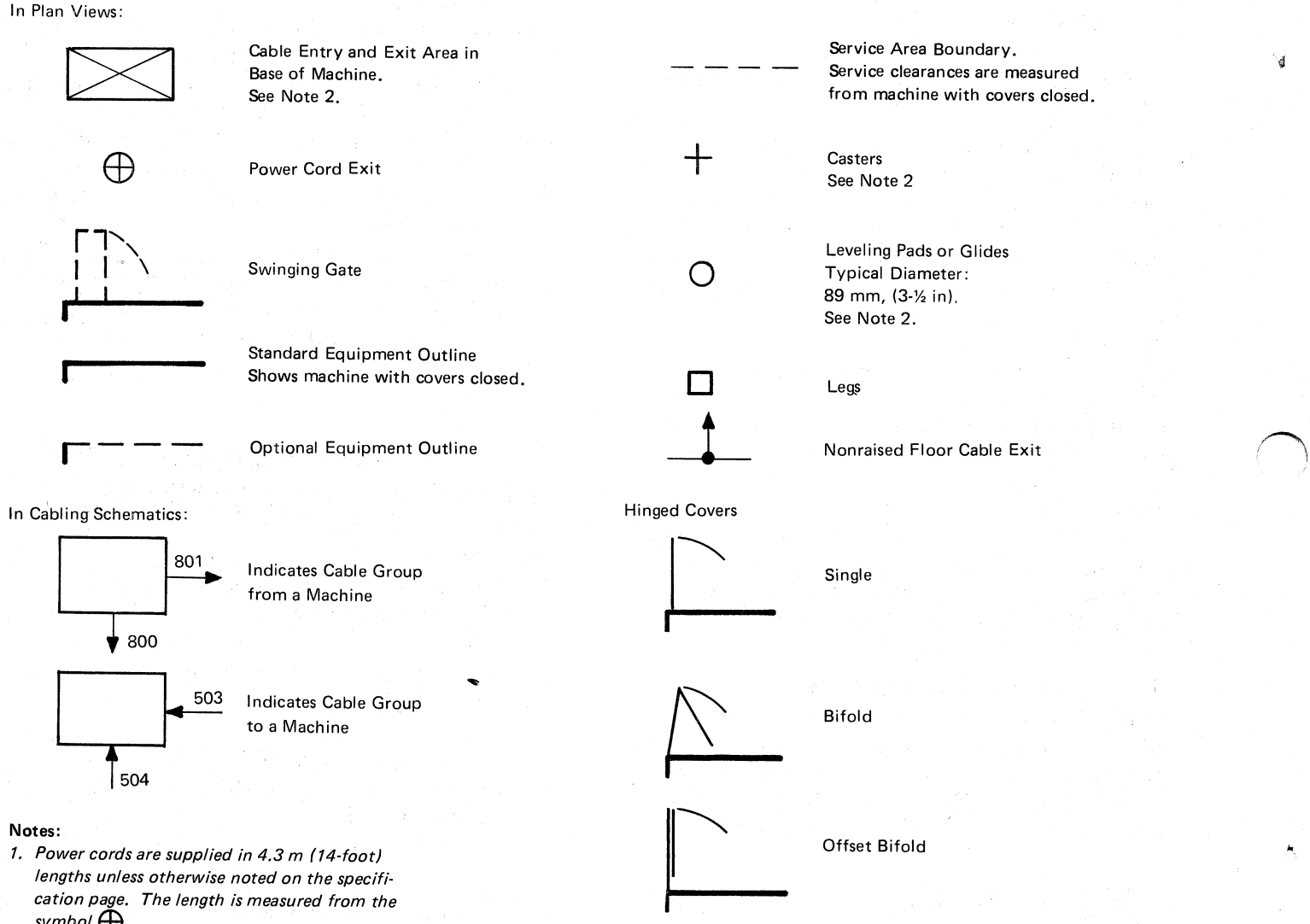
In this manual, English units converted into metric units are rounded to the nearest whole number or to the nearest decimal place given. Exceptions are kilograms (kg), cubic meters per minute ($m^3$/min), kilograms per square meter ($kg/m^2$) pertaining to floor

loading, and meters (m) pertaining to altitude. These are rounded according to the "1/10/50" rule:

1. A number less than 100 is rounded up to the next whole unit; for example, 23.2 becomes 24.
2. A number greater than 100 and less than 1 000 is rounded up to the next ten; for example, 163 becomes 170.
3. A number greater than 1 000 is rounded up to the next 50; that is, 1 218 becomes 1 250.

## 1.14 Symbols used in Plan Views

Figure 1-3 shows the standard symbols used in plan views. Frame numbers are shown circled on plan views and schematics.




**Notes:**

1. *Power cords are supplied in 4.3 m (14-foot) lengths unless otherwise noted on the specification page. The length is measured from the symbol* ⊕.
2. *Unless otherwise noted, locating dimensions are measured from edge of frame, not cover.*

Figure 1-3. Standard Symbols

## 1.15 Abbreviations and Definitions

| | |
|---|---|
| **A** | ampere |
| **ac** | alternating current |
| **A/cm** | amperes per centimeter |
| **ADU** | automatic dialing unit |
| **ambient** | surrounding |
| **ASHRAE** | American Society of Heating, Refrigeration and Air Conditioning Engineers |
| **AWG** | American wire gauge |
| **blk mpxr** | block multiplexer |

**bpi** bits per inch
**bps** bits per second
**BSM** basic storage module
**BTU** British thermal unit
**bus** one or more conductors used for transmitting signals or power

**°C** degree Celsius
**C** coupler
**CA** communications adapter
**CCITT** Consultant Committee of International Telephone & Telegraph (WT)
**CDU** coolant distribution unit
**CE** customer engineer (service representative)
**CER** customer engineering room
**cfm** cubic feet per minute
**chan** channel
**cm** centimeter
**cnsl** console
**coax** coaxial
**cond** conductor
**conn** connector
**cont** continuous
**conv** converter
**CPU** central processing unit (or processor)
**CRT** cathode-ray tube
**C-T-C** connector-to-connector
**ctrl** control
**Cu** copper
**CW** copperweld

**DAA** Data Access Arrangement
**DASF** direct access storage facility
**DAU** data adapter unit
**dc** direct current
**dist** distribution
**dply** display
**DRC** data recording control

