B 1700

PLANNING & INSTALLATION

Burroughs

FIELD ENGINEERING

PLANNING & INSTALLATION MANUAL

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NOTE

Information for the Sections not included in this manual will be supplied when available.

GENERAL

The customer assumes the responsibility for providing suitable space and facilities for the Burroughs System and deciding upon an appropriate location for the computer. Such installation facilities may exist in the offices of some customers; in others, minor or major changes to existing space will provide a suitable location. In still other instances, the customer may desire a complete new building. The operation should follow a planned schedule so that the computer room will be ready when the system is delivered.

The B 1700 Planning and Installation Manual provides the information necessary for proper installation. The customer/consultant should then hire a general contractor to insure that the computer room meets the requirements of all standard and local codes before the computer is delivered.

The following paragraphs list some of the most important factors to be considered when planning for a B 1712/B 1714 or B 1726 site.

SPACE AND LAYOUT REQUIREMENTS

Space and layout requirements differ for each system and depend on the intended applications of the customers as well as the physical area available.

The floor area required for the system is determined by the specific components to be installed; length-to-width ratio of the room, location of columns, provision for future expansion, etc. To determine the exact area required for a specific group of components, a machine layout should be made using the measurements of the room under consideration.

Space should be provided for the daily storage of tape, tape cassettes, cards, printed forms, etc., within the computer room. All other combustible materials, such as permanent master documents, punched card records, disk, cartridges, magnetic tape, etc., should be stored in properly designated and protected storage areas. Consideration should be given in locating storage areas to minimize both the amount of space required and the travel time between areas.

Space must also be planned for printer forms, stands, storage cabinets, card and record files, work tables, desks, communication facilities, etc.

Space access route to be used to move the system units from the unloading area to the EDP should be checked and, a determination made concerning which building modifications, if any, will be required to admit the units. A check should also be made to determine if the units can be delivered into the EDP room without possible conflicts with movers' unions.

LAYOUT OF MACHINE COMPONENTS

The computer room equipment arrangement is basically dependent on the following factors:

1. A typical configuration for a B 1700 is shown in Figure I-1. For different layouts, because of additional peripherals, customer preference, etc., use steps 2, 3, and 4 for guidance.

2. Before making a layout, serious thought should be given to working clearances, both in terms of operations and maintenance. Generally, peripheral equipment such as the card reader, line printer, magnetic tape units, and card punch are located as near to the console printer as practicable. It is highly desirable to maintain a direct path and direct line of sight from the console printer to the above listed peripheral equipment. It is also highly desirable to locate and arrange the above listed peripherals near the EDP room entrance door in order to permit computer operators to obtain and remove punched cards, printer paper, tape reels, etc., from the EDP room.

3. Service clearances are required to permit maintenance personnel to perform service functions and remove components from the equipment cabinets, if necessary. Clearances are also required to permit free air to circulate around equipment. Clearances for equipment are shown in Chart I-1.

4. Signal cable allowances internal to peripheral, central cabinet or the controlling unit must be considered when the computer room is arranged. Refer to Chart I-2.

FLOORING

The standard B 1712/B 1714 system configuration does not require external cable runs. For different layouts, B 1726 or when additional peripherals are added, an elevated floor is recommended.

These floors permit routing, protection, and concealment of the system cabling and ease of equipment arrangement. Elevated floors also provide an excellent method of routing conditioned air close to the equipment units; in addition, they permit the addition and relocation of air registers when equipment is added or relocated within the computer room. The elevated floor should be free access type.

FLOOR CONSTRUCTION

Elevated floor should be capable of withstanding a uniform live load capability of not less than 250 pounds per square foot and a concentrated load of 1,000 pounds per square inch. Elevated floors and the surfaces that support them should have sufficient rating to accommodate the equipment units listed in Chart I-1. Capability of safely supporting additional units due to potential future system growth should be considered.

The elevated floor should be constructed of noncombustible members such as steel or aluminum, except the floor panels which should be covered as described under the heading "FLOOR FINISH." The floor panels should not be larger than 24 inches by 24 inches. If a stringer grid member is used between the pedestals, it is recommended that the stringer grid member be of the removable type. Examples of elevated floor construction are shown in Figure I-2.

FLOOR HEIGHT

The distance between the surface of the structural floor and the bottom surface of new elevated floor stringer or panels should be a minimum of 12 inches when used as an air-conditioning plenum, and a minimum of 8 inches when only conduits and signal cables are installed in the space beneath the floor.

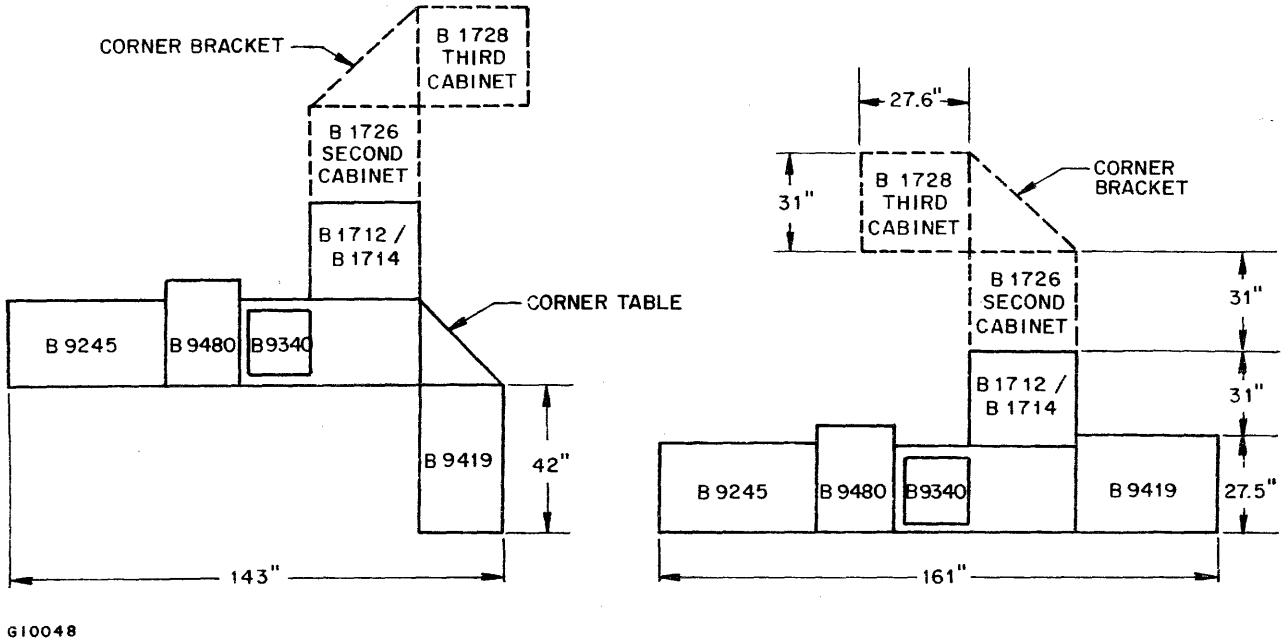


Figure I-1. Typical B 1714 System Clearance

FLOOR OPENINGS

Openings, quantity, and sizes should be indicated to the customer when planning the EDP room. The location and size of these openings relative to the surfaces of the cabinets and equipment units can vary, but recommended sizes are shown in Figure I-3 and the data sheets contained in Section II. The floor opening edges must be protected with non-conductive trim, flush with the floor opening and should have all metal screw heads counter sunk to prevent them from contracting cabinet surfaces.

Air registers should be adjustable and flush with the floor panel surface. They should be constructed of non-conductive material with no screws exposed. Contractors will cut end holes in 24-inch by 24-inch tile for cable entrance. Ordinarily, the only end holes permissible are in elevated floors that have stringer supports.

REMOVAL OF FLOOR PANELS

The floor panels of the elevated floor system should be readily removable to allow installation of the system cabling. The floor panels between the processor cabinet and any peripheral will need to be removed to allow installation of the cables.

FLOOR INSTALLATION

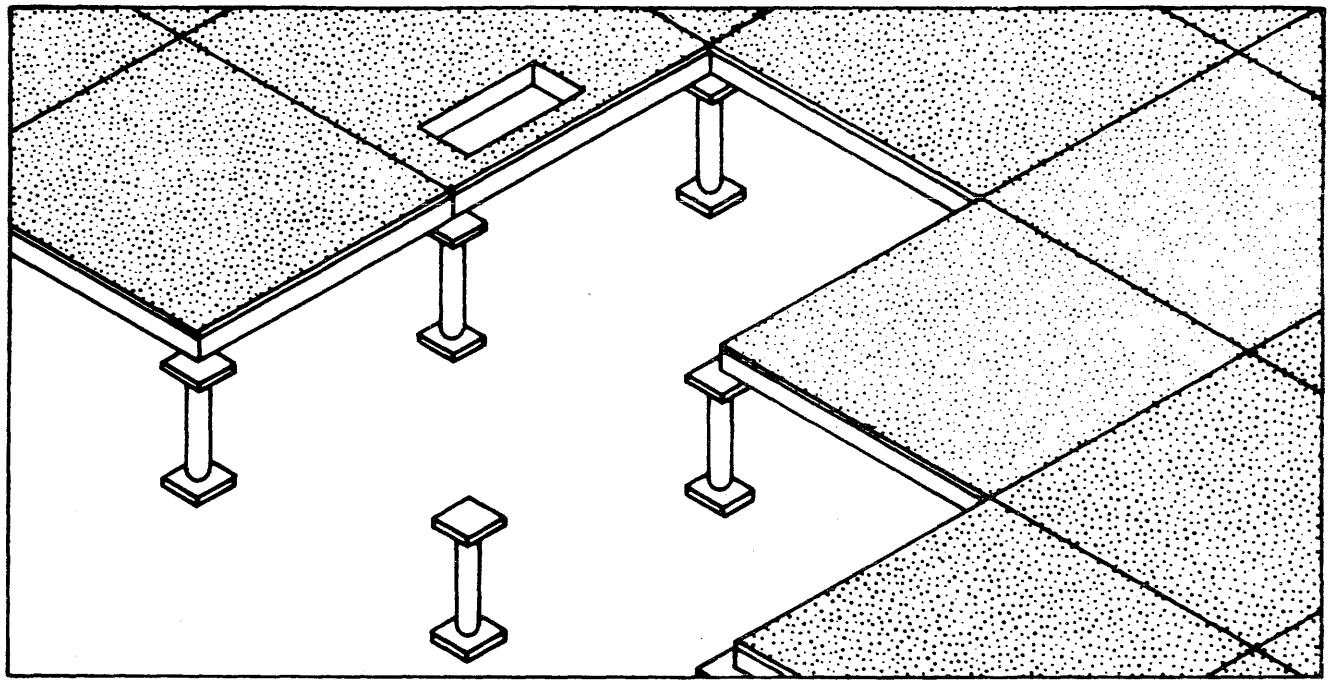
The elevated floor should be installed in accordance with manufacturer's instructions. Particular attention should be given to floor leveling. Normal elevated floor installation practices will provide a floor leveled to within $\pm$ 1/16 inch in a 10-foot span. Individual floor panels should not tilt or rock.

Approved type lifting devices should be provided for removing the floor panels. The preparation of the elevated floor should be complete and the elevated floor surface thoroughly cleaned prior to the delivery of the equipment. The underfloor area and pedestal heads should be cleaned before the equipment delivery. Particular emphasis should be placed upon removing all metal filings from the data processing room.

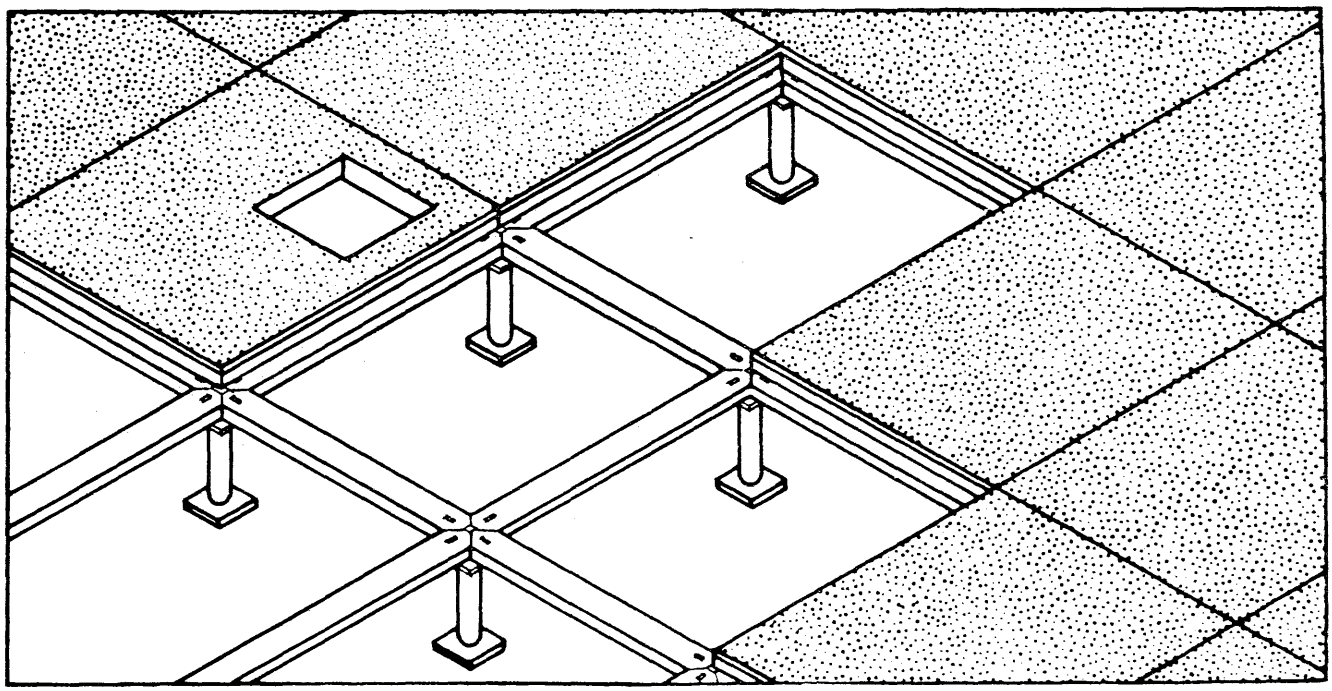
CHART I-1. CLEARANCE AND WEIGHT

MODEL	NAME	DIMENSIONS WIDTH	DEPTH	HEIGHT	*CLEARANCES FRONT	REAR	LEFT SIDE	RIGHT SIDE	WEIGHT
B 1712/ B 1714	Processor/ Main Frame	(1)	(1)	64.75"	3'	1'	3'	3'	850
B 1726	Processor	26"	59"	64.75"	3'	3'	3'	3'	1450
B 9115	Card Reader	22"	19.5"	22"	3'	3'	3'	3'	105
B 9119-1	Card Reader	14"	15"	11"	3'	3'	3'	3'	36
B 9319-2	Reader/Punch	42"	27"	35"	3'	3'	0	0	250
B 9419-2	Interp. Data Recorder	42"	27"	35"	3'	3'	0	0	250
B 9210	Card Punch	44.5"	28"	53"	3'	3'	0	1'	655
B 9340	Console Printer	(1)	(1)	29"	(1)	(1)	(1)	(1)	55
B 9240	Line Printer	75"	29"	55.5"	3'	3'	**30"	**1'	1738
B 9245	Line Printer	46"	25"	54"	3'	3'	**3'	**3'	850
B 9247	Line Printer	42"	28"	44"	3'	3'	**3'	**3'	600
B 9249	Line Printer	30"	24.5"	40.5"	3'	3'	**3'	**3'	150
B 9480	Disk Cart. Drive	21.75"	30"	44"	3'	3'	**3'	**3'	357
B 9491	12.5 IPS 9-Tr.Mag.Tape	21-3/16"	9-1/8"	11-5/8"					30
B 9381	9-Tr. Tape Cluster	36.25"	30.25"	43"	3'	3'	3'	3'	800
B 9134/ B 9135	Reader-Sorter Basic	78.5"	36.25"	54.25"	3'	3'	3'	3'	1200
	4-pocket Mod.	30"	29.25"	40.25"	3'	3'	0	3'	150
	Expansion Mod.	30"	29.25"	40.25"	3'	3'	0	3'	500
B 9136	Reader-Sorter								

NOTES: (1) Refer to Figure I-1.
* Clearances stated are the absolute minimum and should not be used as an equipment-positioning guide.
** If positioned as shown in Figure I-1, enough cable slack must be given to push device aside to allow maintenance.



Without Stringer Members



With Removable Stringer Members

Figure I-2. Elevated Floor

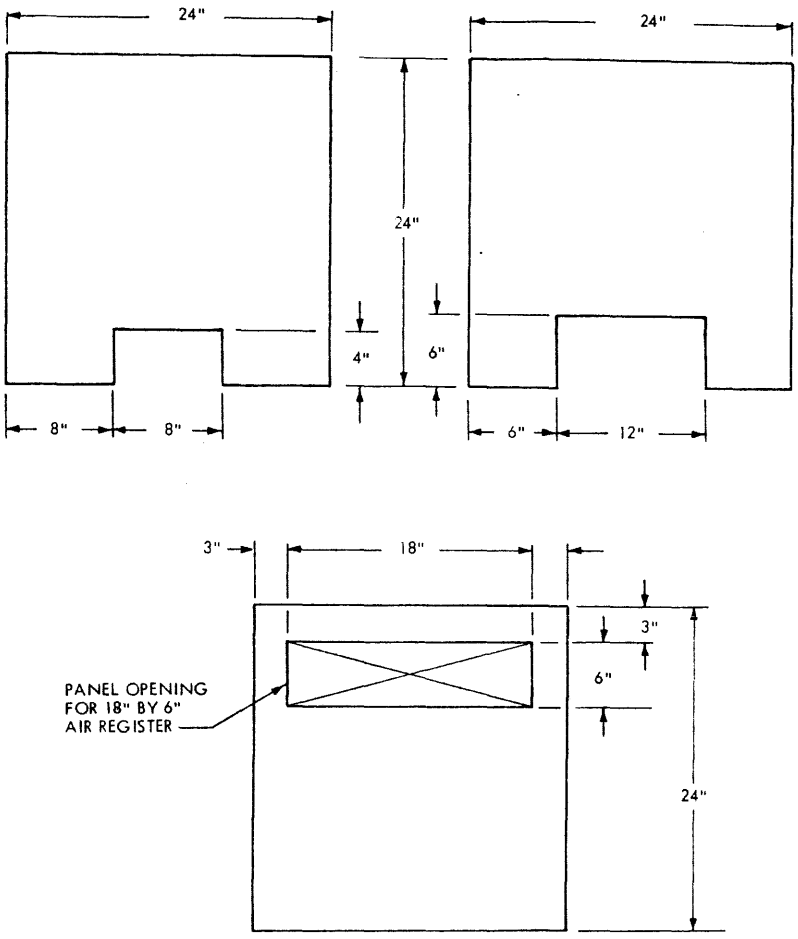


Figure I-3. Typical Floor Openings for Cables and Air Register

FLOOR FINISH

Burroughs recommends that the floor of the computer room be finished with 1/8-inch rubber or vinyl-asbestos tile, constructed with anti-static material. This type of floor prevents the base of the equipment from coming in contact with any metal surfaces of the building, thus providing safety for personnel while working on energized electrical circuits. It also provides a surface that can be readily cleaned with a damp mop or vacuum cleaner and is as static free as possible.

Anti-static floor wax should be used on this type of flooring. The resistance between the wearing surface of the finished floor and ground should be a minimum of 50K ohms.

Burroughs recommends carpeting be avoided wherever possible, due to its high static potential. If carpeting is used, it must be a computer room type carpet containing wire that has been woven into the fabric.

Burroughs Technical Standard 1257 5700, Rev. A, page 17, paragraph 5, defines the requirements for suitable carpet fabrics that minimize static electricity. Additional information on static electricity is contained in NFPA 77-1966 Static Electricity, available from the National Fire Protection Agency, 60 Batterymarch Street, Boston, Mass. 02110.

FLOORING (CONT)

UNDERFLOOR TREATMENT

When the space beneath the floor is used as an air plenum and the surface of the subfloor is concrete, then the subfloor should be sealed with a concrete hardener or painted with a non-cracking paint.

GROUNDING ELEVATED FLOOR

Safety requires that the metal components of the elevated floor (panels, pedestals, pedestal caps, stringers, etc.) be securely connected to building ground or the building metal structural members in order to effectively ground the entire elevated floor surface. The resistance between metal surfaces of the elevated floor and ground should not exceed 10 ohms. This elevated floor should not be directly connected to system ground. Refer to Figure I-4.

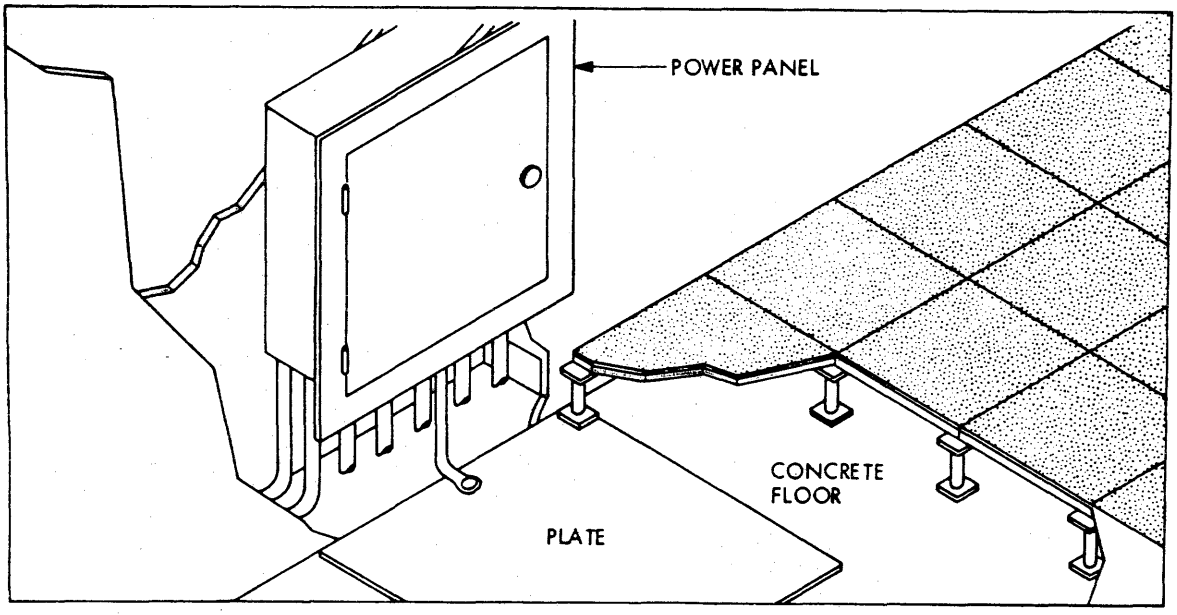


Figure I-4. Elevated Floor Grounding

CABLE TROUGH

In many areas the local codes require that cable troughs be installed to route system cables. In these instances, the cable trough is actually treated as conduit and must be grounded in a similar manner to the elevated floor.

Careful consideration of signal cable length and underfloor air-conditioning allowances must be an important factor when cable troughs are used.

CABLE ALLOWANCE

The majority of the peripherals are provided with a 25-foot cable. A 35- or 50-foot cable (Chart I-2) can be specified when the peripheral is ordered. In certain instances longer (special) cables may be ordered. The maximum distance any peripheral may be from its I/O control will depend on the length of signal cable. Allowances must be made for internal cable lengths within the unit (both the peripheral and central system), cable paths, and any cable bends. Cable allowances are shown in Chart I-3.

CHART I-2. EXTERNAL PERIPHERAL SIGNAL CABLES

A and/or B MODEL NO.	DESCRIPTION	CABLE PART NUMBERS FOR AVAILABLE LENGTHS 15'	25'	30'	35'	50'	100'
9111/9112	Card Reader	NA	1178 0889	1178 0871	1178 9633	1197 1439	NA
9115/9116	Card Reader	2471 3042	2471 3059	2471 3067	2471 3075	2471 3083	2471 3091
9119	96-Col. Card Reader	2471 3042	2471 3059	2471 3067	2471 3075	2471 3083	2471 3091
9131	Reader Sorter	NA	1178 0889	1178 0871	1178 9633	1197 1439	NA
9134/9135/ 9136	Reader Sorters	NA	1089 6702	1090 1312	1090 1320	1090 1338	1090 1346
9210	80-Col. Card Punch	NA	1178 0889	1178 0871	1178 9633	1197 1439	NA
9240	Line Printer	NA	1178 9625	1180 5710	1178 0863	1197 0209	NA
9245	Line Printer	NA	1178 9625	1180 5710	1178 0863	1197 0209	NA
9247	Line Printer	NA	NA	1090 1908	1090 1916	1090 1924	NA
9249	Line Printer	NA	2209 7489	NA	NA	NA	NA
9319	96-Col. Reader/ Punch	2471 3042	2471 3059	2471 3067	2471 3075	2471 3083	2471 3091
9340	Console Printer	1941 7369	NA	NA	NA	1904 0625	NA
9371/9374	Disk File (IA)	NA	2005 6461	NA	2005 6487	2005 6495	NA
9373/9375	Disk File (IC)	NA	1635 8731	NA	1635 8756	1635 8764	NA
9381	Mag. Tape Cluster	NA	1149 6874	NA	1149 6882	1149 6890	NA
* 9390	Mag. Tape Unit	NA	1178 9625	NA	1178 0863	1197 0209	NA
9419	96-Col. Interp. Data Recorder	2471 3042	2471 3059	2471 3067	2471 3075	2471 3083	2471 3091
** 9480/9481	Disk Cart. Drive	NA	1446 6072	NA	NA	NA	NA
9486	Disk Pack Drive	NA	NA	NA	NA	1744 1346	1744 1353
9491	Mag Tape Unit	NA	2210 0127	NA	NA	NA	NA
	Data Set (2 cables)	NA	2209 7976	NA	NA	2209 7984	NA

*Part number for the 6' cable on B9390 units is 1180 5702.
**Part number for the 10' cable on 9480/9481 units is 2158 4826.

CHART I-3 CABLE ALLOWANCE

UNIT	DESCRIPTION	INTERNAL IN UNIT	B 1712/B 1714 I/O	B 1726 I/O
B 9115	300-CPM, 80-Col. Reader	1'	4'	2'
B 9119	300-CPM, 96-Col. Reader	1'	4'	2'
B 9319	96-Col. Reader/Punch	3'	4'	2'
B 9419	96-Col. Interpreting Data Recorder	3'	4'	2'
B 9210	100-CPM, 80-Col. Punch	15"	4'	2'
B 9340	Console Printer	30"	1.5'	2'
B 9240	Line Printer	8"	4'	2'
B 9245	Line Printer	12"	4'	2'
B 9247	Line Printer	12"	4'	2'
B 9249	Line Printer	0	4'	2'
B 9480	Disk Cartridge Drive	0	4'	2'
B 9491	9-Track Mag. Tape	1'	4'	2'
B 9381	Mag. Tape Cluster	5'	4'	2'
B 9134	Reader-Sorter	2'	4'	2'
B 9136	Reader-Sorter	2'	4'	2'

FURNITURE

Furniture can provide a potential source of high-static charge. Precautions should be taken to ensure that seat covers, etc., are made of materials resistant to static build-up. Many plastics will permit the build-up of high-static charges. Cloth-covered chairs are normally less susceptible to generating static charges. Rubber or other insulating type of feet for equipment should be avoided. If casters, ball bearing, etc., are used, they should be lubricated with a graphite or other conductive grease. Rubber tread casters, wheels, etc., should contain conductive material.

The resistance of furniture hardware which touches the floor (such as casters, feet, etc.) should be below 10 ohms from metal in the furniture frame to a metal test surface on which the unloaded furniture sample is placed.

ACOUSTICAL TREATMENT

Acoustical treatment is recommended for a more comfortable operation of the system. The following is presented as general information.

The principal noise sources in a system are the mechanical units such as card punches, printers, reader-sorters, blowers, etc. The floor construction should be of a nature that will retard vibration to other areas. The walls should be constructed to prevent the transmission of noise to the adjacent area. It is important that these walls be constructed from the floor to the base ceiling and properly sealed. The doors must also have a good seal. The use of absorptive materials reduces the average sound pressure level throughout an installation. The greatest sound reduction is obtained by properly treating the ceiling. Best results can be expected from a dropped porous ceiling. If overhead duct work exists, it may be possible that noise generated in the EDP room will be transmitted to other rooms unless proper precautions are taken.

For larger rooms the floor is the second most effective area on which to apply absorptive materials. Wall surfaces should be made soft to prevent reverberations.

LIGHTING

Generally, lighting should be even throughout the equipment area, sufficient for the comfort of operators and the performance of maintenance. A minimum of 50-foot candles (measured 30 inches above the floor) is recommended.

Direct sunlight should be avoided, since lower levels of illumination are needed to observe the various console and indicator lamps. The lights for general illumination should be sectionally controlled by switches so that a portion of the lighting can be turned off as desired. Lights should not be powered from the computer power panel.

In computer rooms without windows, an auxiliary lighting system should be installed in the event of power failures; some local building codes require this.

AIR CONDITIONING

Air conditioning may be required for the B 1700 System. In determining whether or not air conditioning is required, take into consideration the total Btu output of the system and the room size allotted for the system.

Several different types of air-conditioning systems can be designed to satisfy the temperature and humidity requirements. The following are the most common types of systems in use, with a brief description of each. In no case should these descriptions be considered complete, and the use of an experienced air-conditioning contractor is strongly recommended. All local building codes must be met, including the electrical code, because some localities will not permit the use of the elevated floor for air conditioning.

AIR CONDITIONING (CONT)

The system should use predominantly recirculated air with a set minimum for introduction of fresh air for personnel. This minimum fresh air introduction will enable the machine area to be pressurized so that air leakage is always outward. This will help prevent dust entry from adjacent areas.

TYPES OF SYSTEMS

Single-Duct Overhead System

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

The return air to the air conditioning unit is taken from either ceiling return registers above the heat producing units, or a fixed pattern of returns, both in the ceiling or on the walls around the periphery of the room.

The temperature control system consists of temperature and humidity controls placed in a representative location within the computer room. A temperature and humidity recorder is required in order to monitor the room conditions.

Two-Duct, Two Air-Conditioning Unit System

One air-handling unit with separate controls supplies conditioned and filtered air to the air inlets on the equipment. This air may be supplied to the machines through ducts laid beneath the raised floor or fed to a floor plenum chamber with holes through the floor located at the rear or the side of the equipment.

Each machine is supplied with a quantity of air equal to its internal fan capacity. This air absorbs the heat generated by the equipment and is discharged from the top of the units into the room. Relative humidity of the air supplied to the units should be maintained so as to meet equipment environment specifications, and temperatures should be controlled to prevent condensation on or within the units.

To ensure a controlled relative humidity, it is necessary to provide for a reheat system to operate in conjunction with the cooling unit. This unit is basically a "sensible" cooling operation.

The second air-handling unit supplies air directly to the room through a separate duct system and 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 in this manual and give complete year-round air conditioning, ventilation, and heating.

Two-Duct, Single Air-Conditioning Unit System

This system is similar to the system just discussed, except in one respect: this system uses only one air-handling unit to supply both air circuits. The air is filtered and the temperature and humidity regulated before air is supplied through separate ducts to the room and the individual units.

A split coil with a reheat and/or face and bypass dampers can be used to regulate the air to be supplied directly to the individual unit. Relative humidity of this air should be maintained so as to meet equipment environment specifications, and temperature should be controlled to prevent condensation on or within the equipment.

TYPES OF SYSTEMS (CONT)

The temperature control system for the air being supplied to the overhead system is the same as for the single-duct system. In addition, a control system has to be installed in the discharge duct to regulate the air supply to the underfloor system. The controls operate either the separate cooling and reheat coils or the face and bypass dampers in order to maintain the required conditions. A remote-reading temperature and humidity recorder should be installed with the sensing elements in the discharge air to the underfloor system to monitor the air entering the equipment.

Underfloor System (For Elevated Flooring)

NOTE

If it is possible, Burroughs recommends the use of the underfloor system.

In this system, the space between the regular building floor and the raised floor is used as a supply plenum. All air is discharged into the room through floor registers around the perimeter of the area. The air is returned to the air conditioning unit by means of ceiling registers located directly above the equipment.

A higher return temperature can be used in this system without affecting the design conditions of the overall room. The design of this system takes into consideration a heat transfer factor through the metal floor. This affords a certain amount of reheat to control relative humidity of air before it enters the room.

The temperature control system consists of the same controls as those described for the single-duct system. In addition, the system must have air temperature controls in the underfloor supply system to prevent a cold floor, which is uncomfortable. Air entering the equipment through the cable holes must be within stated equipment specifications.

In some areas the local code requires a cover (generally rubber) to prevent the air from exiting through the cable holes.

RECOMMENDATIONS

Ideally, the data-processing room space temperatures should be maintained by an individual system that is responsive to the heat load demands of the data-processing room. The heat load imposed on air-conditioning systems by the data-processing equipment and data-processing room lighting system is a nearly constant load. It normally does not vary extensively while the system is in operation.

The customer should provide an air-conditioning system that is highly reliable, has the capacity and control system to maintain space conditions within specified tolerances, and does not subject the data-processing equipment to variations in temperature and humidity when outside ambient temperatures change. There are commercially available package-type, self-contained air-conditioning units specifically designed to meet the design requirements of electronic data-processing rooms. It is recommended that consideration be given to the use of this type of system on B 1700 installations.

Design Temperatures

The air-conditioning system inside design temperatures for the data-processing room should be based on the following: 72°F. dry bulb, 60°F. wet bulb.

AIR CONDITIONING (CONT)

Ventilation and Infiltration

The type of construction of data-processing rooms has a definite effect on the performance of an air-conditioning system and consequent environment maintained within the space. This is particularly true when attempting to maintain the space relative humidity within specified tolerances.

If large volumes of cool air (below 57°F.) are permitted to infiltrate or are intentionally introduced into the space, then the air-conditioning system should have the means of adding the additional moisture to the space. The performance of a data-processing system is affected when the humidity falls below specifications.

It is recommended that the construction of the data-processing room be in accordance with NFPA Bulletin No. 75. The ventilation requirements should be based on maximum 15 CFM per person (constant occupancy) or one (1) air change per hour, whichever is larger, including any additional required allowances. All makeup air should be introduced into the computer by first passing it through the air-handling unit.

Humidifying Methods

In order to maintain space humidity conditions, particularly during the winter months in cooler climate zones, mositure must be added to the data-processing room space. Steam injection system (dry steam), sprayed coil systems (utilizing de-ionized water supply), and pan-type humidifiers equipped with immersion heaters are acceptable methods of introducing moisture into the air supply. Dry steam is preferable if available. Care must be exercised with sprayed coil systems so that the water sump is kept clean and that excessive water is not blown from the coil surface. Pan-type humidifers equipped with immersion heaters require frequent maintenance.

Water-atomizing devices should not be used, because the minerals contained in the water will be introduced into the space. The minerals can seriously affect the performance of magnetic tape units and printed circuits in electronic equipment.

Air Filtration

The air-conditioning system should be equipped with filters that meet the National Bureau of Standards efficiency test of 45 percent or better (National Bureau of Standards discoloration test using atmospheric dust). Generally, prefilters are placed in front of the high-efficiency filters to increase their effective service life.

Air Distribution System

Burroughs equipment units use room air that is introduced into the cabinet near the base of the unit at floor level and is exhausted near the top of units (with exception of the B 9391/B 9392 magnetic tape and B 9410 peripheral switch units). Air conditioning should not be supplied to the peripheral switch since none is required. Fans are employed within the unit to circulate air and cool components. The magnetic tape unit is designed counter flow; air is introduced near the top and exhausted at the bottom of the cabinet.

The air supplied to the data-processing room may be either delivered overhead using ceiling diffusers or delivered under the elevated floor (if sufficient unobstructed underfloor height is present) using registers that are adjustable and placed near the equipment. It is recommended that a minimum of 12 inches of unobstructed underfloor height be available for use as a plenum chamber.

AIR CONDITIONING (CONT)

Temperature and Humidity Recording Instruments

It is recommended that all customers install temperature and humidity recording instruments. Recording instruments are necessary to provide a continuous record of temperature and humidity conditions in the equipment area. Also, if the air-conditioning requirements are not met, a record is available to indicate the extent and duration of the undesirable condition and indicate whether a drying-out period is required. This may, in some cases, save equipment shutdown time.

Use of the record of temperature and humidity as follows:

1. To assure the customer that the air-conditioning installation is continuously performing its job properly.

   Installation errors and loss of efficiency because of malfunction of some part of the air-conditioning system can be quickly detected.

2. To determine whether a mandatory drying-out period is necessary when humidity limitations are exceeded:

   The drying-out period may be necessary if the excess humidity occurs either during periods of actual equipment operation or during periods when the equipment is shut down and unattended. The extent and duration of the excess humidity are used to determine the duration of the drying-out period.

3. To determine whether the environment in the area meets the requirements for the equipment.

A visual or audible signal device should be installed into the instrument. Its purpose is to provide a visual or audible indication that the temperature or humidity conditions to the computer area are nearing the maximum limitations stated in this manual. Customer personnel can then take action to correct this situation.

BTU/CFM REQUIREMENTS

In general, the BTU requirements are used to select the size of the air conditioner for use in the data-processing room. A one ton air conditioner will supply approximately 12,000 Btu/h of cooling. The data sheets contained in Section II of this manual list the Btu/h and CFM ratings of the B 1700 equipment. The final Btu/h rating should include:

1. Total Btu/h ratings of all equipment.
2. Allowance for future equipment.
3. Allowance for operating personnel in the computer room.

FIRE PREVENTION EQUIPMENT

Portable carbon dioxide or halon fire extinguishers of suitable size and number should be provided in the computer room. These are the recommended non-wetting agents for electrical equipment (Class C Hazard). Extinguishers should be overhead, marked, and readily accessible to individuals in the immediate area. Local codes govern the size and number of extinguishers required. These codes also govern the frequency of cylinder inspection; such inspection is usually accomplished by weighing the extinguisher for dissipation of its contents.

Where portable extinguishers are used as the primary extinguishing agents, it is advisable to locate a standpipe or hose unit within effective range of the computer area as a secondary extinguishing agent for a Class A Hazard.

FIRE PREVENTION EQUIPMENT (Cont)

In some cases, local building codes and ordinances, or insurance regulations require automatic water sprinklers. One of the following should be used, if it conforms to such codes and ordinances.

PRE-ACTION SPRINKLER SYSTEM

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

HIGH TEMPERATURE SPRINKLER HEADS

The sprinkler heads utilized in the computer room should be of a high rated type, preferably in the intermediate range of 175°F. (79°C).

FIRE DETECTION SYSTEM

A fire detection system should be installed to protect the computer and tape storage areas. This detection system should actuate an alarm and shut down the air-conditioning system.

POWER

GENERAL

This section describes the electrical power requirements, grounding, electrical connections, and wiring methods for B 1700 system and associated peripheral equipment. The wiring methods described herein are in compliance with the National Electrical Code (NEC 1968) and the NFPA Standard for the Protection of Electronic Computer Data Processing Equipment, Bulletin No. 75. (1967).

Is is the responsibility of the customer to furnish and install the following:

1. All conduit and power contained therein.
2. All necessary power receptacles for system units and convenience outlets for test equipment in adequate locations, wall circuit breakers or disconnects.
3. Additional EPO (Emergency Power Off) switches, if required, and their associated wiring.

During the planning of the customer's power source capacity for the system, the additional power requirements to expand a small system and the power required for additional system cooling should be taken into consideration.

Customer-supplied and installed power receptacles must mate with either the Burroughs Corporation-supplied Hubbell or Pass and Seymour connectors. When local codes demand a different type of receptacle, the customer must supply both the plug and the receptacle.

According to NFPA panphlet Number 75, Section 4301 states that approved flexible cord and plug assemblies, not to exceed 15-feet in length, may be used to connect equipment to building wiring.

We interpret this to mean the peripheral equipment plugged into building wiring (power receptacles should be located within reach of a 15-foot power cord) attached to our peripheral units. The majority of pluggable peripheral equipment is now being delivered with a 15-foot power cord.

NOTE: Some local codes allow only a maximum of six (6) feet of exposed power cord.

POWER (CONT)

The length of exposed power cord must be established by the contractor in agreement with the local code, and the power cord then cut to the approved length to meet the conduit-routed receptacle.

ELECTRICAL SERVICE REQUIREMENTS

The electrical service requirements for the B 1700 system components are listed in Section II of this manual.

UNDERWRITERS LABORATORIES, INC. ® REQUIREMENTS

The following U.L. grounding requirements apply to the installation of a unit or system in which the grounding current exceeds 5.0 milliamperes.