**EBCD** extended binary-coded decimal
**EBCDIC** extended binary-coded decimal interchange code
**EIA** Electronic Industry Association (or applicable local or national equivalent)
**ESD** electrostatic discharge

**°F** degrees Fahrenheit
**F** front
**FE** field engineering
**fr** frame
**ft** feet

**gpm** gallons per minute

**H** height
**hp** high pressure
**HP** horsepower
**Hz** hertz

**ICA** integrated communications adapter
**ID** identification
**in** inch
**I/O** input/output
**IPCEA** International Power Cables Engineering Association

**kb** kilobyte
**kbps** kilobytes per second
**kcal/hr** kilocalories per hour
**kg** kilogram
**kg/m$^2$** kilograms per square meter
**kVA** kilovolt ampere
**kW** kilowatt
**kybd** keyboard

**L** left
**LA** line adapter
**lb** pound
**lumens/m$^2$** lumens per square meter
**lux** lumens per square meter

**m** meter
**max** maximum
**MCM** thousand circular mils
**m$^3$/min** cubic meter per minute
**MES** miscellaneous equipment specification
**mfg** manufacturing
**MG** motor-generator
**min** minimum, minute
**mm** millimeter
**modem** modulator/demodulator (a device that modulates and demodulates signals transmitted over communication facilities)
**MP** multiprocessing
**mpxr** multiplexer
**ms** millisecond
**MSC** mass storage control
**MSF** mass storage facility
**MSS** mass storage system
**MTU** magnetic tape unit

**NEC** National Electrical Code
**NEMA** National Electrical Manufacturers' Association (or applicable local or national equivalent)
**NFPA** National Fire Protection Association (or applicable local or national equivalent)
**No.** number
**nom** nominal
**NTT** Nippon Telephone and Telegraph

**OD** outside diameter
**OEM** original equipment manufacturer
**oersted** centimeter-gram-second electromagnetic unit of magnetizing force (A/cm = 1.256 oersteds)

**P&S** Pass & Seymour
**PCDU** power and coolant distribution unit
**PDU** power distribution unit
**pF** picofarad
**pH** hydrogen-ion concentration
**ppm** parts per million
**proc** processing
**psi** pounds per square inch
**psig** pounds per square inch gauge
**PTT** postal telephone and telegraph
**PVC** polyvinyl chloride
**pwr** power

**R** rear
**R&S** Russell & Stoll
**rdr** reader
**rel** relative
**rfi** radio-frequency interference
**RPQ** Request for Price Quotation
**Rt** right

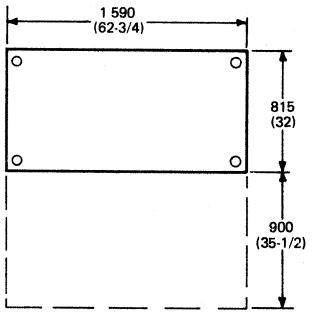
**S** side
**SDA** synchronous data adapter
**sec** second
**seq** sequential
**service clearance** minimum space required to allow working room for the operator and the service representative
**SF** special feature, sales feature
**SP** support processor
**slr** selector
**stg** storage

| | |
|---|---|
| **T** | top |
| **TNL** | Technical Newsletter |
| **UK** | United Kingdom |
| **UL** | Underwriters Laboratory |
| **U.S.A.** | United States of America |
| **V** | volt |
| **VFL** | variable field length |
| **W** | watt |
| **WE** | Western Electric |
| **WT** | IBM World Trade |

# 2.0 Processor Specifications and Cabling Schematics

## CONSOLE TABLE (Optional)

**PLAN VIEW (Metric Scale: 10 mm = 0.5 m)**
English measurements are shown in parentheses.




## SPECIFICATIONS

**Dimensions:**

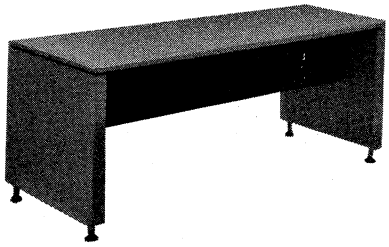
| | Front | Side | Height |
|---|---|---|---|
| mm | 1 590 | 815 | 735 |
| (inches) | (62-3/4) | (32) | (29) |

**Service Clearances:**

| | Front |
|---|---|
| mm | 900 |
| (inches) | (35-1/2) |

**Weight:**

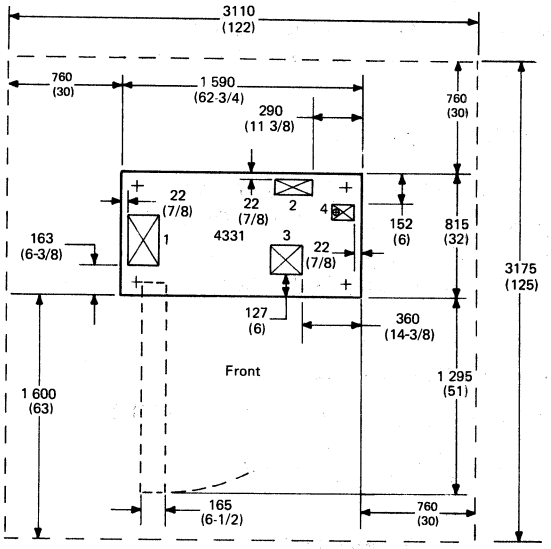
| | |
|---|---|
| kg | 57 |
| (lb) | (125) |



## IBM 4331 PROCESSOR

### PLAN VIEW (Metric Scale: 10 mm = 0.5 m)

English measurements are shown in parentheses.




**Notes:**

*1. A console table is available from IBM as an optional feature.*

*2. Cable entry/exit holes are measured from edge of frame, not covers.*

| Cable Entry/ Exit Number | Floor Cutout Dimensions | |
|---|---|---|
| | Millimeters | Inches |
| 1 | 200 x 330 | 8 x 13 |
| 2 | 100 x 250 | 4 x 10 |
| 3 | 180 x 200 | 7 x 8 |
| 4 | 100 x 150 | 4 x 6 |

## IBM 4331 PROCESSOR SPECIFICATIONS

**Dimensions: ***

| | Front | Side | Height |
|---|---|---|---|
| mm | 1 590 | 815 | 1 000 |
| (inches) | (62-3/4) | (32) | (39-1/2) |

**Service Clearances:**

| | Front | Rear | Right | Left |
|---|---|---|---|---|
| mm | 1 600 | 760 | 760 | 760 |
| (inches) | (63) | 30 | 30 | 30 |

**Weight:**

| | |
|---|---|
| kg | 400 |
| (lb) | (890) |

**Heat Output:**

| | |
|---|---|
| Watts | 1 650 |
| (BTU/hr) | (5,630) |

**Airflow:**

| | |
|---|---|
| $m^3$/min | 34 downdraft |
| (cfm) | (1200) |

**Power Requirements:**

| | |
|---|---|
| kVA | 2.2 |
| Phases | 1 |

Voltages

| | Nominal | Minimum | Maximum |
|---|---|---|---|
| 50 Hz | 200 | 180 | 220 |
| | 220 | 193 | 238 |
| | 230 | 202 | 249 |
| | 240 | 210 | 259 |
| 60 Hz | 200 | 180 | 220 |
| | 208 | 180 | 220 |
| | 220 | 193 | 238 |
| | 240 | 208 | 254 |

**Power Cord:**

Length 4.3 m (14 ft); optionally, 1.8 m (6 ft)

**U.S.A. and Canada**

| | |
|---|---|
| Plug | R&S, 3720 (Provided by IBM) |
| Receptacle | R&S, 3743 (Provided by Customer) |
| Connector | R&S, 3912 (Provided by Customer) |

**World Trade Countries (Except Canada)**

The machine is shipped without plug. This is customer-provided according to local codes and national requirements.

Power Cord Style A6

(See Appendix A in *IBM Input/Output Equipment Installation Manual-Physical Planning for System/360, System/370, and 4300 Processors,* GC22-7064.)

**Environment, Operating:**

| | |
|---|---|
| Temperature | 10 – 32°C (50 – 90°F) |
| Rel Humidity | 8% – 80% |
| Max Wet Bulb | 23°C (73°F) |

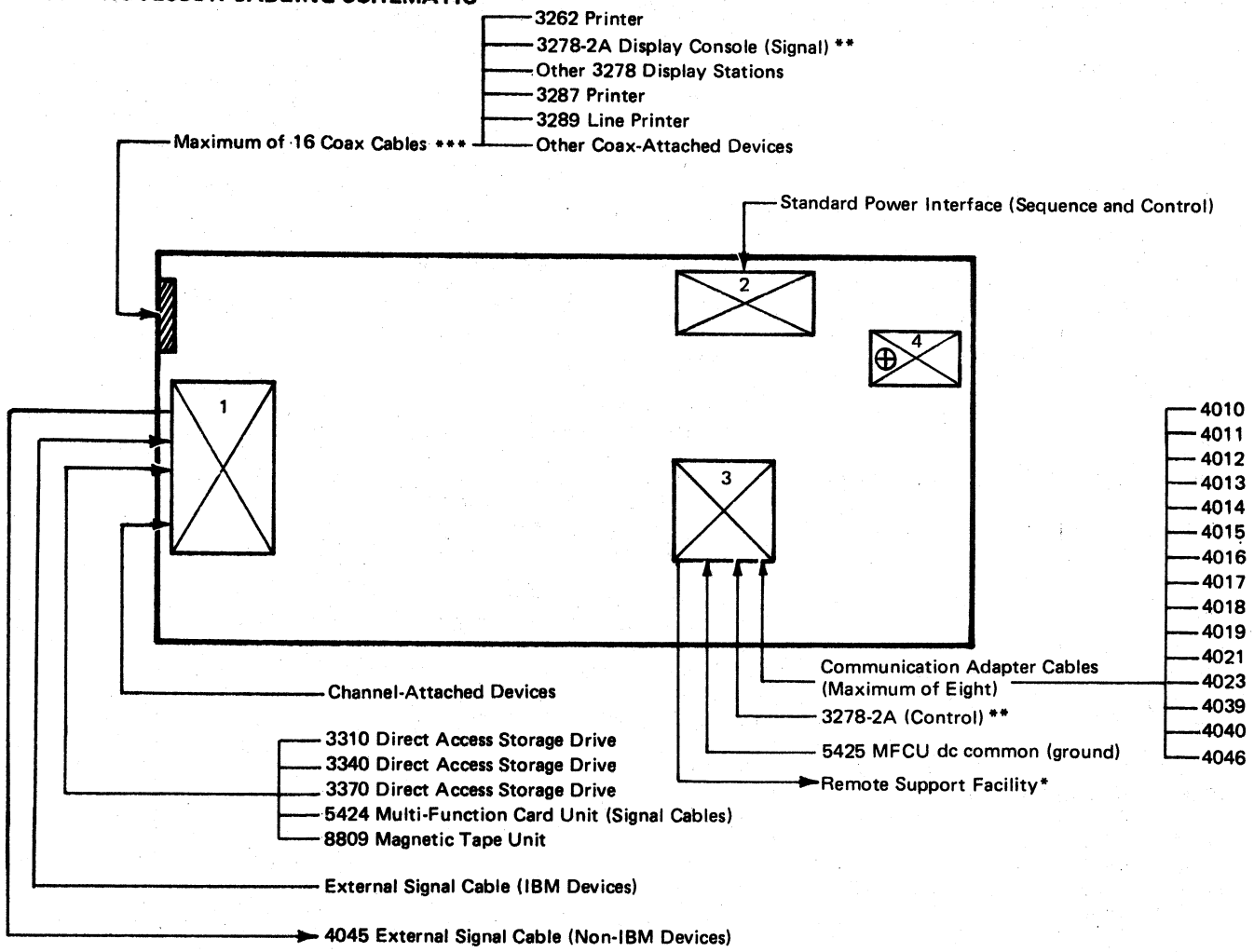
**Environment, Nonoperating:**

| | |
|---|---|
| Temperature | 10 – 43°C (50 – 110°F) |
| Rel Humidity | 8% – 80% |
| Max Wet Bulb | 27°C (80°F) |

* Minimum shipping dimensions without covers: (Shipping without covers must be specified)

| Front | Side | Height |
|---|---|---|
| 1 525 (60) | 750 (29-1/2) | 975 (38-1/2) |

## IBM 4331 PROCESSOR CABLING SCHEMATIC




* A 10 m (33 ft), fixed length interface cable (7.6 m [25 ft] usable length) is shipped with the processor.