1. An insulating grounding conductor that is identical to the grounded and ungrounded branch-circuit supply conductors except that it is finished to show a green color or green with a yellow stripe is to be installed as part of the branch circuit that supplies the unit or system.
2. The equipment units are to be grounded to the grounding conductor mentioned in item 1.
3. The attachment-plug receptacles in the vicinity of the unit or system are all to be of a grounding type, and the grounding conductors serving these receptacles are to be connected to the grounding conductor that serves the equipment units.

ELECTRICAL SERVICE RECOMMENDATIONS

Although the B 1712/B 1714 Central Processor and all peripheral units require only a single phase input power source, it is recommended to furnish three phase, 5-wire service (4-wire and ground) for the system. This practice permits contractors to more easily balance loads on the input power.

The B 1726 Central Processor requires a three phase wye connected input power source for domestic application. For International applications, a three phase wye connected power source is recommended. However, the use of a three phase, delta connected power source is allowed for International application. Input power source connections to the B 1700 systems are shown in figure I-5.

TRANSIENTS

Line transients can be caused by the turn-on/turn-off of heavy electrical machinery such as welders, air-conditioning motors, elevators, etc. In fact, even lighting can cause sizeable spikes that may exceed the transient rating of a specific system unit. Consequently, it is recommended that the system power service be independent.

INDIVIDUAL EQUIPMENT POWER REQUIREMENTS

The electrical power requirements of individual equipment units are shown on the data sheets contained in Section II of this manual.

SYSTEM POWER REQUIREMENTS

The actual system power requirement will depend for the most part on the number of peripherals to be installed. The B 1700 is a modular data processing system and can be expanded considerably beyond the present requirements; therefore, the size of main feeder conductors and the capacity of the electrical distribution panel should include an allowance for future system growth. The branch circuit breaker and conductors for each electronic unit that contains an A/C power module should be sized as determined by the system data sheets.

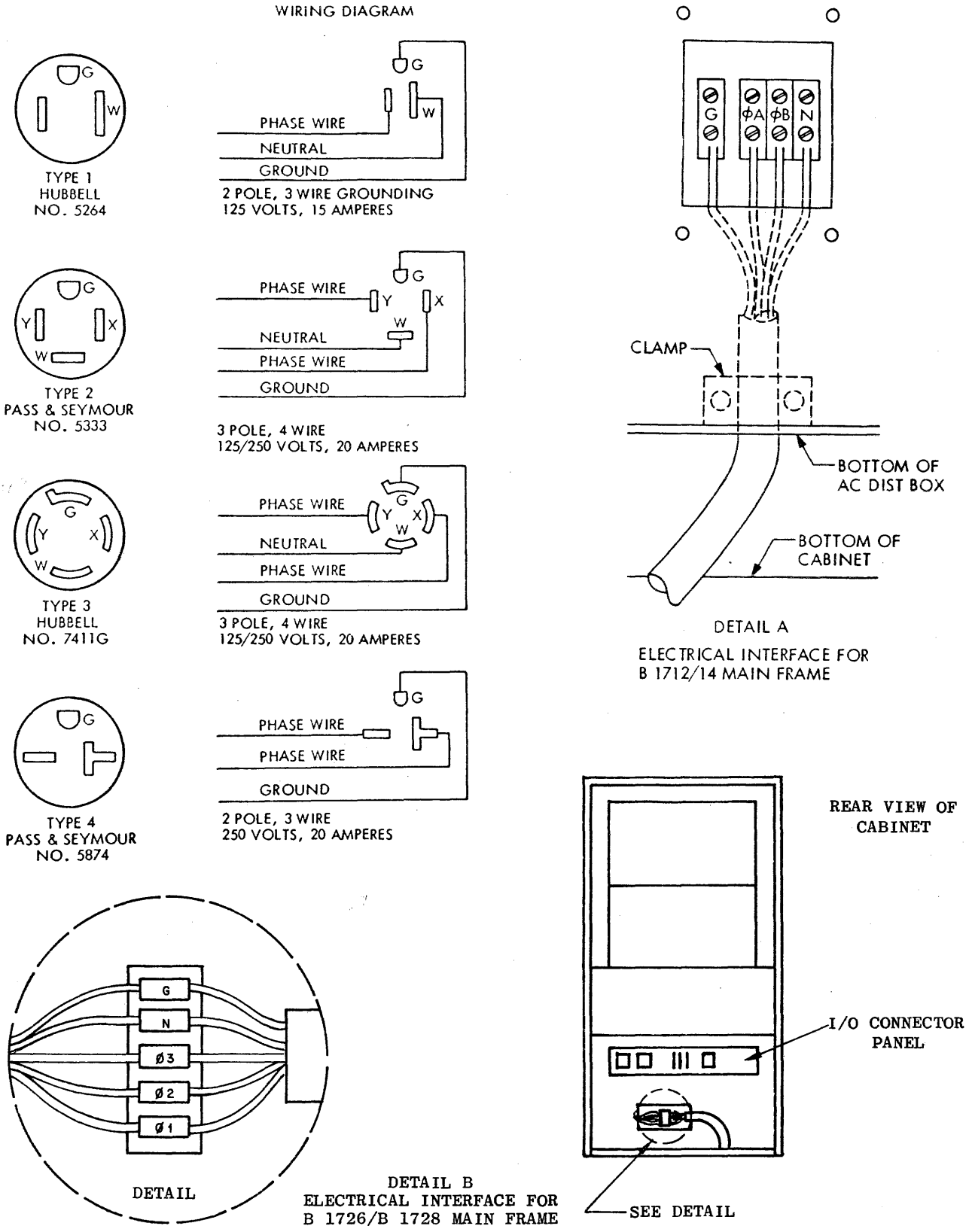


Figure I-5. Receptacle Description (Sheet 1)

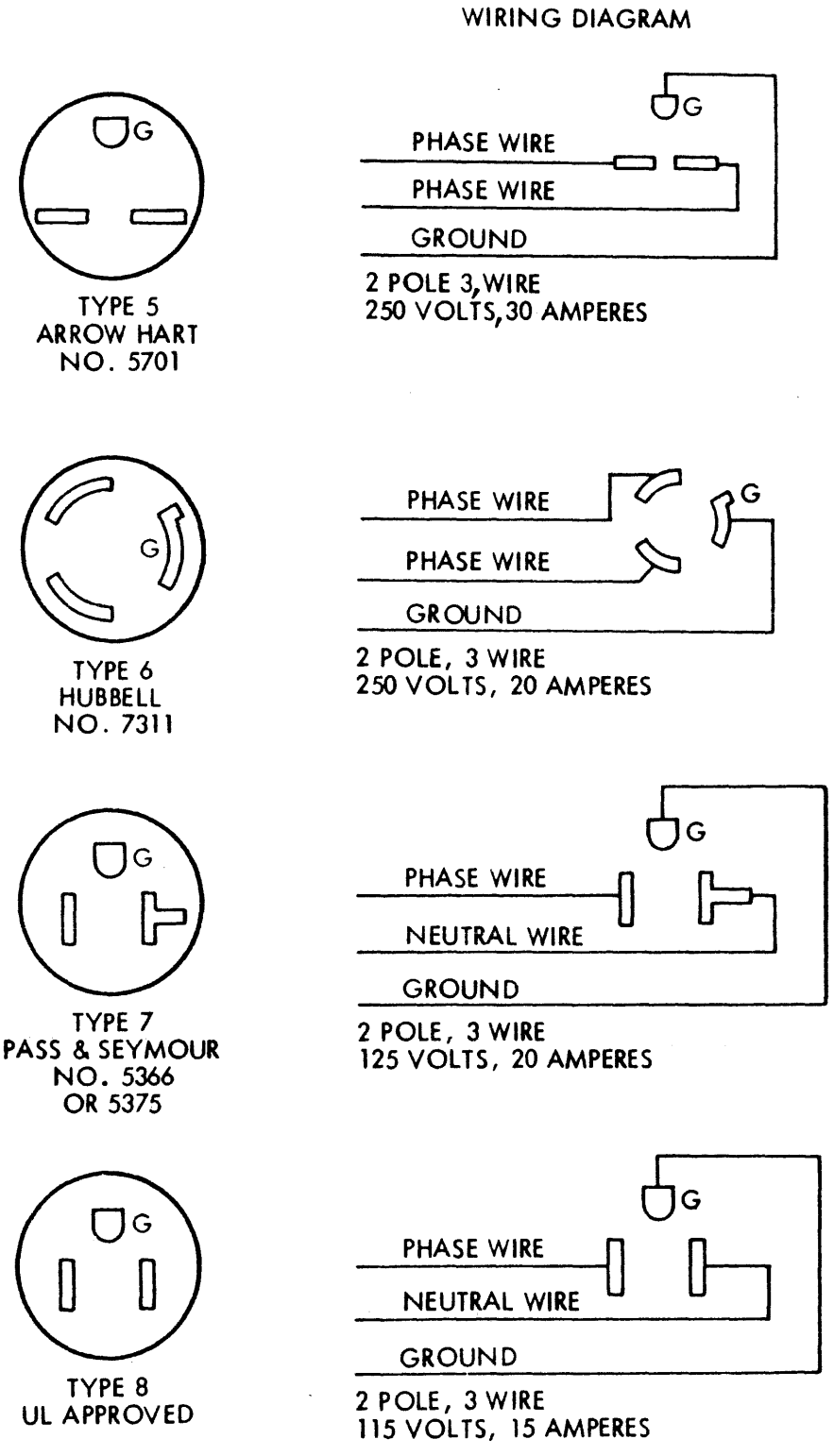


Figure I-5. Receptacle Description (Sheet 2)

POWER (CONT)

ELECTRICAL DISTRIBUTION SYSTEM

The customer should provide an electrical distribution system that is connected to a single power source. The main feeder conductors and ground conductors should be dedicated to the exclusive use of the B 1700 System. Branch circuits for lighting, convenience outlets, elevators, and air-conditioning systems should not be connected to the system panelboard.

The amount of power required for each system may be calculated by adding up the kVA ratings for the individual units in the system (Section II data sheets). Allowances must be made for future growth.

COMMERCIAL POWER INPUT

Each year new demands are being placed on the public service companies supplying the country with electricity. Many articles have been written forecasting possible brown-outs (lower than normal power for short periods of time) for certain sections of the country. When a site is being planned, serious thought should be given to the quality and quantity of input available for the computer and respective peripherals.

It is recommended that the input power be isolated (clean), which normally requires installation of an isolation transformer. In areas where the primary input power to the isolation transformer is questionable, serious thought should be given to alternative input power. The computer user must determine the importance of work flow from the computer in order to justify installation of alternative input power.

In areas subject to electrical storms, where power is interrupted for very short periods of time, one alternative method is the installation of a motor generator. In those areas where power is interrupted for long periods of time the installation of an uninterruptable power supply may be the only alternative available to the user.

PANELBOARDS

The customer should provide a panelboard that includes a branch circuit breaker for each unit requiring facility supplied power. More than one panelboard may be used. However, if more than one panelboard is used, they should be located adjacent to the same source. A typical panelboard circuit breaker arrangement is shown in Figure I-6. The panelboard should contain a solid grounding bar that is not connected to the neutral conductor and is isolated from the metal enclosure. The specific size of the paneboard depends upon the equipment used and anticipated future equipment needs.

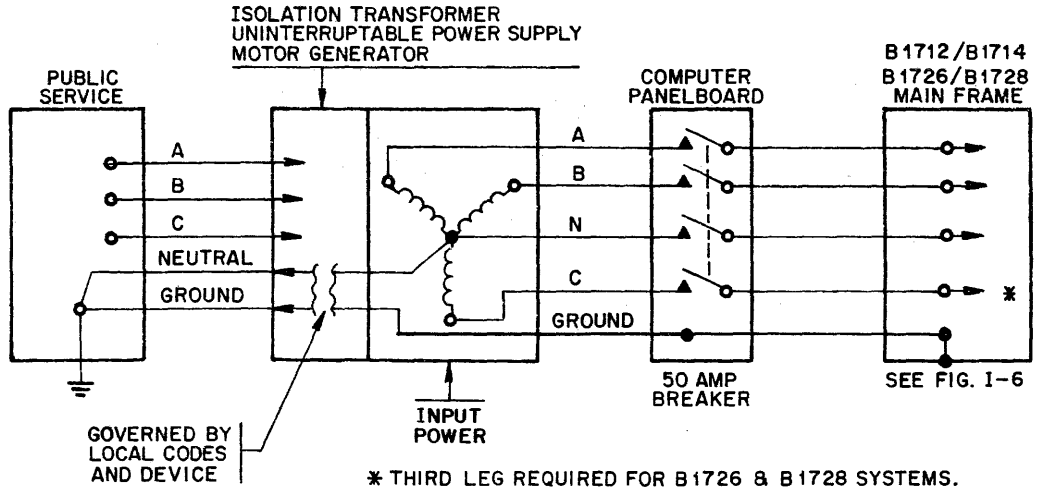


Figure I-6. Input Power and Panelboard

POWER (CONT)

NOTE

All electrical power requirements for data processing equipment should be based on 100 per cent demand loads.

PANELBOARD LOCATION AND DIRECTORY

The panelboard should be conveniently located in an accessible location within the data-processing room. Each panelboard should have a directory that clearly identifies each branch circuit.

BRANCH CIRCUIT WIRING

Branch circuit wiring should conform to Articles 300,310, and 645 of NFPA Bulletin No. 70 (1968). When the underfloor is used as an air plenum, most local codes state that branch circuit conductors should be enclosed in conduit, electrical metallic tubing.

ELECTRICAL INTERFACE

The customer shall furnish wiring direct to the panelboards.

Electrical connection shall be made to Burroughs equipment with the supervision of the Burroughs site engineer.

RECEPTACLE OUTLETS

Some of the peripheral devices used with the B 1712/B 1714 system may be plugged into the AC distribution box of the processor/Main Frame. Chart I-6 identifies these devices. For other devices or remote location of any device, the customer should furnish receptacle outlets. Each receptacle outlet should be identified as to the equipment served, plus the breaker to which it is connected.

RECEPTACLE LOCATION

Receptacle outlets should be located within five (5) feet of the equipment unit it is intended to serve and be accessibly located under a removable floor panel.

SERVICE OUTLETS (Convenience Outlets)

The customer should provide service outlets conveniently located to all equipment units. One outlet may serve more than one equipment unit, but in all cases, there should be a minimum of one receptacle outlet within eight feet of the front of the service outlets for the main frame cabinet.

GROUNDING

Grounding the equipment is an important facility requirement. Therefore, the customer should place particular emphasis on providing an effective and safe grounding system. The following paragraphs describe in detail the requirements for providing an adequate grounding system.

Equipment Grounding Conductors

The grounding conductors to all equipment units shall be installed and finished to show a continuous green color or a continuous green with one or more yellow stripes; they are installed as part of a branch system that supplies the equipment unit or system. (Refer to Chart I-4 for wire size.)

Receptacle Grounding

Equipment unit receptacles should be as specified in Chart I-4. For the best ground, the grounding terminal of the receptacle is not connected to the neutral conductor, outlet box, or any metal surface except the grounding conductor.

CHART I-4. CONNECTOR REQUIREMENTS

MODEL NUMBER	DESCRIPTION	BURROUGHS-PROVIDED PLUG	BURROUGHS-PROVIDED CABLE	CUSTOMER-SUPPLIED CONNECTOR	PHASE WIRE SIZE	NEUTRAL WIRE SIZE	GROUND WIRE SIZE	ELECTRICAL INTERFACE (SEE NOTES)
B 1712/14	Processor/Main Frame	No	No	No	2-4	4	4	See Detail "A" (Fig. I-5) and Note 1 below.
B 1726	Processor/Main Frame	No	No	No	2-4	4	4	See Detail "B".
B 9115	80-Col. Card Reader	5264	14779839	5262	1-12	12	12	Type 1, Note 2.
B 9119	96-Col. Card Reader	5264		5262	1-12	12	12	Type 1, Note 2.
B 9319	96-Col. Reader/Punch	5264		5262	1-12	12	12	Type 1, Note 2.
B 9419	96-Col. Interp. Data Recorder	5264		5262	1-12	12	12	Type 1, Note 2.
B 9210	80-Col. Card Punch	5333	10823417	5331	2-12	12	12	Type 2, Note 3.
B 9340	Console Printer	5264		5262	1-12	12	12	Type 1, Note 2.
B 9240	Line Printer	5333	10823433	5331	2-12		12	Type 3, Note 3.
B 9245	Line Printer	5375	21021100	5374	1-12	12	12	Type 7, Note 2.
B 9247	Line Printer	5375	10876829	5374	1-12	12	12	Type 7, Note 2.
B 9249	Line Printer	5264		5262	1-12	12	12	Type 1, Note 2.
B 9480	Disk Cartridge Drive	5264		5262	1-12	12	12	Type 1, Note 2.
B 9491	9-Track Mag. Tape 12.5 IPS	5264		5262	1-12	12	12	Type 1, Note 2.
B 9381	Mag. Tape Cluster	5701	11452836	5700	2-12		12	Type 5, Note 3.
B 9134	Reader/Sorter	3765	10816833	3764	8	8	8	Type 6, Note 3.
B 9135	Reader/Sorter	3765	10816833	3764	8	8	8	Type 6, Note 3.

NOTES: (1) B 1712/14 Main Frame is hand wired to power cable; see detail A, Fig. I-5.

(2) See Fig. I-5 for description of plugs. This device is normally plugged into AC distribution box of the B 1712/14 mainframe.

(3) See Fig. I-5 for description of plugs.

POWER (CONT)

Solid Grounding Bar

Equipment-grounding conductors should be connected securely to a solid grounding bar. This bar should be located in the panelboard cabinet(s) that serve the system. The solid grounding bar is in addition to the solid neutral bar.

EMERGENCY POWER OFF

The customer should furnish a means for the disconnect of all electrical power to the data-processing equipment and shut off the fan motor(s) of the air-conditioning system(s) that supply air to the data-processing room in the event of an emergency (fire, earthquake, discharging sprinkler system, etc.). This may be accomplished by the following methods. (Refer to NFPA No. 70, Section 645, dated 1968.)

1. A remote-type switch, relay (latch type) mechanically held or main circuit breaker equipped with a shunt trip device should be installed in the main feeders that supply power to the panelboard(s) serving the data-processing equipment. The emergency power-off device should not interrupt the data-processing room lighting circuits.

2. Provide a method of turning off air-conditioning that serves the computer room.

3. The disconnecting means mentioned above shall be controlled from locations readily accessible to the operator and at designated exit doors from the data processing room. The B 1700 is equipped with circuit breakers to control AC power to the Main Frame and devices plugged into the AC Distribution Box. These breakers are under the access panel located below the table.

PRE-INSTALLATION SCHEDULE AND CHECK LIST

The successful installation of the B 1700 system will demand close attention and supervision long before the system arrives. The following steps are meant as a guide and should be adhered to as closely as possible.

AFTER ORDER IS CONFIRMED

1. Field Engineering (F.E.) personnel responsible for the site should review the order to determine the equipment units desired.

2. Read this planning and installation manual.

3. Determine the prospective location of the system. Make a preliminary layout of the proposed installation.

4. Discuss with customer or consultant all phases of the proposed installation. The discussion should include the size of the proposed room, physical layout of the equipment, floor loadings, the use of raised floors, and electrical power and air conditioning requirements.

5. Advise Burroughs of security or other restrictions.

6. The customer should study local delivery quotations on power, air conditioning, customer-supplied cable, and other equipment to determine when each item must be ordered.

7. Order necessary cables. Refer to form 1903812(formerly form 2280).

PRE-INSTALLATION SCHEDULE AND CHECK LIST (CONT)

SIX MONTHS BEFORE EQUIPMENT DELIVERY

1. The air-conditioning and power requirements, delivery date and installation schedule should be reviewed.
2. Configuration should be reconfirmed with the account manager.
3. F.E. Manager should check for any additional field engineering training requirements.

FOUR MONTHS BEFORE EQUIPMENT DELIVERY

1. Order site spares, tools, manuals, test equipment, lubricants, etc.
2. Order necessary customer supplies, with sales assistance.
3. F. E. Manager should increase bulk literature distribution to include the new site.