** One 3278-2A Console Display. Fixed cable length 7.6 m (25 ft) between station and processor; ordered separately from 3278-2A.

*** Route cables to this customer-access panel through cutout No. 1. Maximum length 1 500 m (4921 ft) except as noted above.

## *Cable List*

Order one cable for the attachment of each external device:

| *Group No.* | *Specify Feature Code** | *Number of Cables* | *To* | *From* | *Device Connector* | *Maximum Length m(ft)* | *Notes* |
|---|---|---|---|---|---|---|---|
| 4010 | 1020 without 2835 | 1 | Processor-CA | Autocall Unit | 25-pin male | 10 (33) | 6 |
| 4011 | 3701 without 2835 | 1 | Processor-CA | External modem (clocked or nonclocked), except for NTT modem in Japan | 25-pin male | 10 (33) | 6,7 |
| 4012 | 4801 | 3 | Processor-CA | Local Attachment (DTE without business machines clock) | 25-pin male | 10 (33) | 5 |
| 4013 | 5650 | 1 | Processor-CA | Dataphone** Digital Service | 15-pin male | 10 (33) | 2,9 |
| 4014 | 4720 | 1 | Processor-CA | External V.35 Modem | 34-pin male | 10 (33) | 10 |
| 4015 | 4720 | | Processor-CA | Adapter, external V.35 Modem, for countries with pin size 20 at 48k modems. Order in addition to Group 4014. | 16-pin male | .2 (.7) | 10 |
| 4016 | 4782 | 1 | Processor-CA | CBS Arrangement, U.S.A. switched line Auto Answering, with integrated modem | 7 spade lugs | 10 (33) | 2 |
| 4017 | 4787 | 1 | Processor-CA | U.S.A. nonswitched line plus CDT arrangement, U.S.A. switched line Manual Answer, with integrated modem | two 4-prong plugs | 10 (33) | 2 |
| 4018 | 4788 | 1 | Processor-CA | U.S.A. nonswitched line plus CBS arrangement, U.S.A. switched line Auto Answering, with integrated modem | 4-prong plug and 7 spade lugs | 10 (33) | 2 |
| 4019 | 4781 | 1 | Processor-CA | U.S.A./Japan nonswitched line, with integrated modem | 4-prong plug | 10 (33) | 1 |
| 4021 | 2831 | 1 | Processor-CA | WT switched line, with integrated modem | 4 spade lugs | 10 (33) | 3,8 |
| 4023 | 2832 | 1 | Processor-CA | WT nonswitched line, with integrated modem | 4 spade lugs | 10 (33) | 4 |
| 4039 | 3701 with 2835 | 2 | Processor-CA | U.K. Post Office Modem | 25-pin male | | |
| 4040 | 1020 with 2835 | 2 | Processor-CA | U.K. Autocall Unit | 16-pin male | 10 (33) | |
| 4045 | 3898 | 1 | External Signal (for non-IBM Equipment) | Processor | 23-pin Burndy | 66 (217) | |
| 4046 | 3701 without 2835 | 1 | Processor | External modem interface (clocked or nonclocked), NTT Modem in Japan | 25-pin male | 10 (33) | 7 |

**Notes:**

* *Order one cable group for each Specify Feature code.*

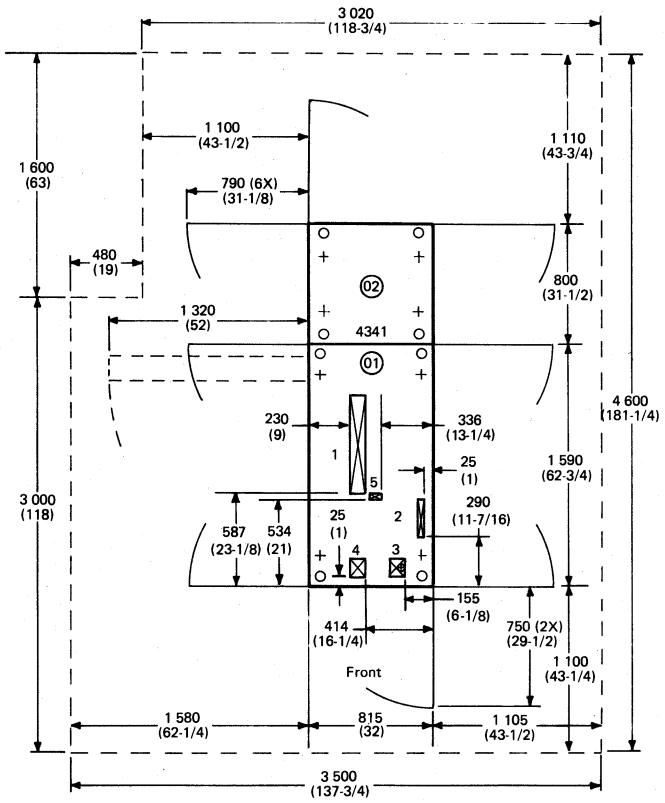
** *Dataphone is a registered trademark of the American Telephone and Telegraph Corporation.*

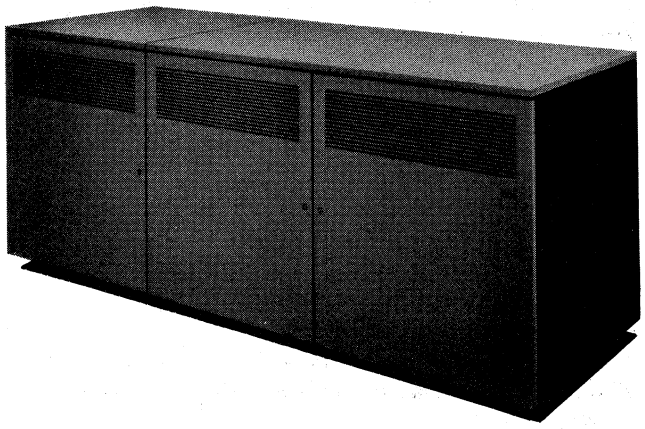
1. *U.S.A., Canada and Japan.*
2. *U.S.A. and Canada only.*
3. *Not U.S.A. or Canada.*
4. *Not U.S.A., Canada or Japan.*
5. *Cables 4012B and 4012C are interconnected by a customer-provided cable: twisted pair 0.325 $mm^2$ (AWG No. 22), 50 pF/m (16.4 pF/ft) maximum. Maximum resistance: 112 ohms/km (180 ohms/mile); maximum attenuation: 2.2 dB/km (3.5 dB/mile). Cable should be shielded if located near noise-generating devices or cables.*
6. *United Kingdom postal equipment requirements met by cable group 4039 or 4040.*
7. *For Japanese NTT modems, order group 4046.*
8. *Maximum of three lines.*
9. *Maximum of eight lines.*
10. *Maximum of one line.*

## IBM 4341 PROCESSOR

**PLAN VIEW (Metric Scale: 10 mm = 0.5 m)**

English measurements are shown in parentheses.



| Cable Entry/ Exit Number | Dimensions | |
|---|---|---|
| | Millimeters | Inches |
| 1 | 110 x 665 | 4 x 26 |
| 2 | 40 x 270 | 1-½ x 10-½ |
| 3 | 100 x 130 | 4 x 5 |
| 4 | 100 x 130 | 4 x 5 |
| 5 | 85 x 55 | 3-½ x 2 |

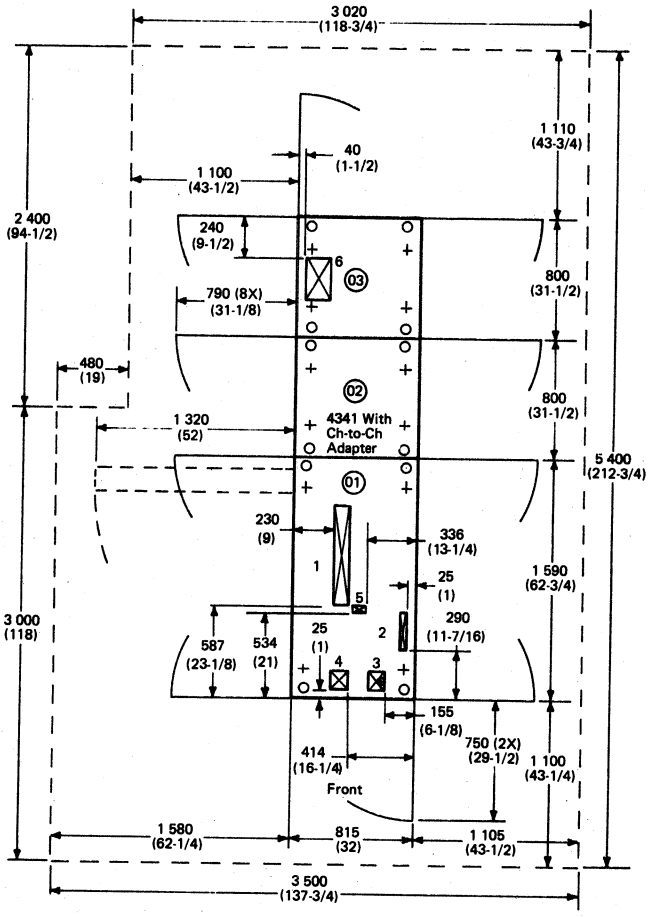
**Notes:**

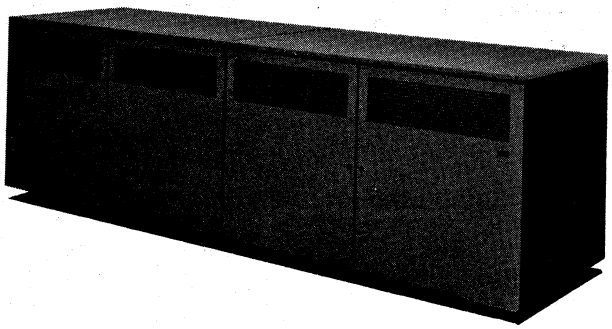
1. *A console cable is available from IBM as an optional feature.*
2. *Cable entry/exit holes are measured from edge of frame, not covers.*

## IBM 4341 PROCESSOR WITH CHANNEL-TO-CHANNEL ADAPTER

**PLAN VIEW (Metric Scale: 10 mm = 0.5 m)**

English measurements are shown in parentheses.



| Cable Entry/ Exit Number | Dimensions | |
|---|---|---|
| | Millimeters | Inches |
| 1 | 110 x 665 | 4 x 26 |
| 2 | 40 x 270 | 1-½ x 10-½ |
| 3 | 100 x 130 | 4 x 5 |
| 4 | 100 x 130 | 4 x 5 |
| 5 | 85 x 55 | 3-½ x 2 |
| 6 | 155 x 280 | 6 x 11 |

**Note:**

1. *A console table is available from IBM as an optional feature.*
2. *Cable entry/exit holes are measured from edge of frame, not covers.*

## SPECIFICATIONS

**Dimensions* (Basic Processor):**

| | Front | Side | Height |
|---|---|---|---|
| mm | 815 | 2 390 | 1 000 |
| (inches) | (32) | (94-1/4) | (39-1/2) |

**Service Clearance (Basic Processor):**

| | Front | Rear | Right | Left |
|---|---|---|---|---|
| mm | 1 100 | 1 110 | 1 105 | 1 580 |
| (inches) | (43-1/4) | (43-3/4) | (43-1/2) | (62-1/4) |

**Dimensions* (with Channel-to-Channel Feature):**

| | Front | Side | Height |
|---|---|---|---|
| mm | 815 | 3 190 | 1 000 |
| (inches) | (32) | (125-3/4) | (39-1/2) |

**Service Clearance (with Channel-to-Channel Feature):**

| | Front | Rear | Right | Left |
|---|---|---|---|---|
| mm | 1 100 | 1 110 | 1 105 | 1 580 |
| (inches) | (43-1/4) | (43-3/4) | (43-1/2) | (62-1/4) |

**Weight:**

| | | | |
|---|---|---|---|
| Frame 01 | 515 kg | (1140 lb) | |
| Frame 02 | 305 kg | ( 670 lb) | |
| Frame 03 | 185 kg | ( 400 lb) | Channel-to-Channel Feature |
| Total | 1005 kg | (2210 lb) | |