The final layout should be made and approved by the account manager, field engineer and the customer, using the following list as a check list:

1. Will the space allocated for the site permit system configurations resulting in functional distribution of the various system units?
2. Will the layout, as initially planned, permit system expansion economically?
3. Has an area been set aside for field engineering with a desk and cabinet?
4. Does the site location present special problems for unloading and locating units? If so, have solutions been devised; and have necessary arrangements been implemented?
5. What type flooring is to be employed?
6. Is the proposed layout compatible with maximum length cables?
7. Has the system site been checked for unusual vibrations?
8. Has the system site been checked for ac deficiencies such as interruption of power by electrical storms.
9. Are the full power requirements for the system and possible future expansion acknowledged?
10. Is the requirement for cables, conduit, circuit breakers, service outlets, emergency power off, or disconnect switches acknowledged?
11. Has the total heat load of the system been established?
12. Have the requirements for ambient temperature and relative humidity been acknowledged?
13. Have provisions been made to include the temperature and humidity instruments for the computer room?
14. Has sufficient filtering been provided to ensure cleanliness of the cooling air introduced into the computer room?
15. Have additional growth requirements been provided for future system expansion?
16. Have the lighting requirements for the computer room been established?

PRE-INSTALLATION SCHEDULE AND CHECK LIST (CONT)

17. Has acoustical treatment of the computer room been discussed?

18. Has the arrival date of the system and peripherals been reconfirmed?

19. Have provisions been made to have Rol-O-Lifts or substitute equipment at the site at the time of system arrival?

20. If Data Communications are involved, has the telephone company been notified?

21. The customer and sales should be notified that the delivery date only starts the installation and the system will not be available until Field Engineering turn-over.

THREE MONTHS BEFORE EQUIPMENT DELIVERY

1. Reconfirm configuration with account manager.

2. A survey should be made to see how the work is progressing at the computer site.

TWO MONTHS BEFORE EQUIPMENT DELIVERY

1. Reconfirm configuration with account manager.

2. A survey should be made to see how the work is progressing at the computer site.

3. The required forms should be assembled to include the following:

Forms Required	Form Number	Formerly Form	F.M.M. Reference
Weekly Time and Expense Report	1900636	556	2.12.7-1
Daily Summary	1900677	591	2.12.8-1
System Log Book	1902517	1768	2.12.2-1
Personnel and Maintenance Record	1905627	2665	
System Equipment Inventory	1905635	2666	
Intershift Log for F.E.	1905809	2698	
Stop Report for Customers	1901857	1462	
RIN Record	1904752	2487	
PM Record	1905114	2557	
F.E. System Use Record	1905304	2592	
Daily Installation Reports	1902095	1565	2.12.13-1
Branch Mailing Envelopes			
F.E. Attention Reporting	1900057	14	
	1900065	18	
Technical Problem Memo	1903763	2265	2.12.9-5
Library Binders (Part Number 1622 7167)			

4. Check to see if the customers supplies have arrived.

PRE-INSTALLATION SCHEDULE AND CHECK LIST (CONT)

5. Reconfirm configuration with account manager.

6. A survey should be made to see how the work is progressing at the customer site.

ONE MONTH BEFORE EQUIPMENT DELIVERY

1. Check progress at the site to include electrical and environmental status.

2. Check all non-standard cables to see if they are correct. Did all required cables arrive?

3. Start assembling spares, tools, test equipment, and manuals. Assemble all items in the branch as received and, if possible, transport to computer site.

4. Arrangements should be made to ensure sufficient tools will be on site to facilitate installation.

Standard Test Equipment Required:

1. Oscilloscope Tektronix 465 or equivalent
2. Multimeter Triplett 630 or equivalent
3. Digital Voltmeter

Special Tools Required:

1.	Wire Wrap tool 26 gauge	1622 3760
2.	Chip removal tool	1622 4206
3.	Wrench, box, open-end, 1"; 13" long	1623 1474
4.	Wrench, box, open-end, 3/4"; 9 1/2" long	1623 1482
5.	Wrench, box, open-end, 11/16"; 8 1/2" long	1623 1490
6.	Wrench, box, open-end, 5/8", 7 5/8" long	1623 1508
7.	Wrench, box, open-end, 9/16"; 6 3/4" long	1623 1516
8.	Wrench, box, open-end, 1/2"; 6" long	1623 1524
9.	Wrench, box, open-end, 7/16"; 5 3/8" long	1623 1532
10.	Wrench, 12 pt. double-end offset box, 7/16", and 1/2" opening, 8 1/4" long	1623 3827
11.	Wrench, 12 pt. double-end offset box, 9/16" and 1/2" opening, 7 3/4" long	1623 3835
12.	Wrench, box, open-end, 1 1/8" opening, 16" long	1623 3926
13.	Set of 8 combination box and open-end wrenches	1623 8974
14.	Wrench, box, open-end, 1 1/16" opening, 16" long	1622 2960
15.	Wrench, box, open-end, 1 1/4" opening, 16" long	1622 2952
16.	Card Extender (Processor)	2207 1237
17.	Card Tester	2207 1500
18.	Card Extender (Logic Power Supply)	2207 0254
19.	Power Supply Dummy Load	2204 8797
20.	Desolder Pump	1622 2887
21.	Desolder Pump Replacement Tip	1622 2879
22.	Rol-O-Lifts ® or comparable equipment (additional help may be acquired from the computer movers if prior arrangements have been made).	

PRE-INSTALLATION SCHEDULE AND CHECK LIST (CONT)

TWO WEEKS BEFORE EQUIPMENT DELIVERY

The site preparation should be completed at least two weeks prior to the system arrival date and include the following:

1. Lighting, floor ramps, painting, plastering, and decorating should be completed.
2. Entire area, including floor plenum, should be cleaned.
3. Power facilities tested and ready to be connected to the system.
4. Air-conditioning system(s) tested and working properly.
5. Temperature and humidity recording instruments in position.
6. Arrangements made for special equipment to handle the movement of the system units into the computer room and positioned per the site layout.

ONE WEEK BEFORE EQUIPMENT DELIVERY

1. Field Engineer should make a final check of all electrical power with a meter.
2. Spares, tools, and test equipment should be on site with the spare parts catalogued.
3. The system library should be complete.
4. The Field Engineer maintenance room should be complete.
5. Where possible, the information cables (non-standard) should be laid before system delivery.
6. Office manager to make out a copy of the installation register (form 1904265(formerly form 2406).

SYSTEM ARRIVAL

Refer to Section IV of this manual for installation information.

GENERAL

This section contains the necessary information to determine the input power and air conditioning requirements for a B 1700 system. These requirements can be determined by the use of the Power and Heat Calculation charts (charts II-1 through II-4), and the data sheets. The data sheets are located at the end of this section.

ENVIRONMENT

The B 1700 system requires certain environmental conditions to provide reliable system operation. These requirements are as follows:

a. Input power must be free from excessive fluctuations. This can be achieved in most installations by using an isolation transformer for the B 1700 system.

b. Temperature and humidity must be controlled to prevent the specified range and rate of change from being exceeded.

Chart II-1. B 1710 Series System Single-Phase Power and Heat Calculation

A/B NUMBER B 17--	NAME BASIC CENTRAL PROCESSOR	APPARENT POWER KVA
	INPUT/OUTPUT CONTROLS	
	PERIPHERAL UNITS	

Single-Phase Power Subtotal	
System Expansion Factor (25% is recommended)	x1.25
Total Single-Phase Power requirement	
Total System Power Factor	x0.85
Total System Power in kilowatts	kW
KW-to-Btu/h conversion factor	x3400.
Total system Btu/h	
Single-Phase input voltage	kV
Total system current requirement	A

Chart II-2. B 1710 Series System Three-Phase Power and Heat Calculation

A/B NUMBER B 17--	NAME BASIC CENTRAL PROCESSOR	APPARENT POWER KVA
	INPUT/OUTPUT CONTROLS	
	PERIPHERAL UNITS	

Three-Phase Leg-to-Leg Power Subtotal	
Factor for all three Leg-to-Leg combinations	x3.0
Existing System Three-Phase power subtotal	
System Expansion Factor (25% is recommended)	x1.25
Total Three-Phase power requirement	
Total system power factor	x0.85
Total system power in kilowatts	KW
KW to Btu/h conversion factor	x3400.
Total system Btu/h	Btu/h
Three-Phase Leg-to-Leg voltage	KV
Three-Phase Leg-to-Leg apparent current	A
Three-Phase correction factor	x1.73
Three-Phase corrected input leg current	A

Chart II-3. B 1720 Series System Mainframe Power and Heat Calculation

A/B NUMBER	NAME	APPARENT POWER
B 17--	BASIC CENTRAL PROCESSOR	KVA
	INPUT/OUTPUT CONTROLS	

A-to-B Leg and B-to-C Leg Power Subtotal	KVA
A-to-B-to-C Leg Convenience Outlets Load	KVA
A-to-B-to-C Leg Power Total	KVA
	÷ 2.0
Total A-to-B or B-to-C Leg Load	KVA

Chart II-4. Series System Total System Power Requirements

A-TO-B LEG LOADS			B-TO-C LEG LOADS			C-TO-A LEG LOADS		
B NUMBER	NAME	KVA	B NUMBER	NAME	KVA	B NUMBER	NAME	KVA
B 1720 Series	Central Processor		B 1720 Series	Central Processor		B 1720 Series	Central Processor	
Total System A-to-B Leg Load			Total System B-to-C Leg Load			Total System C-to-A Leg Load		

Largest numerical Leg-to-Leg Load	KVA
Multiply by three	x3
Total system load	KVA
System Expansion Factor (25% is recommended)	x1.25
Total system input power requirements	KVA
Total system power factor	x.85
Total system kilowatts	KW
Btu/h conversion factor	x3400.
Total system Btu/h	Btu/h
Largest numerical Leg-to-Leg load current	A
Three-Phase correction factor	x1.73
Total system input current (for any leg)	A

	Largest Numerical Leg Load Current
Largest Numerical Leg Load, Leg-to-Leg Kilovolts	Largest Numerical Leg Load

INPUT POWER REQUIREMENTS

Input power for the B 1700 system must be relatively free from transients, line surges, and noise. Input power requirements are as follows:

Static Line Variation -- line voltage ±5%, not to exceed 188-230V or 108-132V.

Transient Line Minimum -- 0.7 times normal line voltage for 2 cycles.

Transient Line Maximum -- 2.0 times normal line voltage for 0.5 cycles (8 milliseconds) OR
3.0 times normal line voltage for 5 milliseconds.

Frequency -- 49.5 Hz to 50.5 Hz OR 5 9.4 Hz to 60.6 Hz.

Line Voltage (188 to 230V) is measured from leg-to-leg of a single-phase input power source or from one leg to any other leg of a three-phase input power source. Line voltage (108 to 130V) is measured from either leg of a single-phase input power source to neutral or from any leg of a three-phase input power source to neutral.

INPUT POWER ISOLATION

The input power source to a B 1700 series system must be isolated from all other electrically powered devices. System power isolation is accomplished by the use of an isolation transformer connected between the B 1700 system input power source and the main power source. If the B 1700 system uses both a three-phase power source and a single-phase power source, both input sources require an isolation transformer.

TERMPERATURE AND HUMIDITY REQUIREMENTS

The B 1700 system is designed to operate in a class B environment. Class B environment is defined as an ambient temperature range of 60 to 100 degrees fahrenheit and a relative humidity range of 10 to 90 percent. However, the actual temperature and humidity limits for class B environment are shown in figure II-1.

For reliable operation, system media (punched cards and magnetic tape) must be stored and used in a class C environment. A class C environment is defined as an ambient temperature of 65 to 80 degrees fahrenheit and a relative humidity of 40 to 60 percent. Therefore, to achieve the greatest system reliability, it is recommended that a class C environment be provided for the B 1700 system. The class C environment limits are shown in figure II-1.

There are also requirements on the rate of environmental change. The ambient temperature must not be cycled from one extreme to the other in less than eight hours. Relative humidity must not be cycled from one extreme to the other in less than four hours.

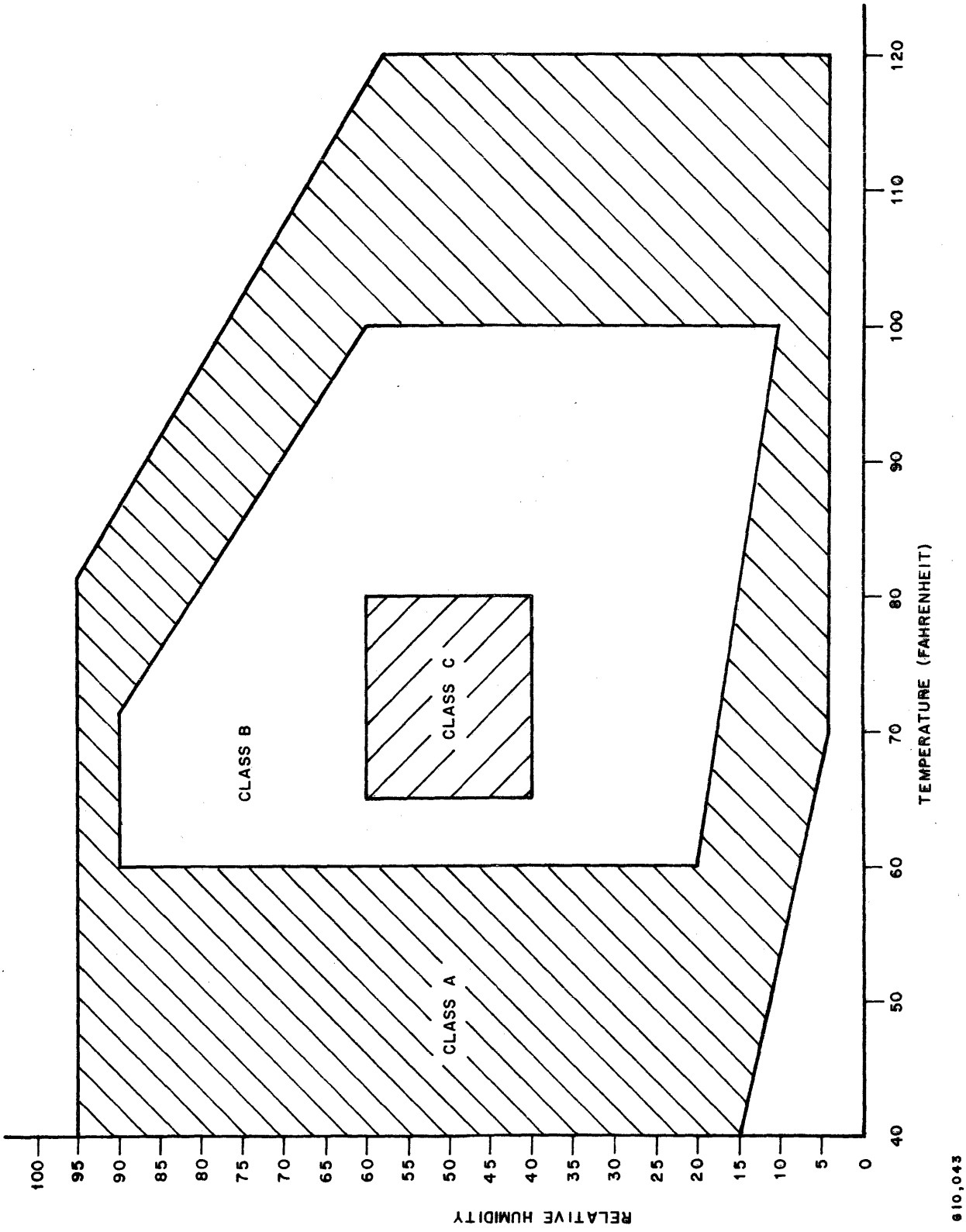


Figure II-1. Class A, B, and C Environments

INPUT POWER SOURCES

Input power for a B 1710 series central system can be derived from either a single-phase power source (approximately 220 Vac) or two legs of a three-phase power source (approximately 208 Vac).

Input power for a B 1720 series central system must be derived from a three-phase power source (approximately 208 Vac).

Input power for an auxiliary cabinet (used in a B 1728 system) can be derived from either a single-phase power source or two legs of a three-phase power source. If this power source is derived from the same three-phase power source that is used as input power to the central processor, a separate circuit breaker must be used.

SINGLE-PHASE POWER SOURCE

If the input power source to a B 1710 series system is derived from a single-phase power source, the input power and air conditioning requirements can be approximated by using the following procedure:

a. Calculate the total kVA load by adding the kVA load of each piece of equipment connected to the single-phase input power source. The equipment kVA loads are contained in the data sheets.

b. Multiply the total kVA load by 1.25 to compensate for future system expansion. The product of this calculation is the total system kVA requirements.

c. Multiply the total system kVA requirements by 0.85 (system power factor) to obtain total system kW.

d. Multiply total system kW by 3400 to obtain total system Btu/h.

THREE-PHASE POWER SOURCE

If the input power source to a B 1700 series system is derived from a three-phase power source, the following conditions are required:

a. If the B 1700 system is located in the United States of America (domestic), the power transformer input to the system must by wye connected.

b. If the B 1700 system is located outside of the United States of America (international), the power transformer input to the system can be either wye or delta connected.

c. The load on each of the three leg-to-leg combinations must be identical or nearly identical (load balancing).

The input power and air conditioning requirements for a B 1700 system connected to a three-phase input power source can be approximated by using the following procedures:

a. Calculate the total kVA load by adding the kVA load of each piece of equipment on all three leg-to-leg combinations (A-to-B, B-to-C, and C-to-A). Include in this total the kVA loads of the 117/120 Volt equipment. Mainframe and peripheral equipment kVA ratings are contained in the data sheets.

b. Multiply the total kVA load by 1.25 to compensate for future system growth. The product of this calculation is the total system kVA requirements.

c. Multiply the total system kVA requirements by 0.85 (system power factor) to obtain total system kW.

d. Multiply the total system kW by 3400 to obtain total system Btu/h.

POWER AND HEAT CALCULATIONS

The power and heat calculation procedures for a B 1700 system are divided into five sections:

a. B 1710 series systems, single-phase input power source.

b. B 1710 series systems, three-phase input power source.

c. B 1720 series systems, three-phase input power source.

d. B 1728 Auxiliary Cabinet, single-phase input power source.

e. B 1728 Auxiliary Cabinet, three-phase input power source.

B 1710 SERIES SYSTEMS, SINGLE-PHASE INPUT POWER SOURCE

Input power and air conditioning requirements for a B 1710 series system connected to a single-phase input power source can be determined by using the following procedure:

a. Use the B 1710 Series System Single-Phase Power and Heat Calculation chart (chart II-1) for all calculations.

b. Use chart II-5 (contained in DATA SHEET 1) for all central processor kVA ratings.

c. List the kVA rating of the basic central processor. (The basic central processor contains 16,384 bytes of S-memory.)

d. List the kVA rating of each additional memory module.

e. List the kVA rating of each I/O base extension.

f. List the kVA ratings of each I/O control.

g. List the kVA ratings of each peripheral unit (refer to the appropriate data sheet). Include both the devices that are connected to the convenience outlets of the central processor and the devices that are connected to the same single-phase power source that furnishes input power to the central processor.

h. Add the listed kVA ratings to obtain the single-phase power subtotal (kVA).

i. Multiply the single-phase power subtotal (kVA) by the system expansion factor to obtain the total single-phase power requirement. The recommended expansion factor is 25 percent; however, the actual system expansion factor must be determined on an individual basis.

j. Multiply the total single-phase power requirement by the system power factor (0.85) to obtain total system power in kilowatts (kW).

k. Multiply the total system power (kW) by the kW-to-Btu/h conversion factor (3400) to obtain total system Btu/h.

l. Measure the single-phase input voltage in kilovolts (approximately 0.22 kV).

m. Divide the total single-phase power requirement figure (kVA) by the single-phase input voltage (kV) to obtain the total system current requirement in amperes (A). The total system current requirement is used to determine the wire size that must be used to furnish input power to the system.

B 1710 SERIES SYSTEM, THREE-PHASE INPUT POWER SOURCE

If a B 1710 series system is powered by a three-phase input power source, the components of the system must provide a balanced load to the input power source. A balanced load is achieved when the loads connected between each pair of the three input power legs are equal (A-to-B, B-to-C and C-to-A). Load balancing is accomplished by connecting the central processor between two legs of the input power source (for example, A-to-B) and connecting the peripheral devices equally between the other legs of the input power source (for example, B-to-C and C-to-A).

Although it is generally not possible to achieve a perfect load balance, the field engineer must attempt to equalize the three loads within the limits of the available system components.