**Heat Output:**

4 050 W (13,800 BTU/hr) maximum

4 400 W (15,000 BTU/hr) with Channel-to-Channel Feature

**Airflow:**

| | |
|---|---|
| $m^3$/min | 37 downdraft |
| (cfm) | (1300) |

*Minimum shipping dimensions without covers:
(Shipping without covers must be specified)

| | Front | Side | Height |
|---|---|---|---|
| Frame 01 | 750 (29-1/2) | 1 525 (60) | 975 (38-1/2) |
| Frame 02 or 03 | 750 (29-1/2) | 760 (30) | 975 (38-1/2) |

**Power Requirements:**

| | | | |
|---|---|---|---|
| kVA | 50 Hz | 5.6 | (6.0 with Channel-to-Channel Adapter) |
| | 60 Hz | 4.4 | (4.8 with Channel-to-Channel Adapter) |

Phases 3

Voltages

| | Nominal | Minimum | Maximum |
|---|---|---|---|
| 50 Hz | 200 | 180 | 220 |
| | 220 | 193 | 238 |
| | 380 | 333 | 410 |
| | 400 | 350 | 432 |
| | 415 | 363 | 448 |
| 60 Hz | 200 | 180 | 220 |
| | 208 | 180 | 220 |
| | 220 | 193 | 238 |
| | 240 | 208 | 254 |

Power monitoring circuits require that power lines be contained in properly grounded conduit or shielded cables.

**Power Cord:**

Length 4.3 m (14 ft); optionally, 1.8 m (6 ft)

**U.S.A. and Canada**

| | |
|---|---|
| Plug | R&S, FS 3760 (Provided by IBM) |
| Receptacle | R&S, FS 3754 (Provided by Customer) |
| Connector | R&S, FS 3934 (Provided by Customer) |

**World Trade Countries (Except Canada)**

The machine is shipped without plug. This is customer-provided according to local codes and national requirements.

Power Cord Style is D1.

(See Appendix A in *IBM Input/Output Equipment Installation Manual-Physical Planning for System/360, System/370, and 4300 Processors,* GC22-7064.)

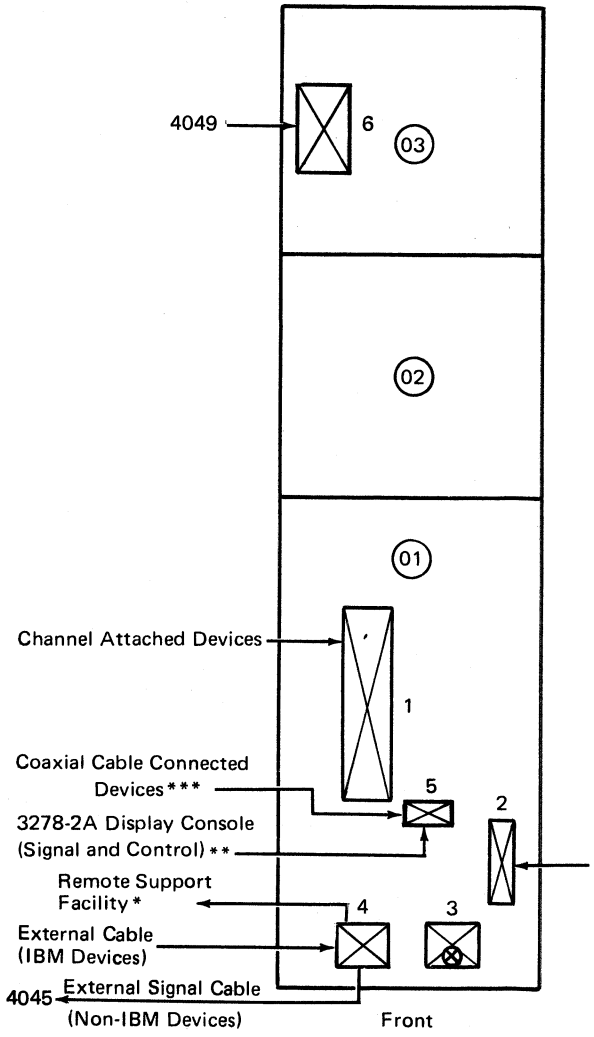
**Environment, Operating:**

| | |
|---|---|
| Temperature | 10-32°C (50-90°F) |
| Rel Humidity | 8-80% |
| Max Wet Bulb | 23°C (73°F) |

**Environment, Nonoperating:**

| | |
|---|---|
| Temperature | 10-43°C (50-110°F) |
| Rel Humidity | 8-80% |
| Max Wet Bulb | 27°C (80°F) |

## IBM 4341 PROCESSOR CABLING SCHEMATIC




* A 10-m (33-ft), fixed length interface cable (7.6 m [25 ft] usable length) is shipped with the processor.

** One 3278-2A Console Display. Fixed cable length 7.6 m (25 ft) between station and processor. Ordered and shipped separately from 3278-2A.

*** Any combination of three units maximum: 3287 Printers and/or 3278-2A Display stations. Maximum length 1 500 m (4921 ft).

| Group No. | No. of Cables | From | To | Cable Entry | Maximum Length | Notes |
|---|---|---|---|---|---|---|
| 4049 | 2 | Channel-to-Channel Adapter | Control Unit or Channel | 4 | 30.5 m (100 ft) | 1, 2 |
| 4045 | 1 | Processor | External Signal (for non-IBM equipment) | 4 | 66 m (217 ft) | |

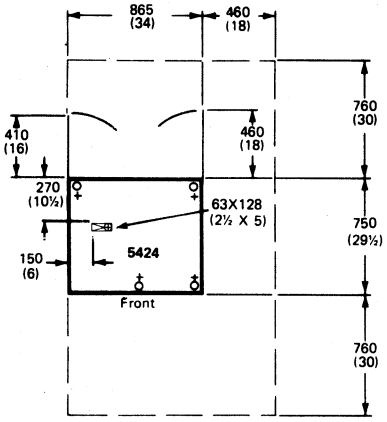
**Notes:**

1. *Available as feature.*
2. *Maximum cumulative channel cable length is 61 m (200 ft), unless modified by general control-to-channel cabling schematic, available to attach up to six control units. This restriction applies to both connected channels.*