Input power and air conditioning requirements for a three-phase input power source can be determined by using the following procedure:

a. Use the B 1710 Series System Three-Phase Power and Heat Calculation chart (chart II-2) for all calculations. Three charts are required; one for the A-to-B leg load, one for the B-to-C leg load, and one for the C-to-A leg load. The first chart incorporates steps b through h of this procedure.

b. Use chart II-5 (contained in DATA SHEET 1) for all central processor kVA ratings.

c. List the kVA rating for the basic central processor. (The basic central processor contains 16,384 bytes of S-Memory).

d. List the kVA rating of each additional memory module.

e. List the kVA rating of each I/O base extension.

f. List the kVA rating of each I/O control.

g. List the kVA ratings of all of the other devices that are connected between the same two legs of the input power source. (Include those devices that are connected to the central processor convenience outlets.)

h. Add the listed kVA ratings to obtain one of the three-phase, leg-to-leg power subtotals.

i. Use another copy of the B 1710 Series Three-Phase System Power and Heat Calculation chart to list the load ratings of the second input power leg-to-leg combination.

j. List the kVA ratings of all devices that are connected to the leg-to-leg combination selected in step i of this procedure.

k. Add the listed kVA ratings to obtain the second three-phase, leg-to-leg power subtotal.

l. Use another copy of the B 1710 Series Three-Phase System Power and Heat Calculation chart to list the load ratings of the third input power leg-to-leg combination.

m. List the kVA ratings of all devices that are connected to the leg-to-leg combination selected in step l of this procedure.

n. Add the listed kVA ratings to obtain the third three-phase, leg-to-leg power subtotal.

o. Select the B 1710 Series Three-Phase System Power and Heat Calculation chart that has the largest (numerical value), three-phase, leg-to-leg power subtotal.

p. Multiply the three-phase, leg-to-leg power subtotal (selected in step o of this procedure) by 3 to obtain the existing system three-phase power subtotal (kVA).

q. Multiply the existing system three-phase power subtotal (kVA) by the system expansion factor to obtain the total three-phase power requirement. (Although the recommended system expansion factor is 25 percent, the actual system expansion factor must be determined on an individual basis.)

r. Multiply the total three-phase power requirement figure by the total system power factor (0.85) to obtain total system power in kilowatts (kW).

s. Multiply the total system power (kW) by 3400 to obtain total system Btu/h.

t. Measure the leg-to-leg voltage (approximately 0.208 kV) of the input power phase selected in step o of this procedure.

u. Divide the leg-to-leg three-phase input power subtotal (obtained in step o) by the leg-to-leg kilovolts (obtained in step t) to obtain the three-phase leg-to-leg apparent current of the selected phase.

v. Multiply the three-phase leg-to-leg apparent current by 1.732 to obtain a three-phase corrected input leg current. The three-phase input leg corrected current is used to determine the wire size that must be used to furnish input power for the system.

B 1720 SERIES SYSTEMS, THREE-PHASE INPUT POWER SOURCE

The B 1720 series system must provide a balanced load to the three-phase input power source. A balanced load is achieved when the loads connected between each pair of the three input power legs are equal (A-to-B, B-to-C and C-to-A).

Although it is generally not possible to achieve a perfect load balance, the field engineer must attempt to equalize the three loads within the limits of the available system components. The B 1720 series system ac distribution is connected to provide a partial load balance. The master logic power supply is connected between legs A and B of the three-phase input power supply. The slave logic power supply is connected between legs B and C. The S-memory power supply(s), the two blowers (fans), and the ac distribution control are connected between legs C and A. Load balancing for a B 1720 series system is accomplished by connecting the peripheral devices to the appropriate leg-to-leg combination so that the loads on each leg-to-leg combination are identical.

Input power and air conditioning requirements for a B 1720 series system can be determined by using the following procedure:

a. Use the B 1720 Series System Mainframe Power and Heat Calculation chart (chart II-3) to determine the central processor A-to-B leg and B-to-C to determine the leg load. The procedures for determining the A-to-B leg and B-to-C leg loads is contained in steps b through j of this procedure.

b. Use chart II-5 (contained in DATA SHEET 2) for the central processor kVA ratings.

c. List the kVA rating for the basic central processor. (The basic central processor contains 2,048 bytes of M-memory.)

d. List the kVA rating of each additional M-memory module.

e. List the kVA rating of each I/O base extension.

f. List the kVA rating of each I/O control.

g. Add the listed kVA ratings to obtain the A-to-B leg and B-to-C leg power subtotal.

WARNING

Remove all input power to the central processor before performing the next step of this procedure. Switch the two circuit breakers located in the ac distribution box to the OFF position. Also, switch the master (wall or panel board) circuit breaker that supplies input power to the central processor to the OFF position. Failure to perform this operation can result in serious injury or death to the person that performs the next step of this procedure (step h).

h. Determine the phase leg that is connected to each set of convenience outlets. The three sets of convenience outlets are mounted on the ac distribution box. Convenience outlets J1 are connected to leg A; convenience outlets J2 are connected to leg B, and convenience outlets J3 are connected to leg C. The J1, J2, and J3 identifiers are silk screened on the inside of the ac distribution box.

   1. Use the back of the chart II-3 for the calculations to be performed in steps h2 through h9.

   2. Calculate the kV rating(s) of the peripheral device(s) that is connected to the phase A convenience outlets (refer to the data sheets contained in this section). This calculation will provide the total leg A-to-neutral load.

   3. Calculate the total leg B-to-neutral load and the total leg C-to-neutral load by using the methods contained in step h2.

   4. Write the following three headings on the calculation sheet; A-to-B leg, B-to-C leg, and C-to-A leg.

   5. List 1/2 of the total leg A-to-neutral load under both the A-to-B leg leading and the C-to-A leg heading.

   6. List 1/2 of the total leg B-to-neutral load under both the A-to-B leg heading and the B-to-C leg heading.

   7. List 1/2 of the total leg C-to-neutral load under both the C-to-A leg heading and B-to-C leg heading.

   8. Add the figures in each listing to provide three leg-to-leg loads.

   9. Add the totaled A-to-B leg load to the totaled B-to-C leg load and list this sum on the front of the chart II-3 as the A-to-B-to-C leg convenience outlets load.

i. Add the A-to-B leg and B-to-C leg power subtotal (determined in step h) to the A-to-B-to-C convenience outlets load to obtain the A-to-B-to-C leg power total (kVA).

j. Divide the A-to-B-to-C leg input power total by 2 to obtain either the total A-to-B or the total B-to-C leg load.

k. List the total A-to-B and total B-to-C leg loads on chart II-4.

l. Calculate the C-to-A leg load rating by using the procedures in steps m through r.

m. Use the B 1710 Series System Three-Phase Power and Heat Calculations chart (chart II-2) for all calculations.

n. Use chart II-5 (contained in DATA SHEET 2) for the central processor kVA ratings except list 2.5 kVA in the place reserved for the basic central processor kVA rating.

o. List the kVA ratings of each additional S-memory module.

p. Add the listed kVA ratings to obtain the C-to-A leg input power subtotal (kVA).

q. Add the C-to-A legs input power subtotal to the C-to-A leg convenience outlets load (determined in step h8) to obtain the C-to-A leg load.

r. List the C-to-A leg load on chart II-4. This chart is to be used for the remaining steps of this procedure.

s. List in the appropriate columns of chart II-4 the kVA ratings of all other devices that are connected between any two of the three legs of the three-phase input power source.

t. Add each of the leg-to-leg loads to determine the largest numerical leg-to-leg load.

u. List the largest numerical leg-to-leg load and multiply this load by three to obtain the total system load in kVA.

v. Multiply the total system load by the system expansion factor to obtain the total system input power requirements. Although 25 percent is the recommended system expansion factor, the actual system expansion factor percentage must be determined on an individual basis.

w. Multiply the total system input power requirements (kVA) by the total system power factor (0.85) to obtain total system kilowatts (kW).

x. Multiply the total system kilowatts by 3400 to obtain the total system Btu/h. The total system Btu/h value must be used to determine the air conditioning requirements for the system.

y. Use chart II-4 and the following procedure to determine the largest numerical leg load current of the three-phase input supply.

   1. List the largest numerical leg load (determined in step t) as the dividend.

   2. Measure and list the largest numerical leg load kilovolts (leg-to-leg kV) as the divisor.

   3. Perform a division to obtain the largest numerical leg load amperage (A).

   4. List the largest numerical leg load current.

   5. Multiply the largest numerical leg load current by the three-phase correction factor (1.73) to obtain the total system input current requirements for each leg of the three-phase input power supply.

z. Repeat the procedure outlined in step y to obtain the current of any three-phase input supply leg on a given piece of equipment. The only change of procedure is that the largest numerical leg load (step y1) must be that of the given piece of equipment.

B 1728 SERIES AUXILIARY CABINET, SINGLE-PHASE INPUT POWER SOURCE

Input power and air conditioning requirements for a B 1728 auxiliary cabinet may be obtained by using the B 1710 Series Single-Phase Power and Heat Calculation chart (chart II-1).

a. List the kVA rating for the basic auxiliary cabinet. This rating is 1.6 kVA.

b. List the kVA rating of each I/O base extension located in the auxiliary cabinet (refer to chart II-6, DATA SHEET 2).

c. List the kVA rating of each I/O control located in the auxiliary cabinet (refer to chart II-6, DATA SHEET 2).

d. List the kVA ratings of each S-memory modules located in the auxiliary cabinet.

e. Add the listed kVA ratings to obtain single-phase power subtotals (kVA).

f. Multiply the single-phase power subtotal by the system expansion factor to obtain the total single-phase power requirement. Although the recommended system expansion factor is 25 percent, the actual system expansion factor percentage must be determined on an individual basis.

g. Multiply the total single-phase power requirement (kVA) by the system power factor (0.85) to obtain total system power in kilowatts (kW).

h. Multiply the total system power (kW) by 3400 to obtain total system Btu/h.

i. Measure the single-phase input voltage in kilovolts.

j. Divide the single-phase power requirement (kVA) by the single-phase input voltage (kVA) to obtain the total single-phase current requirement in amperes (A). The total single-phase current requirement is used to determine the wire size that must be used to furnish input power to the auxiliary cabinet.

B 1728 AUXILIARY CABINET, THREE-PHASE INPUT POWER SOURCE

It is assumed that the three-phase input power source to the B 1728 auxiliary cabinet is the same power source that furnishes input power to the B 1728 central processor.

Input power and air conditioning requirements for a B 1728 auxiliary cabinet connected to one phase of a three-phase power supply can be determined by using the following procedure:

a. Use the B 1710 Series System Three-Phase Power and Heat Calculation chart (chart II-2) for initial calculations (steps b through g).

b. Use chart II-6 (contained in DATA SHEET 2) for kVA ratings.

c. List the kVA rating for the basic auxiliary cabinet. This rating is 1.6 kVA.

d. List the kVA rating of each I/O base extension located in the auxiliary cabinet.

e. List the kVA ratings of each I/O control.

f. List the kVA ratings of each S-memory module.

g. Add the listed kVA ratings to obtain the three-phase, leg-to-leg power subtotal.

h. List the auxiliary cabinet three-phase, leg-to-leg power subtotal to the appropriate column on chart II-4.

DATA SHEET 1 - B 1712/B 1714 CENTRAL SYSTEM

EQUIPMENT CHARACTERISTICS

Dimensions	CP*	Table	Clearances**	
Width	27.75"	52"	Front	36"
Depth	32.75	24"	Rear	36"
Height	64.00	26.75"	Left	36"
Weight	720 lbs.	180 lbs.	Right	36"

Air Flow	60Hz	50Hz	Power and Heat
CFM	900	710	Refer to chart II-2 for power and Btu/h calculations.

*Includes cover dimensions.

**All clearances are specified from the Central Processor. Table arrangement will denote actual front clearances requirement.

INPUT POWER CABLING

The input power to the B 1712/B 1714 central processor is either 50 Hertz, single-phase, 208/240 VAC, three-wire service or 60 Hertz, single-phase, 208/240 VAC, four-wire service. The location of the central processor power cable is shown in figure II-2.

PERIPHERAL SIGNAL CABLING

The peripheral signal cabling interface is located in a panel mounted underneath the operator's table. Cables from the I/O controls and the peripheral units are routed to this area. Refer to figure II-2 for cable entrance locations.

PERIPHERAL POWER CABLING

A power distribution panel containing circuit breakers and four receptacles is located adjacent to the peripheral signal cabling interface area.

One of the circuit breakers (30 amperes) is used for the central processor; the other circuit breaker (35 amperes) is used for the four outlets. A 60 Hertz system provides 115/120 VAC at the four Hubbell, type 5264, outlets. A 50 Hertz system provides 208/230 VAC at the four Pass and Seymour, type 5874, outlets.

Chart II-5. B 1712/B 1714 Central System Power and Heat

NUMBER	UNIT	KVA	Btu/H
B 1712/ B 1714	Basic Central Processor containing ... Processor Main Memory (16,384 bytes) One I/O Base, Power Supplies and fans.	2.500	8,500
B 1012-XX/ B 1014-XX	Additional S- Memory adapters (8,192 bytes)	0.061	207
A 1305	I/O Base Extension	0.014	48
A 1340	Console Printer Control	0.060	204
A 1115	Card Reader Control, 300 CPM-80 Column	0.060	204
A 1116	Card Reader Control, 600 CPM-80 Column	0.060	204
A 1119-1	Card Reader Control, 300 CPM-96 Column	0.120	408
A 1210-1	Card Punch Control, 80 Column, 100 CPM	0.060	204
A 1319-2	Card Reader/Punch/Print Control, 96 Col., 300-60-60	0.120	408
A 1319-4	Card Reader/Punch/Print Ctrl, 96 Col., 500-120-120	0.120	408
A 1419-2	Card Reader/Punch/Print Ctrl, 96 Col., 300-60-60	0.120	408
A 1419-6	Card Reader/Punch/Print/Sort 96 Col., 300-300-300- 6 Pocket	0.120	408
A 1245-16	Printer Control, 300 LPM, 132 print positions	0.060	204
A 1245-19	Printer Control, 400 LPM, 132 print positions	0.060	204
A 1247-2	Printer Control, 400 LPM, 120 print positions	0.120	408
A 1247-3	Printer Control, 750 LPM, 120 print positions	0.120	408
A 1249-1	Printer Control, 90 LPM, 132 print positions	0.060	204
A 1249-2	Printer Control, 180 LPM, 132 print positions	0.060	204
A 1381	Tape Cluster Control	0.300	1,020
A 1491-2	10 KB Tape Control	0.420	1,428
A 1480	Disk Cartridge Control, 2.3/4.6 Megabytes	0.180	612
A 1481	Disk Cartridge Control, 4.6/9.3 Megabytes	0.180	612
A 1135	Reader Sorter Control, 900 DPM	0.120	408
A 1136	Reader Sorter Control 600 DPM	0.120	408
A 1351	*Single Line Control	0.120	408
	*For a Line Adapter add:	0.060	204

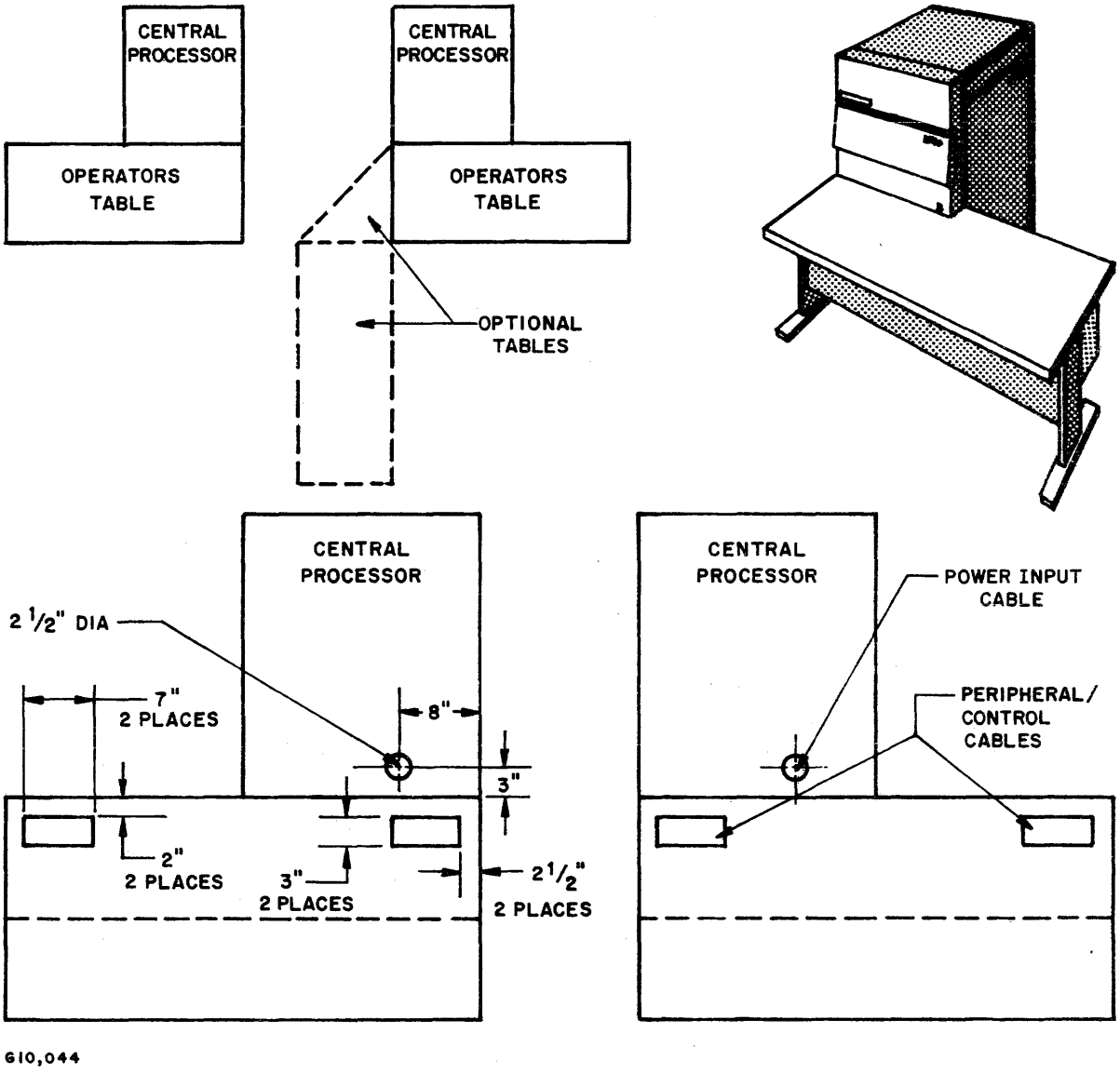


Figure II-2. B 1712/B 1714 Central System

DATA SHEET 2 - B 1726 CENTRAL SYSTEM

EQUIPMENT CHARACTERISTICS

Dimensions	GP*	Table	Clearances**
Width	27.75"	..... 52"	Front .....36"
Depth	62.00"	..... 24"	Rear .....36"
Height	64.00	..... 26.75"	Left .....36"
Weight	1320 lbs.	..... 180 lbs.	Right .....36"

Air Flow	60 Hz	50 Hz	Power and Heat
CFM	1800	1420	Refer to chart II-3 for power and heat calculations.

*Includes cover dimensions
**All clearances are specified from the Central Processor. Table arrangement will devote actual front clearance requirement.

INPUT POWER CABLING

The B 1726 System requires three-phase input power. The ONLY recommended input power for domestic systems is a wye connected, five-wire service providing 208/240 VAC between the three wye legs and 115/120 VAC between any leg and neutral. The recommended input power for International application is either a delta or wye connected four-wire service, providing 208/240 VAC between the three delta or wye legs. Also, a wye connected 240/415 VAC five-wire service can be used since 208/240 VAC is provided between each leg to neutral. The power cable to the B 1726 Central Processor enters through the opening at the rear bay of the system as shown in figure II-3.

PERIPHERAL SIGNAL CABLE

The peripheral signal cabling interface is located in a panel at the rear of the two-bay central processor cabinet. Access to this panel is provided by an opening in the bottom of the rear cabinet as shown in figure II-3.

SYSTEM CIRCUIT BREAKERS

There are two 3-section circuit breakers located in a panel mounted underneath the operator's table. The 50 ampere circuit breaker is used for the Central System power supplies and the 15 ampere circuit breaker is used to supply six outlets. Both circuit breakers consist of three interlocked circuit breakers rated at 50 amperes and 15 amperes, respectively. The six outlets provide 115/120 VAC single-phase for 60 Hz systems or 208/240 VAC, single-phase, for 50 Hz systems. Each of the six outlets are labeled, denoting the peripheral unit that may use this outlet as a power source. Failure to use the indicated peripheral unit in the correct outlet can result in an unbalanced power line or activate the 15 ampere circuit breaker.