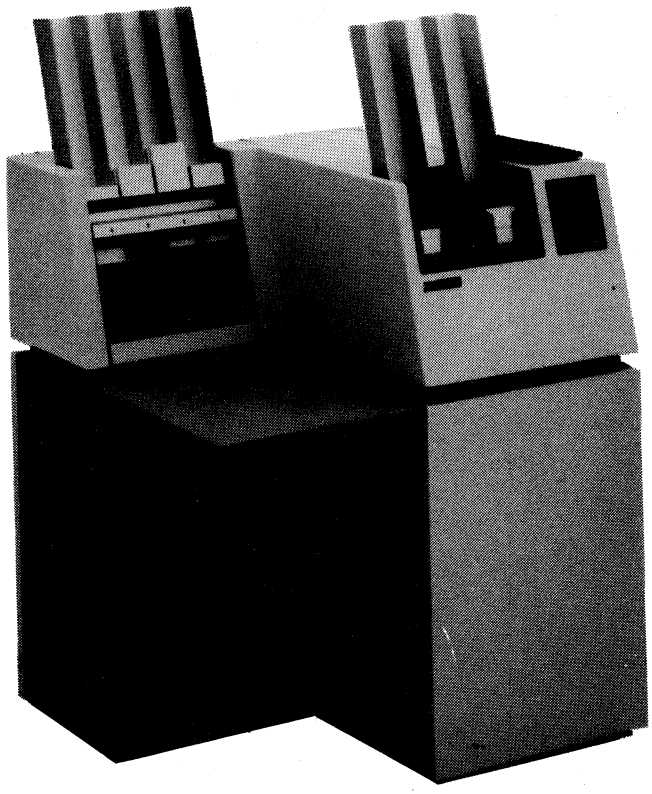
## IBM 5424 MULTI-FUNCTION CARD UNIT MODELS A1, A2, K1, K2, AND K3 (WITH SF 6510)

**PLAN VIEW (Metric Scale: 10 mm = 0.5 m)**

English measurements are shown in parentheses.




**Note:** *Two 10-foot (3-meter) signal cables and a 15.6-foot (4.76-meter) dc common (ground) cable are supplied.*



### SPECIFICATIONS

**Dimensions:**

| | Front | Side | Height |
|---|---|---|---|
| mm | 865 | 750 | 1400 |
| (inches) | (34) | (29½) | (55) |

**Service Clearances:**

| | Front | Rear | Right | Left |
|---|---|---|---|---|
| mm | 760 | 760 | 460 | 0 |
| (inches) | (30) | (30) | (18) | (0) |

**Weight:**

| | |
|---|---|
| kg | 260 |
| (lb) | (570) |

**Heat Output:**

| | |
|---|---|
| Watts | 880 |
| (Btu/hr) | (3000) |

**Airflow** Convection

**Power Requirements:**

| | | | |
|---|---|---|---|
| kVA | 1.3 | | |
| Phases | 1 | | |
| Voltages | | | |
| 50 Hz | 200 | 220 | 235 |
| 60 Hz | 200* | 208 | 230 |

*not available in U.S.A.

| | |
|---|---|
| Plug | R&S, FS3720 (Provided by IBM) |
| Receptacle | R&S, FS3743 (Provided by Customer) |
| Connector | R&S, FS3913 (Provided by Customer) |
| Power Cord Style | A6 |

**Operating Environment:**

| | |
|---|---|
| Temperature | 16-38°C (50-110°F) |
| Rel Humidity | 8-80% |
| Max Wet Bulb | 23°C (73°C) |

**Nonoperating Environment:**

| | |
|---|---|
| Temperature | 10-43°C (50-110°C) |
| Rel Humidity | 8-80% |
| Max Wet Bulb | 27°C (80°C) |

# Appendix C: Template List

| *Unit* | *Order Number* |
|---|---|
| 4331 | GX24-3728 (Metric and English Units) |
| 4341 | GX24-3729 (Metric and English Units) |
| 5424 | GX21-9294 (Metric Units) |
| 5424 | GX21-9386 (English Units) |

For *channel-attached* I/O equipment template order numbers, refer to *IBM Input/Output Equipment Installation Manual–Physical Planning for System/360, System/370, and 4300 Processors,* GC22-7064.

# Appendix G: Installation Planning Schedule and Checklist

This planning aid lists installation tasks and responsibilities in order of occurrence. If new site construction or major renovation is required, a considerably longer lead time and planning cycle will probably be required. Because data processing equipment requirements differ, use the following suggested schedule and list of tasks as a guide. It may be copied as required.

If any scheduled checkpoint is not met, *notify your IBM representative.*

| *Time Frame and Task or Consideration* | *No Action Required* | *Scheduled Completion Date* | *Actual Completion Date* |
|---|---|---|---|
| **Eight Months Before Delivery** | | | |
| 1. Verify IBM equipment to be installed (see Section 1.1). | _____ | _____ | _____ |
| 2. Verify delivery and installation schedule for common-carrier telecommunication equipment. | _____ | _____ | _____ |
| 3. Determine prospective location. Prepare a list of components, storage cabinets, work tables, chairs, desks, and other furnishings to be used. In planning space requirements, have you considered: | | | |
| a. Future expansion? | _____ | _____ | _____ |
| b. Floor loading? | _____ | _____ | _____ |
| c. Fire protection? | _____ | _____ | _____ |
| d. Safety of personnel and records? | _____ | _____ | _____ |
| e. Security? | _____ | _____ | _____ |
| f. Acoustics? | _____ | _____ | _____ |
| g. Vibration? | _____ | _____ | _____ |
| h. Potential for electromagnetic interference? | _____ | _____ | _____ |
| i. Possibility of atmospheric contamination? | _____ | _____ | _____ |
| j. Adequate access route for movement of equipment from receiving area to computer room (ramps, doors, corridors, elevators, etc.)? | _____ | _____ | _____ |
| k. Rigging required? | _____ | _____ | _____ |
| 4. Make a scaled layout of the room and equipment (1.2.2). | _____ | _____ | _____ |
| a. Service clearances and service access observed? | _____ | _____ | _____ |
| b. Operator convenience and storage of forms and other supplies considered? | _____ | _____ | _____ |
| c. Cable length limitations observed? | _____ | _____ | _____ |
| d. Place orders for any non-IBM supplied cables. | _____ | _____ | _____ |

| *Time Frame and Task or Consideration* | *No Action Required* | *Scheduled Completion Date* | *Actual Completion Date* |
|---|---|---|---|
| e. Channel priorities of devices considered? (IBM reviews this item with you at cable ordering time.) | | | |
| f. Layout of units (including furniture, etc.) made by using scaled templates? | | | |
| 5. Determine floor loading (1.2.3). | | | |
| 6. Use of raised floors (1.2.3.2). | | | |
| a. Adequate height for all equipment cables, plumbing, etc.? | | | |
| b. Raised floor surfaces free of exposed metal? | | | |
| c. Panel covering meets antistatic and resistance requirements? | | | |
| d. Extra pedestals required? | | | |
| e. Conductive path provided from metal raised floor (if used) to ground? | | | |
| 7. Determine if furniture antistatic characteristics meet resistance requirements (1.2.4). | | | |
| 8. Consider acoustic treatment of room (1.2.5). | | | |
| 9. Determine lighting requirements (1.2.7). | | | |
| a. General lighting adequate? | | | |
| b. Emergency lighting provided? | | | |
| 10. Determine air conditioning requirements (1.3). | | | |
| a. Size the air conditioning load by summing requirements for all heat loads (including personnel). | | | |
| b. Present facilities adequate? | | | |
| c. Humidity control required? | | | |
| d. Temperature and humidity recording devices provided? | | | |
| e. Air conditioning controlled by computer room power-off disconnect? | | | |
| 11. Determine power requirements (1.4). | | | |
| a. Voltage limits meet IBM equipment specifications? | | | |
| b. Total load computed by using power profile information provided by IBM? | | | |
| c. Arrangements made for any additional services required? | | | |
| d. Computer power panels connected to feeders that serve no other loads? | | | |

| *Time Frame and Task or Consideration* | *No Action Required* | *Scheduled Completion Date* | *Actual Completion Date* |
|---|---|---|---|
| e. Computer power panels easily accessible, preferably in computer room? | | | |
| f. Circuit breakers labeled to identify which branch circuits they control? | | | |
| g. Computer power panel grounded to service entrance ground or suitable building ground? | | | |
| h. Branch circuit grounding wire insulated? | | | |
| i. Each branch circuit receptacle checked for proper phase rotation? | | | |
| j. Required room emergency power-off controls located at operator area as well as at main computer-room exit doors? | | | |
| k. Room Emergency Power Off provided for any equipment located remote from the main computer room? | | | |
| l. Lightning protection requirements considered? | | | |
| m. General purpose convenience outlets installed? | | | |
| n. Standby (backup) power system planned? Type? _____ | | | |
| 12. If previous equipment must be retained and operated while new units are being installed: | | | |
| a. Additional power required? | | | |
| b. Temporary power circuits required? | | | |
| c. Additional temporary air conditioning required? | | | |
| d. Temporary layout planned for the transition period? | | | |
| e. External cables available? | | | |
| 13. Determine safety requirements (1.6) | | | |
| a. Computer in a fire-resistant area or room? | | | |
| b. Computer area isolated from hazardous processes and materials? | | | |
| c. Fire protection equipment available? | | | |
| d. Emergency plan for personnel and records evacuation established? | | | |
| 14. Is space planned for storage of data recording media within specifications (1.7)? | | | |
| 15. Verify all contractor and vendor related activity schedules to ensure that facilities are ready when equipment is delivered. | | | |

| *Time Frame and Task or Consideration* | *No Action Required* | *Scheduled Completion Date* | *Actual Completion Date* |
|---|---|---|---|
| **Six Months Before Delivery:** | | | |
| Verify the following schedule: | | | |
| 1. Installation of power. | _____ | _____ | _____ |
| 2. Installation of air conditioning. | _____ | _____ | _____ |
| 3. Delivery of equipment. | _____ | _____ | _____ |
| 4. Installation of equipment. | _____ | _____ | _____ |
| **Four Months Before Delivery:** | | | |
| 1. Review the **Eight-Month** check list. | _____ | _____ | _____ |
| 2. Review equipment to be installed and finalize layout plan. | _____ | _____ | _____ |
| 3. Submit the layout plan to IBM so that IBM-supplied cables can be ordered. | _____ | _____ | _____ |
| 4. Verify plans for installing cables through permanent walls or floors. | _____ | _____ | _____ |
| 5. Confirm all contractor and vendor schedules to ensure that schedules are compatible with equipment delivery. | _____ | _____ | _____ |
| 6. Confirm that all telephone or PTT line installation schedules for Remote Support Facility and telecommunication equipment are compatible with equipment delivery schedules. | _____ | _____ | _____ |

| *Time Frame and Task or Consideration* | *No Action Required* | *Scheduled Completion Date* | *Actual Completion Date* |
|---|---|---|---|
| **Two Weeks Before Delivery:** | | | |
| 1. Review the **Four-Month** checklist. | _____ | _____ | _____ |
| 2. Verify completion of all contractor and vendor activity. | _____ | _____ | _____ |
| 3. IBM-supplied cables should arrive. | _____ | _____ | _____ |
| 4. Accept delivery of IBM test equipment and furniture. | _____ | _____ | _____ |
| **One Week Before Delivery:** | | | |
| 1. Review the **Two-Week** checklist. | _____ | _____ | _____ |
| 2. Air conditioning system operational? | _____ | _____ | _____ |
| 3. Arrangements made for balancing air conditioning system to computer room load immediately after equipment installation? | _____ | _____ | _____ |
| 4. Power facilities installed? | _____ | _____ | _____ |
| 5. Branch circuits tested for proper phase rotation? | _____ | _____ | _____ |
| 6. Physical facilities (plastering, painting, decorating, lighting, ramps, floors, etc.) completed? | _____ | _____ | _____ |
| 7. Communication facilities (voice and data lines, data sets, etc.) installed and tested? | _____ | _____ | _____ |
| 8. Remote Support Facility line and telephone handset installed and tested? | _____ | _____ | _____ |
| 9. Cable holes cut in floor panels as shown on final layout? | _____ | _____ | _____ |
| 10. Arrangements made for moving equipment from receiving area to final location? | _____ | _____ | _____ |

# Index

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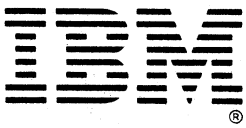

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Data Processing Division
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360 Hamilton Avenue, White Plains, N. Y., U. S. A. 10601

IBM 4300 Processors
Installation Manual–Physical Planning
Order No. GA24-3667-1

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|---|---|---|---|
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| Programming | ☐ | Supervising | ☐ |
| Maintaining | ☐ | Other | ☐ |

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