Chart II-6. B 1726 Central System Power and Heat

NUMBER	UNIT	KVA	BTU/H
B 1726	Basic Central Processor containing Processor Main Memory (24,576 bytes) Control Memory (2,048 bytes) I/O Base Power Supplies and fans	3.200	10,880
B 1305	I/O Base Extension	0.014	48
B 1026-XX	Additional S- Memory adapters (8192 bytes)*	0.061	207
B 1026-2	Additional M- Memory adapter (2048 bytes)	0.071	241
B 1340	Console Printer Control	0.060	204
B 1111	Card Reader Control, 800/1400 CPM, 80 Column	0.060	204
B 1115	Card Reader Control, 300/600/800 CPM, 80 Column	0.060	204
B 1119-1	Card Reader Control, 300 CPM, 96 Column	0.120	408
B 1210	Card Punch Control, 100 CPM, 80 Column	0.060	204
B 1213	Card Punch Control, 300 CPM, 80 Column	0.120	408
B 1319	Card Reader/Punch/Print Control, 300/500-60/120-6/120, 96 Column	0.120	408
B 1419	Card Reader/Punch/Print Control, 300-60-60, 96 Col.	0.120	408
B 1240	Printer Control, 475/700/1,040 LPM	0.060	204
B 1247	Printer Control, 400/750 LPM	0.120	408
B 1381	Tape Cluster Control	0.300	1,020
B 1390	18/50/72 KC 7-Channel Tape Control		
B 1491	10 KB Tape Control	.420	1,428
B 1394-2	9-Channel Tape Control		
B 1480	Disk Cartridge Drive Control, 2.3/4.6 Megabytes	0.180	612
B 1481	Disk Cartridge Drive Control, 4.6/9.3 Megabytes	0.180	612
B 1486	Disk Pack Drive Control, 95.5 Megabytes	0.180	612
B 1484-4	Disk Pack Drive Control, 175 Megabytes	0.180	612
B 1374	Head-Per-Track Disk File Control	0.240	816
B 1131	Reader Sorter Control, 13 Pocket, 1000 DPM	0.120	408
B 1134	Reader Sorter Control, 4 Pocket, 1625 DPM	0.120	408
B 1135	Reader Sorter Control, 8/12 Pocket, 900 DPM	0.120	408
B 1136	Reader Sorter Control, 8/12 Pocket, 600 DPM	0.120	408
B 1351	** Singleline Control	0.120	408
B 1352	** Multiline Control	0.240	816
B 1353	** Multiline Control Extension	0.240	816
B 1120	Paper Tape Reader Control	0.120	408
B 1220	Paper Tape Punch Control	0.120	408

*Add 0.198 KVA for each 64 K bytes of main memory with the exception of the first 64 K bytes.

** Each Line Adapter add: 0.060 204

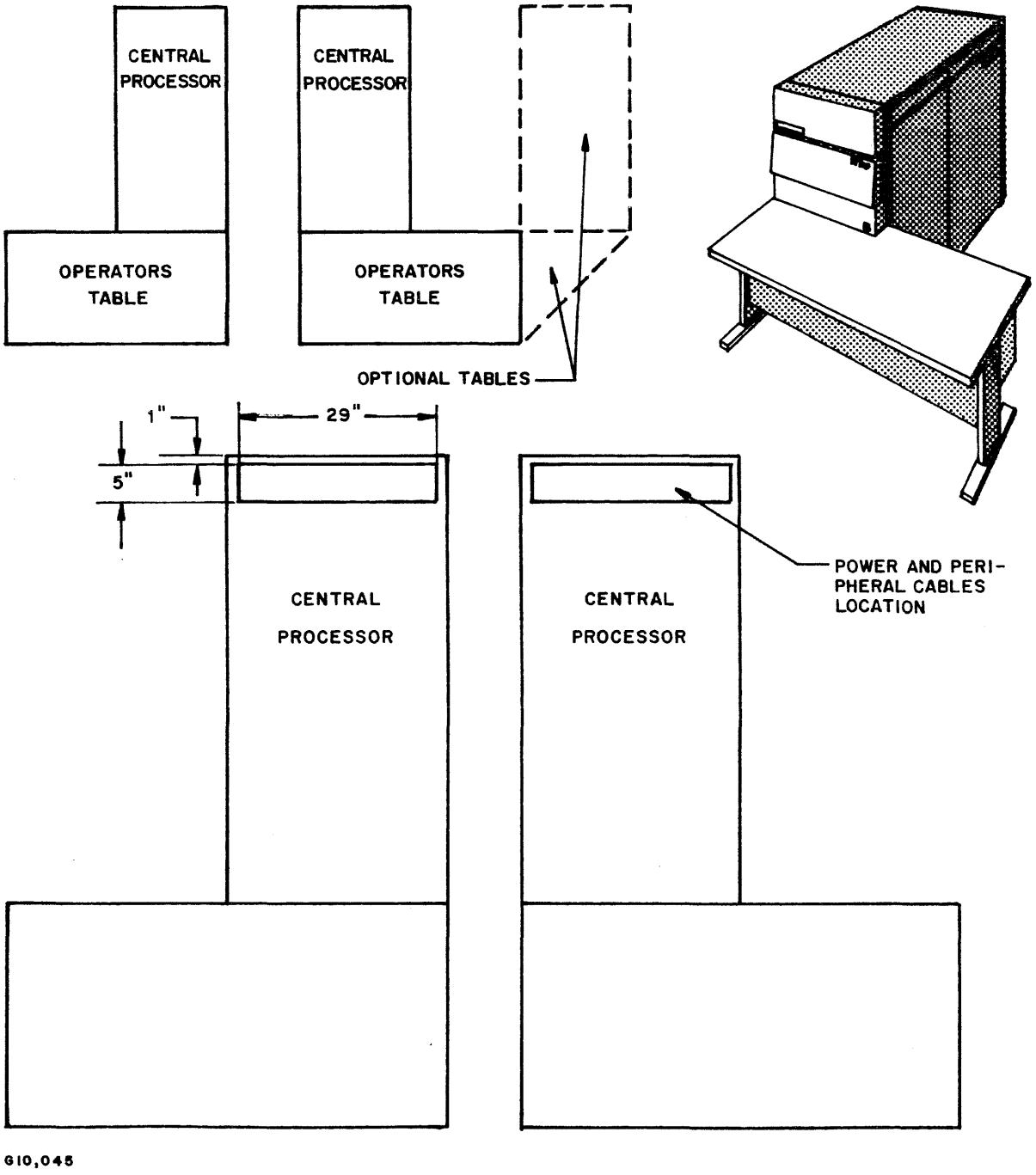


Figure II-3. B 1726 Central System

DATA SHEET 3 - B 9340 CONSOLE PRINTER

EQUIPMENT CHARACTERISTICS

Dimensions

Width	17.25"
Depth	17.50"
Height	11"
Weight	55 lbs.

Air Flow and Heat

CFM	0
Btu/h	800

Clearances

Front	36"
Rear	0.0"
Left	0.0"
Right	0.0"

Power

Operating Voltages...	115/120V, single phase, 50/60 Hz
Circuit Breaker	Fused
KVA	0.32
L1	2.7A
L2	0.0A
Power Cord Rating	15A
Power Cord	2-wire and ground
Power Plug	Hubbell type 5264

UNIT DESCRIPTION

The B 9340 Console Printer (SPO) is shown in figure II-4.

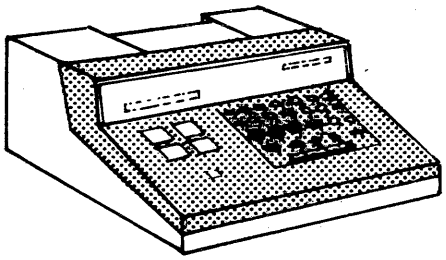


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Figure II-4. B 9340 Console Printer

DATA SHEET 4 - B 9111/B 9112 CARD READERS

EQUIPMENT CHARACTERISTICS

Dimensions

Width ..... 48"
Depth ..... 29"
Height ..... 50"
Weight .....920 lbs.

Clearances

Front .....36"
Rear .....36"
Left ..... 0.0"
Right ..... 0.0"

Air Flow and Heat

CFM 400
Btu/h 3900

Internal Signal Cable Allowance .....12"

Signal Cable Bend Allowance...12"

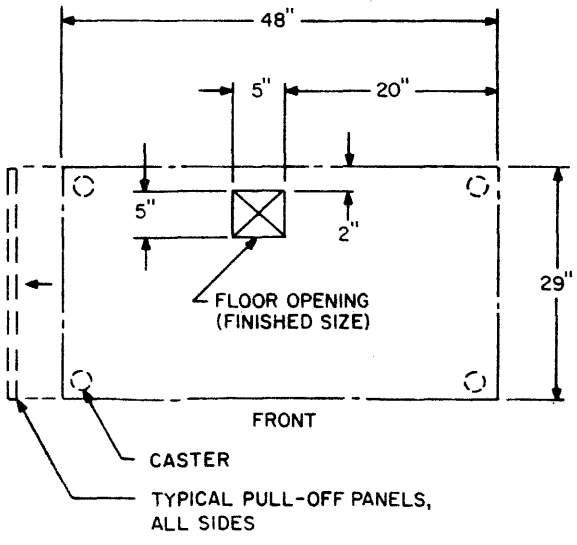
Power

Circuit Breaker..... 2-pole, 20A
KVA 1.8
Operating Voltages.. 115/120V, single-phase, 50/60 Hz
L1 ..... 15.0A
L2 ..... 0.0A
Power Cord Rating .. 20A
Power Cord ..... 2-wire and ground
Power Plug ..... 5366 Pass and Seymour

UNIT DESCRIPTION

This 80-column card reader, figure II-5, is available in two models as follows:

Unit	CPM
B 9111	800
B 9112	1400



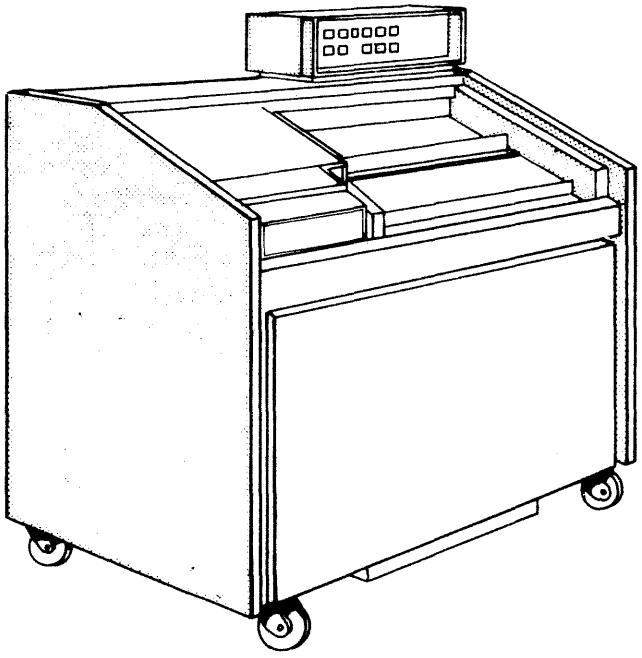


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Figure II-5. B 9111/B 9112 Card Reader

DATA SHEET 4 - B 9111/B 9112 CARD READERS (Cont)

FLOOR OPENINGS

The recommended floor openings are shown in figure II-5.

AIR INTAKE AND EXHAUST VENTS

One 13-inch by 18-inch air intake vent is located at the lower left rear of the unit. One 4-inch by 24-inch air exhaust vent is located at the top right rear of the unit.

CABINET PLACEMENT AND CABLE ENTRANCE

The card reader rests on four rubber wheel casters. The readers must be within 40 feet of the central control cabinet, when measured from floor opening to floor opening.

Cable entrance to the card reader is depicted in figure II-6.

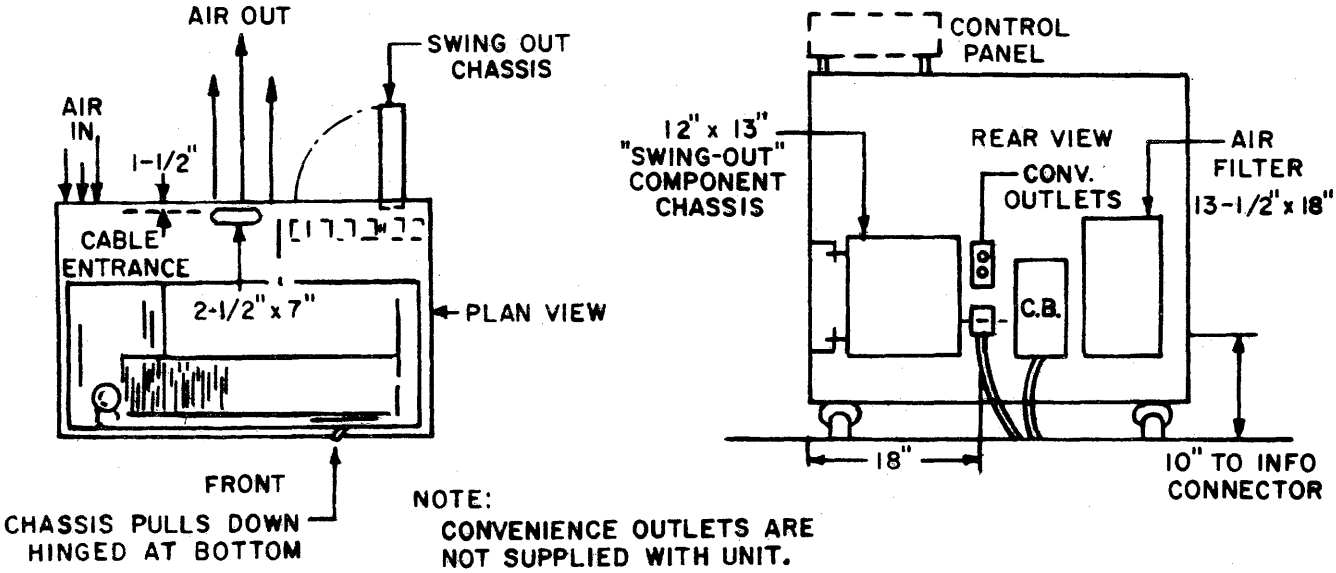

Figure II-6. B 9111/B 9112 Cable Entrances

LOGIC CABLES

The following is a list of 75-pin cables available for the B 9111 and B 9112. One cable is required, as determined by the distance between the card reader and its control.

Cable No.	Length	Cable No.	Length
1178 0889	25 feet	1178 0871	30 feet
1178 9633	35 feet	1197 1439	50 feet

DATA SHEET 5 - B 9115/B 9116/B 9117 CARD READERS

EQUIPMENT CHARACTERISTICS

Dimensions

Width .....22"
Depth .....19.5"
Height .....22"
Weight .....105 lbs.

Air Flow and Heat

CFM 100
Btu/h 820

Clearances

Front .....36"
Rear .....36"
Left .....36"
Right .....36"

Power

Circuit Breaker .....Fused
Operating Voltages...115/120V ac, 60 Hz,
220/240V ac, 50 Hz
KVA 0.4
L1 .....3.3A
L2 .....NA
Power Cord Rating ...15A
Power Cord .....2-wire & ground
Power Plug .....Hubbell, type 5264

UNIT DESCRIPTION

This 80 column card reader (figure II-7) is available in three models as follows:

Unit	CPM
B 9115	300
B 9116	600
B 9117	800

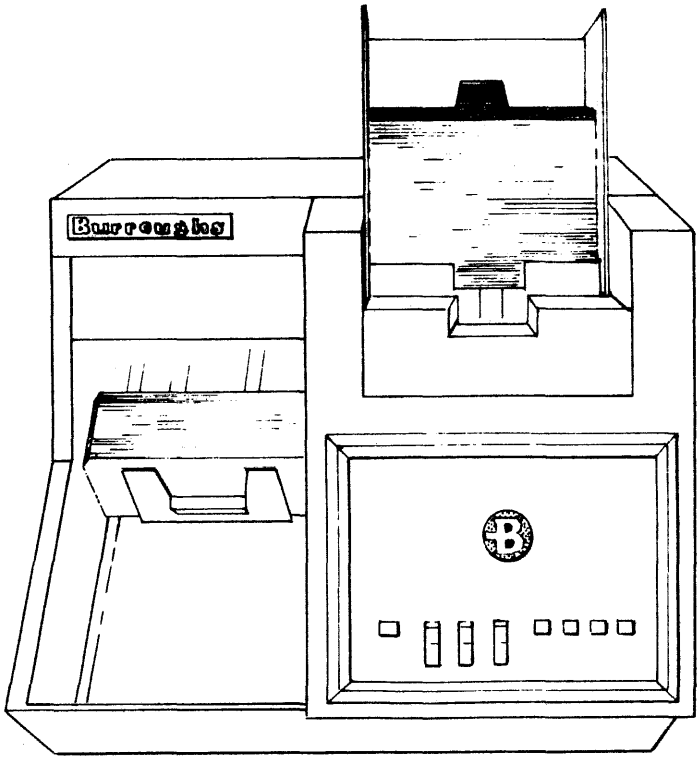

Figure II-7. B 9115/B 9116/B 9117 Card Reader

DATA SHEET 5 - B 9115/B 9116/B 9117 CARD READERS (Cont)

LOGIC CABLES

The following is a list of the logic cables available for the B 9115, B 9116, B 9117 card reader. One logic cable is required between the card reader and the I/O control.

CABLE NO.	LENGTH
2471 3067	30 Ft.
2471 3075	35 Ft.
2471 3083	50 Ft.
2471 3091	100 Ft.

DATA SHEET 6 - B 9419-2/B 9419-6 INTERPRETER DATA RECORDERS

EQUIPMENT CHARACTERISTICS

Dimensions

Width	42"
Depth	27"
Height	35"
Weight	250 lbs.

Clearances

Front	36"
Rear	36"
Left	0.0"
Right	0.0"

Air Flow and Heat

CFM	8
Btu/h	1200

Power

Operating Voltages	115/120V ac, single-phase, 50/60 Hz
KVA	0.33
Circuit Breaker	8 amp.
L1	2.8 amp.
L2	0.0 amp.
Power Cord Rating	15 amp.
Power Cord	2-wire & ground
Power Plug	Pass & Seymour, Type 5874

UNIT DESCRIPTION

The 96 column interpreter data recorder (figure II-8) is available in two models as follows:

Unit	Read	Punch	Print	Sort
B 9419-2	300 CPM	60 CPM	60 CPM	No
B 9419-6	300 CPM	60 CPM	60 CPM	300 CPM, 6 pocket

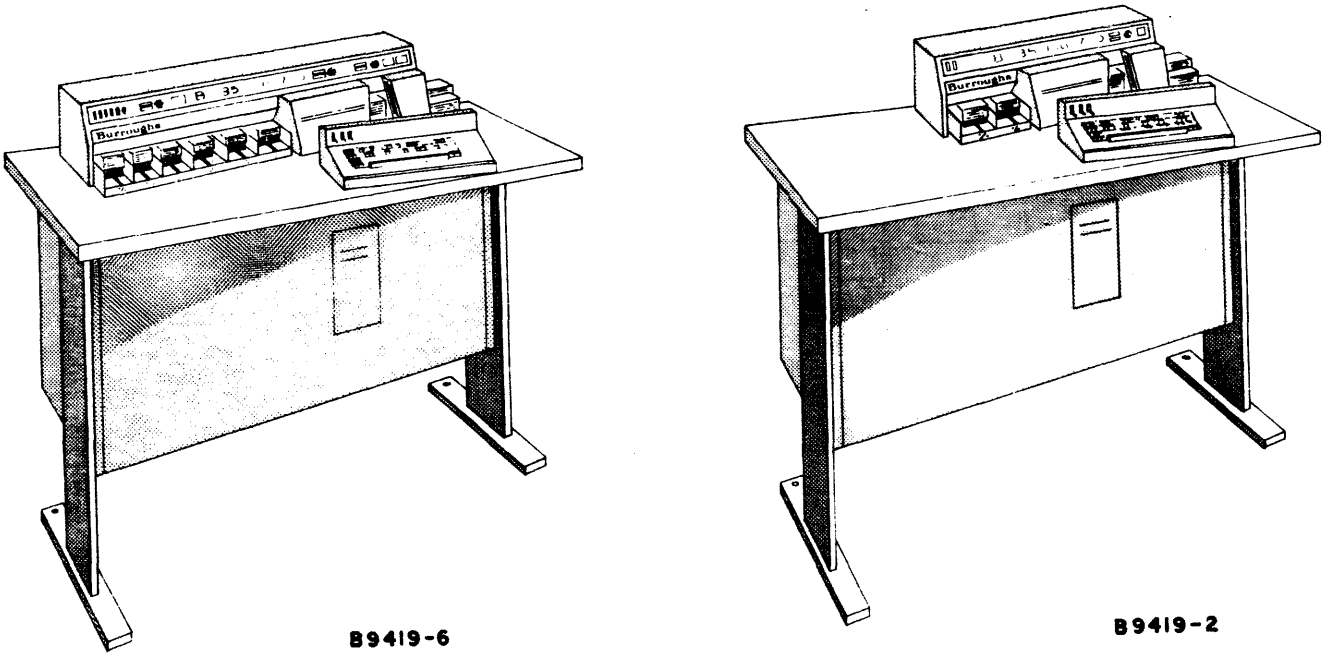

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Figure II-8. B 9419-2/B 9419-6 Interpreter Data Recorders

DATA SHEET 7 - B 9319-5 MULTIFUNCTION CARD UNIT

EQUIPMENT CHARACTERISTICS

Dimensions

Width	42"
Depth	27"
Height	35"
Weight	250

Clearances

Front	36"
Rear	36"
Left	0.0"
Right	0.0"

Air Flow and Heat

CFM	0
Btu/h	1200

Power

Circuit Breaker	Fused
Operating Voltages	115/220V ac, single-phase, 60 Hz
KVA	1.0
L1	10.0
L2	NA
Power Cord Rating	20A
Power Cord	2-wire & ground
Power Plug	Hubbell, type 5264

UNIT DESCRIPTION

The 96 column multifunction card unit (figure II-9) provides the following capabilities:

a. Reading cards at 1000 CPM.

b. Punching cards at 120 CPM.

c. Punching and/or printing cards at 120 CPM.

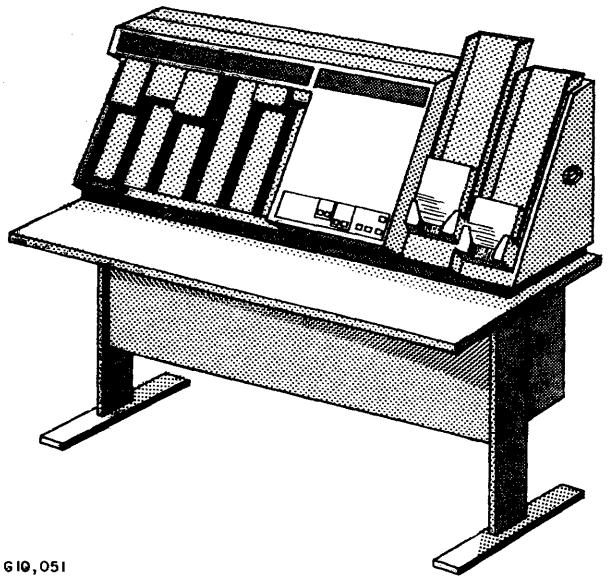

Figure II-9. B 9319-5 Multifunction Card Unit

DATA SHEET 8 - B 9319-1/B 9319-2 READER-PUNCH

EQUIPMENT CHARACTERISTICS

Dimensions

Width .....42"
Depth .....27"
Height .....35"
Weight .....250 lbs.

Air Flow

CFM 8
Btu/h 400

Clearances

Front .....36"
Rear .....36"
Left .....0.0"
Right .....0.0"

Power

Circuit Breaker .....Fused
Operating Voltages ....115/120V, ac single-phase, 50/60 Hz
KVA ..... .33
L1 .....2.8
L2 .....0.0
Power Cord Rating 15
Power Cord .....2-wire & ground
Power Plug .....Hubbell, type 5264

UNIT DESCRIPTION

The 96 column, reader-punch unit (figure II-10) provides the following capabilities:

a. Reading cards at 300 CPM.
b. Punching cards at 60 CPM.
c. Punching and/or printing cards at 60 CPM.

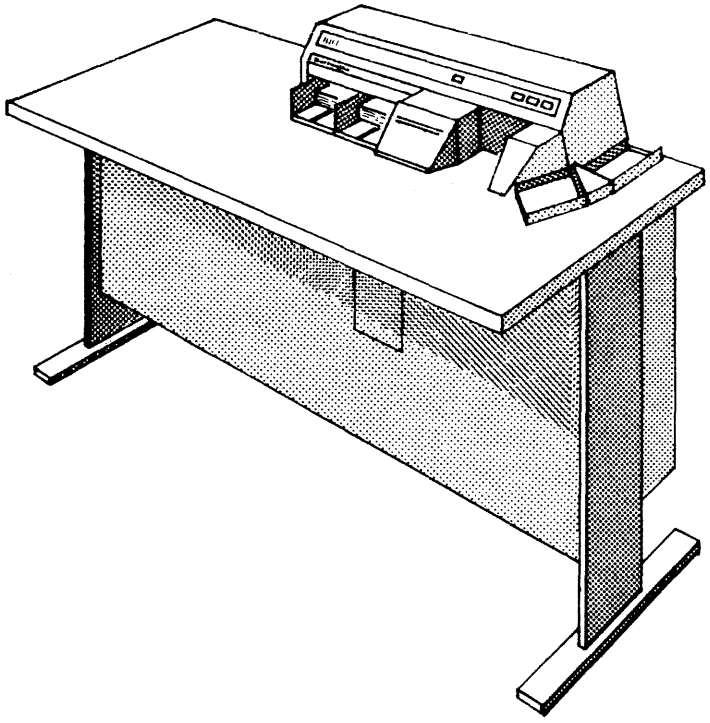

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Figure II-10. B 9319-1/B 9319-2 Reader-Punch

DATA SHEET 9 - B 9210 CARD PUNCH

EQUIPMENT CHARACTERISTICS

Dimensions

Width .....44.5"
Depth .....28"
Height .....53"
Weight .....655 lbs.

Air Flow and Heat

CFM 200
Btu/h 4000

Clearances

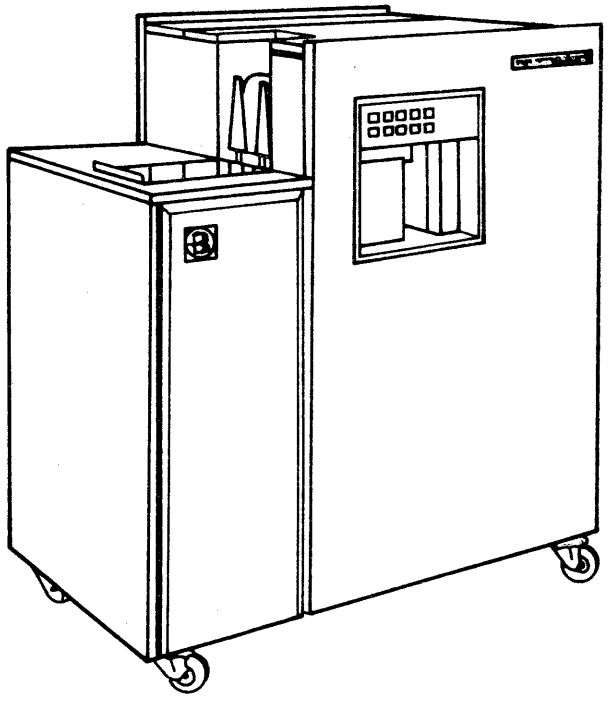
Front .....36"
Rear .....36"
Left .....0.0"
Right .....12"

Power

Circuit Breaker 30A
Operating Voltages....208/230V ac, single-phase, 60 Hz; 220/230/240V ac, single-phase, 50 Hz
KVA 1.4
L1 .....7.5A
L2 .....3.0A
Power Cord Rating 20A
Power Cord 4-wire
Power Plug .....Pass & Seymour, type 5333

UNIT DESCRIPTION

This 80 column card punch (figure II-11) operates at 100 CPM.



810,053

Figure II-11. B 9210 Card Punch

DATA SHEET 10 - B 9212/B 9213 CARD PUNCH

EQUIPMENT CHARACTERISTICS

Dimensions

Width .....21"
Depth .....43 1/2"
Height .....49"
Weight .....611 lbs.

Air Flow and Heat

CFM 1000
Btu/h 4400
Internal Signal Cable Allowance 10"
Signal Cable Bend Allowance ..... 12"

Clearances

Front .....36"
Rear .....36"
Left .....36"
Right .....36"

Power

Operating Voltages ....208/230V ac, single-phase, 60 Hz 220/230, 240V ac, single-phase, 50 Hz
KVA 2.00
Circuit Breaker 2-pole, 20A
L1 ..... 7.0A
L2 ..... 7.0A
Power Cord Rating 20A
Power Cord ..... 2-wire & ground
Power Plug ..... 5874 Pass & Seymour

UNIT DESCRIPTION

The 80 column card punch (figure II-12) is available in two models as follows:

Unit	CPM
B 9212	150
B 9213	300

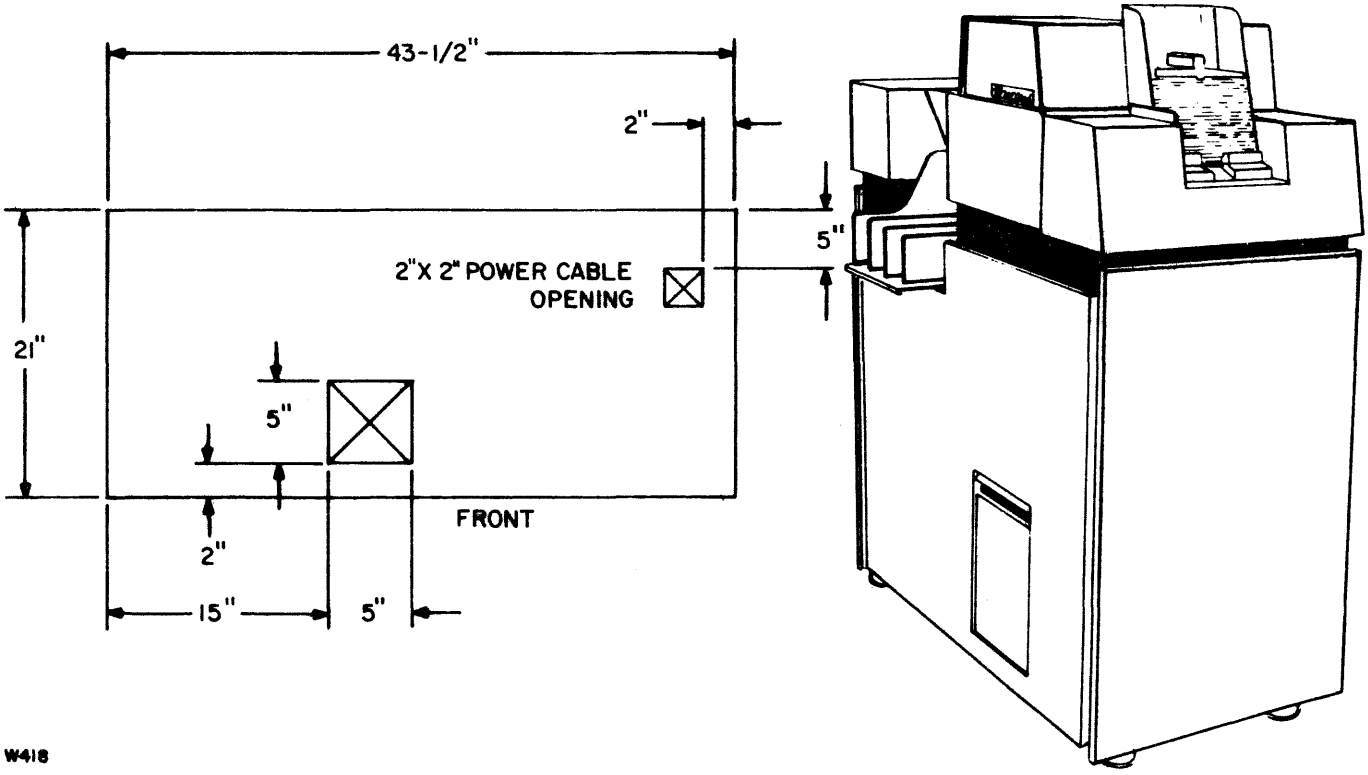


Figure II-12. B 9212/B 9213 Card Punch

DATA SHEET 10 - B 9212/B 9213 CARD PUNCH (Cont)

FLOOR OPENINGS

The base dimensions for the card punch and the recommended floor openings are shown in figure II-12. The power cable cut-out is not required, as the power cord may be routed through the signal cable cutout.

AIR INTAKE AND EXHAUST VENTS

One 4-inch by 13-inch air intake vent (figure II-13) is located at the bottom left rear panel of the unit. One 4-inch by 13-inch air exhaust vent is located at the bottom right rear panel of the unit, and one 5-inch by 3- 1/3 inch vent is located on top of the unit.

CABINET PLACEMENT AND CABLE ENTRANCE

The card punch rests on four load pads or optional casters which can be ordered with the unit. The B 9212/B 9213 must be located within 40 feet of the cabinet containing the I/O control. The cable entrance is depicted in figure II-13.

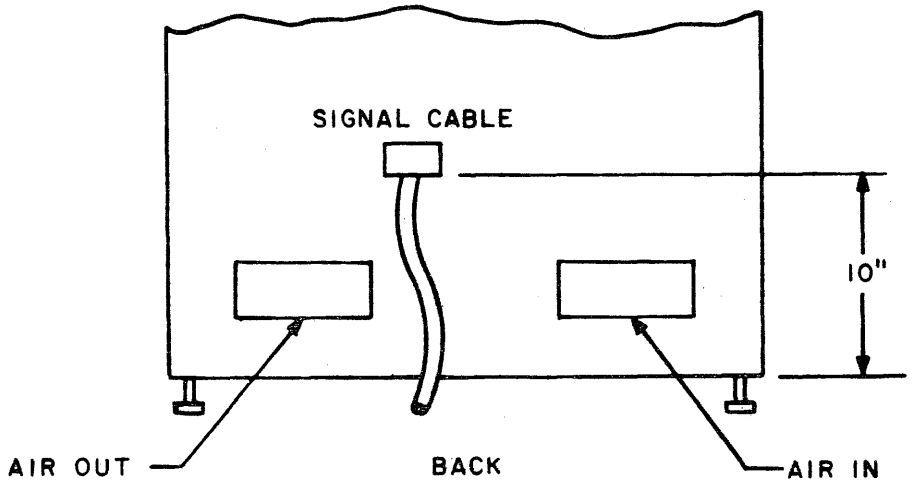


Figure II-13. B 9312/B 9313 Punch Cable Entrances

LOGIC CABLES

The following is a list of the 75-pin cables available for the B 9212/B 9213. One cable is required for each punch: the cable length is determined by the distance between the punch and the control.

Cable No.	Length	Cable No.	Length
1178 0889	25 feet	1178 0871	30 feet
1178 9633	35 feet	1197 1439	50 feet

CARD PUNCH OPTIONS

The following options are available for the card punch(s):

a. 50 Hz power module.

b. Hopper extension option (increases input hopper capacity to 2200 (0.007) cards).

c. 150 CPM module, 50 Hz.

d. 150 CPM module, 60 Hz.

e. Punch casters.

DATA SHEET 11 - B 9240 LINE PRINTER

EQUIPMENT CHARACTERISTICS

Dimensions

Width .....75"
Depth .....29"
Height .....55.5"
Weight .....1738 lbs.

Air Flow and Heat

CFM 1100
Btu/h 6000

Clearances

Front .....36"
Rear .....36"
Left .....30"
Right .....12"

Power

Operating Voltages....208/230V, single-phase, 50/60 Hz
Circuit Breaker 20A
KVA 2.2
L1 .....8.4A
L2 .....9.4A
Power Cord Rating 20A
Power Cord .....3-wire & ground
Power Plug .....Hubbell, type 7411 G

UNIT DESCRIPTION

The B 9240 Line Printer (figure II-14) is available in three models as follows:

Unit	LPM	Print Positions
B 9240-1	475	132
B 9240-2	700	132
B 9240-3	1040	132

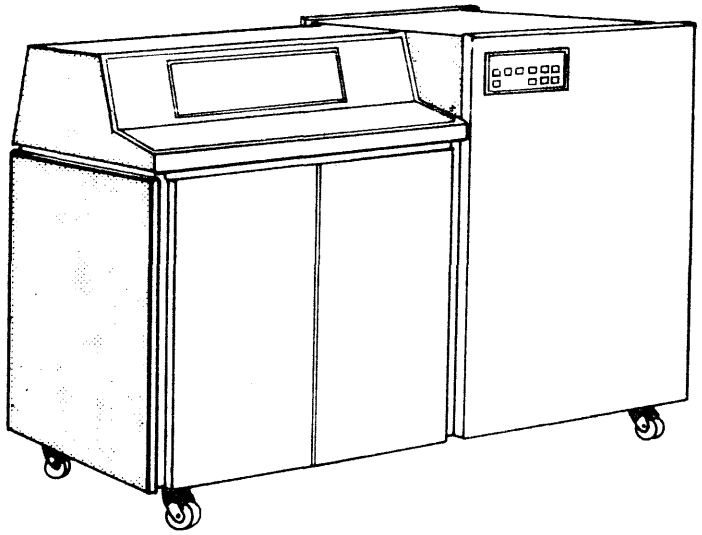


Figure II-14. B 9240 Line Printer

DATA SHEET 12 - B 9243 LINE PRINTER

EQUIPMENT CHARACTERISTICS

Dimensions

Width .....78"
Depth .....29"
Height .....51"
Weight .....1450 lbs.

Air Flow and Heat

CFM 600
Btu/h 5000
Internal Signal Cable Allowance .....8"
Signal Cable Bend Allowance .....12"

Clearances

Front .....36"
Rear .....36"
Left .....30"
Right .....36"

Power

Operating Voltages.208/230V, single-phase, 50/60 Hz
Circuit Breaker 2-pole, 20A
KVA 3.00
L1 .....14.0A
L2 .....14.0A
Power Cord Rating ..20A
Power Plug .....5874 Pass and Seymour
Power Cord.....2-wire & ground

FLOOR OPENINGS

The recommended location and the size of the floor openings are shown in figure II-15.

AIR INTAKE AND EXHAUST VENTS

Four 7-inch by 24-inch air intake vents are located at the bottom of the unit. One 8-inch by 24-inch air exhaust vent is located at the top right side and rear of the unit, and two 8-inch by 6-inch air exhaust vents are located at the top left rear of the unit.

CABINET PLACEMENT

The printer must be located within 40 feet of the peripheral control cabinet as measured from floor opening to floor opening. The printer rests on four leveling screws unless rubber wheel casters are specified when the order is placed.

LOGIC CABLES

One cable is required for each line printer; the cable length is determined by the distance between the printer and the control.

Cable No.	Length	Cable No.	Length
1178 9625	25 feet	1180 5710	30 feet
1178 0863	35 feet	1197 0209	50 feet

LINE PRINTER OPTIONS

The following items are available for the B 9242/B 9243 line printer:

a. 50 or 60 Hz module.
b. High or low speed slew.
c. Stacker drive.
d. Printer lister caster kit.
e. American drum BCL (standard).

DATA SHEET 12 - B 9243 LINE PRINTER (Cont)

f. BCL encoder (with parity).

g. 120 print positions.

h. 132 print positions.

UNIT DESCRIPTION

The B 9243 line printer (figure II-15) operates at 860 LPM.

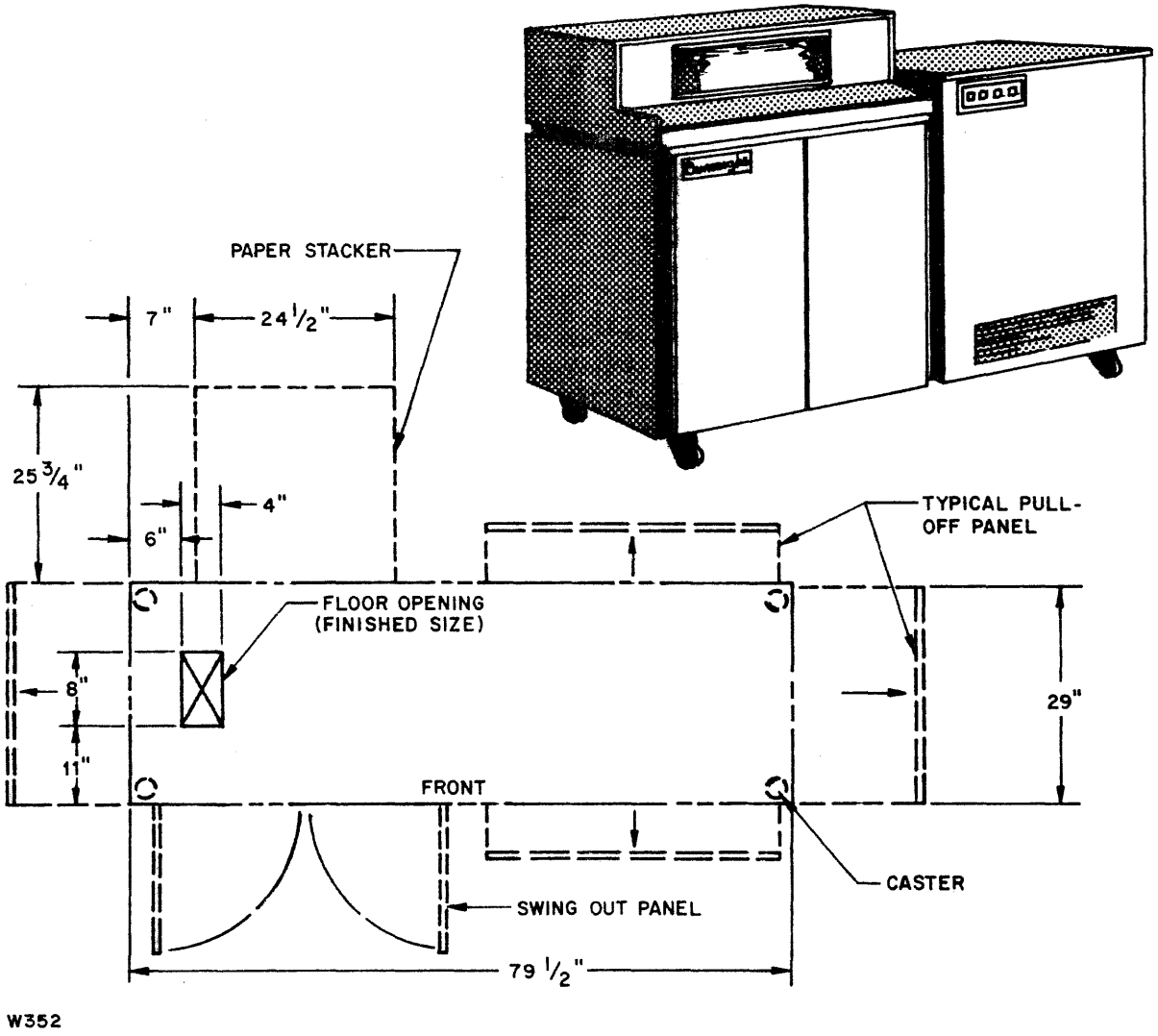


Figure II-15. B 9242/B 9243 Line Printer

DATA SHEET 12 - B 9243 LINE PRINTER (Cont)

The following options are available for the drum and encoder:

a. EBCDIC drum (STD).
b. BCL encoder 6-bits with parity.
c. American drum.
d. American CR encoder.
e. Germanic drum.
f. Sterling encoder.
g. Latin American drum.
h. Portuguese encoder.
i. Spanish encoder.
j. Latin American BULL encoder.
k. Scandinavian drum.
l. Danish encoder.
m. Swedish encoder.
n. Katakana drum, 132 col.
o. Katakana alternate-zero encoder.
p. OCR "A" numeric & STD alpha.
q. OCR "B" alpha numeric.

The following options are available for the buffer:

a. LSD, buffer 120 PP.
b. LSD, buffer 132 PP.
c. Quick cancel 120 PP.
d. Quick cancel 132 PP.
e. LSD to MSD adapter 120 PP.
f. LSD to MSD adapter 132 PP.
g. Maintenance panel.
h. Dual Printer control.

DATA SHEET 13 - B 9245 LINE PRINTER

EQUIPMENT CHARACTERISTICS

Dimensions

Width .....46"
Depth .....25"
Height .....54"
Weight .....850 lbs.

Air Flow and Heat

CFM 250
Btu/h 3700
Internal Signal Cable Allowance 12"
Signal Cable Bend Allowance 12"

Clearances

Front .....36"
Rear .....36"
Left .....36"
Right .....36"

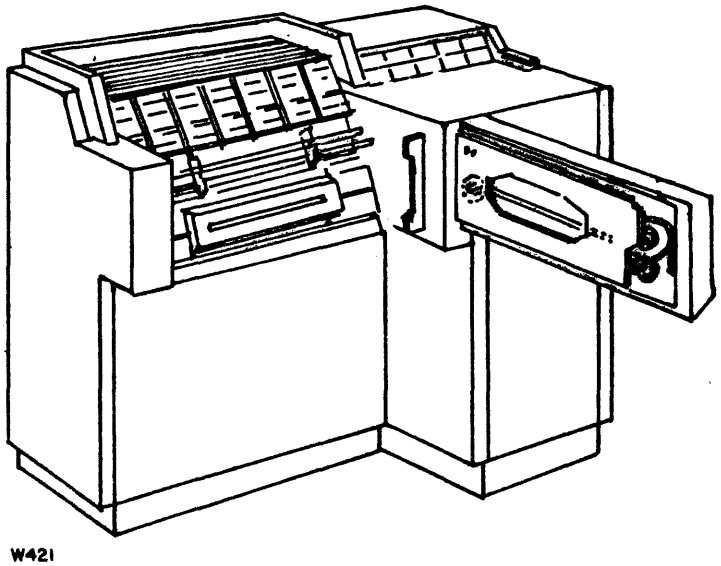
Power

Circuit Breaker ...20A
Operating Voltages.115/120V, single-phase, 50/60 Hz
KVA 1.5
L1 .....14.0A
L2 .....0.0A
Power Cord Rating..50A
Power Cord .....2-wire & ground
Power Plug .....Hubbell, type 5375

UNIT DESCRIPTION

The B 9245 Line Printer (figure II-16) is available in two models as follows:

Unit	LPM	Print Positions
B 9245-16	300	132
B 9245-19	400	132



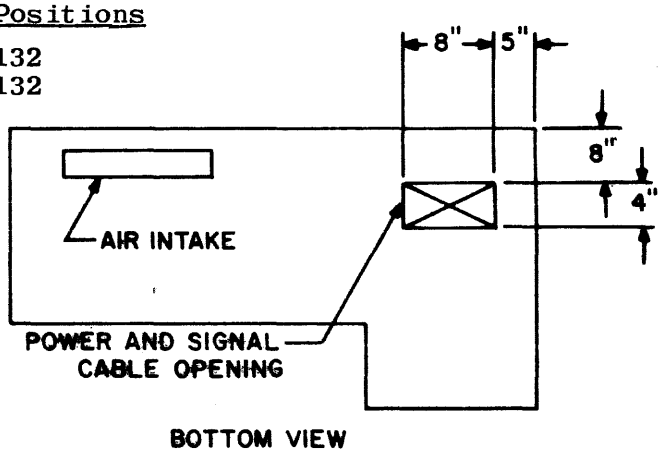


Figure II-16. B 9245 Line Printer

DATA SHEET 13 - B 9245 LINE PRINTER (Cont)

FLOOR OPENINGS

The location and the size of the floor openings are shown in figure II-16.

AIR INTAKE AND EXHAUST VENTS

Air intake is located at the left rear bottom of the unit. Both the logic gate and power supply have cooling fans for proper air flow.

CABINET PLACEMENT AND CABLE ENTRANCE

The B 9245 has casters and leveling screws. The leveling screws are lowered when the printer is in position. The line printer must be within 24 feet of the cabinet containing the I/O control. The cable entrance is shown in figure II-16.

LOGIC CABLES

The following is a list of the 104-pin cables available for the B 9245.

Cable No.	Length	Cable No.	Length
1178 9625	25 feet	1180 5710	30 feet
1178 0863	35 feet	1197 0209	50 feet

LINE PRINTER OPTIONS

a. 120 print positions 365 LPM.
b. 132 print positions 365 LPM.
c. 132 print positions 730 LPM.
d. 60 Hertz, 100-240 V, power.
e. 60 Hertz, 200-240 V, power.
f. Stacker, wire.
g. Rear control panel.
h. Casters.
i. 2 Ch format tape reader.
j. 180 LPM adapter, 365 LPM printer, 60 Hz.
k. 180 LPM adapter, 365 LPM printer, 50 Hz.
l. 2 Ch format tape cartridge.
m. Superior print quality adapter, 60 Hz.
n. Superior print quality adapter, 50 Hz.
o. Optimum print quality adapter, 60 Hz.
p. Optimum print quality adapter, 50 Hz.
q. 2 Ch format tape punch.
r. German RFT suppressor.

DATA SHEET 14 - B 9247-2/B 9247-3 LINE PRINTER

EQUIPMENT CHARACTERISTICS

Dimensions

Width ..... 42"
Depth ..... 28"
Height ..... 44"
Weight ..... 600 lbs.

Air Flow and Heat

CFM 150
Btu/h 7378

Clearances

Front ..... 36"
Rear ..... 36"
Left ..... 36"
Right ..... 36"

Power

Circuit Breaker 20A
Operating Voltages....115/120V ac, single-phase, 60 Hz
KVA 2.7
L1 23
L2 .....NA
Power Cord Rating.....25
Power Cord .....2-wire & ground
Power Plug .....Hubbell, type 5264

UNIT DESCRIPTION

The B 9247-2/3 train printer (figure II-17) provides the following capabilities:

Unit	LPM
B 9247-2	400
B 9247-3	750

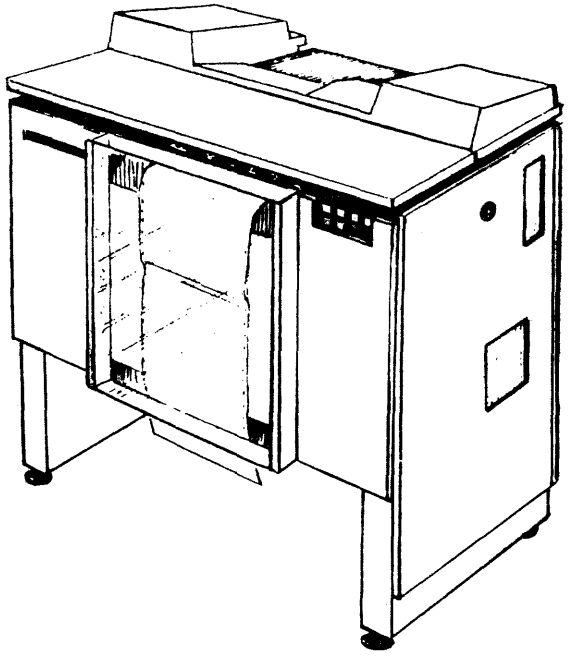


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Figure II-17. B 9247 Line Printer

DATA SHEET 14 - B 9247-2/B 9247-3 LINE PRINTER (Cont)

LOGIC CABLES

The available signal cables for the B 9247-2/3 line printer are listed below. Only one signal cable is required between the line printer and the I/O Control.

Part No.	Cable Length
1090 1908	30 ft.
1090 1916	35 ft.
1090 1924	50 ft.
1090 2328	100 ft.

LINE PRINTER OPTIONS

The following list of options are available for the B 9247-2/3 line printer.

a. 132 print positions.

b. Optional Character Sets.

c. Format tape reader, 2 or 12 channel.

OPTIONAL CHARACTER SETS

The option character sets for the train printer are listed below:

16 Character Set, EBCDIC-3
48 Character Set, RPG
48 Character Set, Fortran
48 Character Set, B 300/B 500
64 Character Set, EBCDIC-3
64 Character Set, U.K. B 3500
64 Character Set, U.K. B 6500
64 Character Set, Latin/Portugal
64 Character Set, Latin/Spain-3
64 Character Set, Sweden/Finland-3
64 Character Set, Denmark
64 Character Set, BCL
64 Character Set, Turkey
64 Character Set, ANSCII-3
64 Character Set, France/Belgium
64 Character Set, U.K.
64 Character Set, Germany/Austria
64 Character Set, Italy
64 Character Set, Sweden/Finland-2
64 Character Set, Latin/Spain-2
64 Character Set, ANSCII-2
64 Character Set, OCR-A Numeric
64 Character Set, OCR-B Numeric
64 Character Set, Brazil Numeric
64 Character Set, Denmark/Norway
64 Character Set, Yugoslavia
64 Character Set, EBCDIC-2
96 Character Set, EBCDIC-3
96 Character Set, Katakana
96 Character Set, ANSCII-2

DATA SHEET 15 - B 9249 LINE PRINTER

EQUIPMENT CHARACTERISTICS

Dimensions

Width ..... 30"
Depth ..... 24.5"
Height ..... 40.5"

Clearances

Front ..... 36"
Rear ..... 36"
Left ..... 36"
Right ..... 36"

Air Flow

CFM 0.0
Btu/h 1000

Power

Operating Voltages.. 115/120V, single-phase, 50/60 Hz
Circuit Breaker .... Fused
KVA 0.4
L1 ..... 3.0
L2 ..... 0.0
Power Cord Rating .. 15A
Power Cord ..... 2-wire & ground
Power Plug ..... Hubbell, type 5264

UNIT DESCRIPTION

The B 9249 Line Printer (figure II-18) is available in two models as follows:

Unit	LPM	Print Positions
B 9249-1	90	132
B 9249-2	180	132

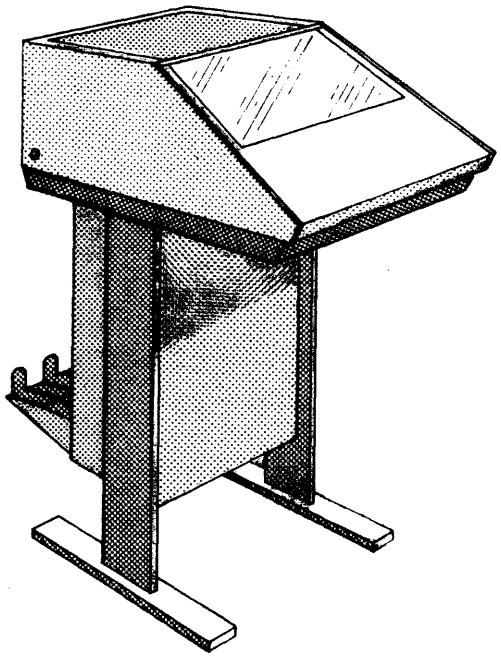

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Figure II-18. B 9247 Line Printer

DATA SHEET 16 - B 9134/B 9135 READER SORTER

EQUIPMENT CHARACTERISTICS

Dimensions	Basic Reader Sorter	Four Pocket Module	Clearances
Width	78.5"	30"	Front..... 36"
Depth	36.25"	29.25"	Rear ..... 36"
Height	54.25"	40.25"	Left ..... 36"
Weight	1200 lbs.	500 lbs.	Right ..... 36"

Air Flow and Heat

CFM 600
Btu/h 16,000

Power

Operating Voltages....208/240V, single-phase, 50/60 Hz
Circuit Breaker 40A
KVA 6.9
L1 .....20A
L2 .....20A
Power Cord Rating 45A
Power Cord .....2-wire & ground
Power Plug .....Hubbell, type 7311

UNIT DESCRIPTION

The B 9134/B 9135 Reader Sorter (figure II-19) is available in three models as follows:

Unit	DPM	Pockets
B 9134-1	1625	4,8,12,16
B 9135-2	900	8
B 9135-3	900	12

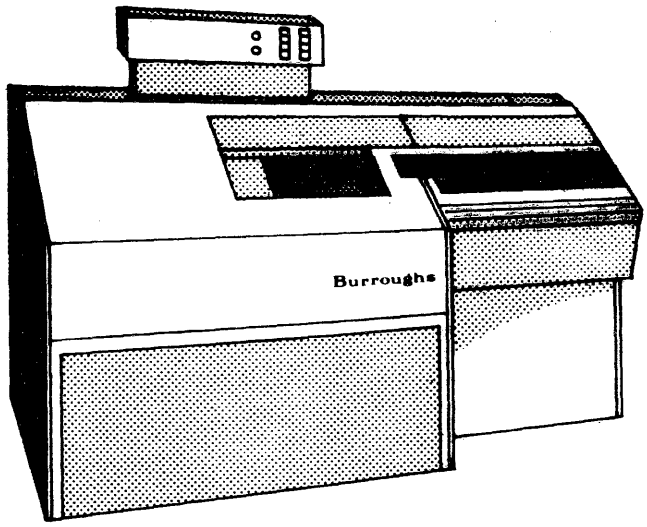

Figure II-19. B 9134/B 9135 Reader Sorter

DATA SHEET 17 - B 9480/B 9481 DISK CARTRIDGE DRIVES

EQUIPMENT CHARACTERISTICS

Dimensions

Width ..... 21-3/4"
Depth ..... 30"
Height ..... 44"
Weight ..... 357 lbs.

Air Flow and Heat

CFM 200
Btu/h 2100

Clearances

Front ..... 36"
Rear ..... 36"
Left ..... 0.0"
Right ..... 0.0"

Power

Operating Voltages ....115/120V, single-phase, 50/60 Hz
Circuit Breaker .....Fused
KVA 0.6
L1 .....5.0
L2 .....0.0
Power Cord Rating 15A
Power Cord .....2-wire & ground
Power Plug .....Hubbell, type 5264

UNIT DESCRIPTION

The B 9480/B 9481 Disk Cartridge Drive (figure II-20) is available in four models as follows:

Unit	Megabytes	Drive
B 9480-1	2.3	Single
B 9480-2	4.6	Dual
B 9481-1	4.6	Single
B 9481-2	9.2	Dual

*Power ratings are for a dual drive unit.

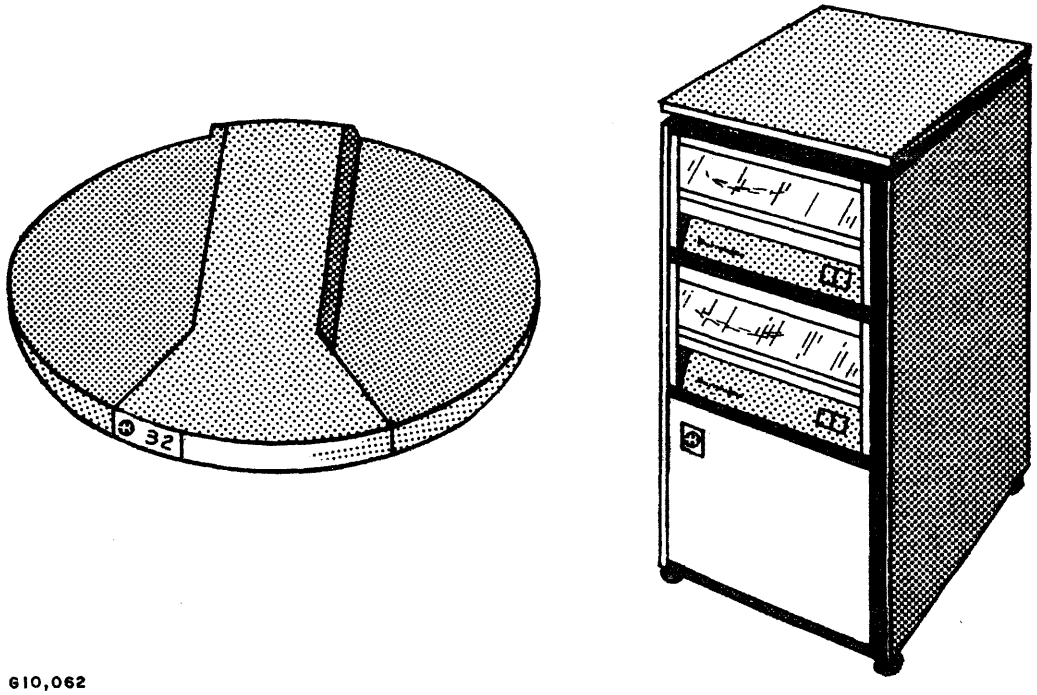

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Figure II-20. B 9480/B 9481 Disk Cartridge Drive and B 9985 Disk Cartridge

DATA SHEET 18 - B 9491-2 10KB MAGNETIC TAPE UNIT

EQUIPMENT CHARACTERISTICS

Dimensions

Width	21.25"
Depth	9.25"
Height	11.5"
Weight	30 lbs.

Air Flow and Heat

CFM	33
Btu/h	410

Clearances

Front	24"
Rear	6"
Left	0.0"
Right	0.0"

Power

Operating Voltages	115/120V, single-phase, 50/60 Hz
Circuit Breaker	Fused
KVA	0.2
L1	1.0
L2	0.0
Power Cord Rating	15A
Power Plug	Hubbell, type 5264

UNIT DESCRIPTION

The B 9491 10KB Magnetic Tape Unit (figure II-21) is only available as a 12.5 IPS, non-selectable 9-track device. These units may be stacked vertically.

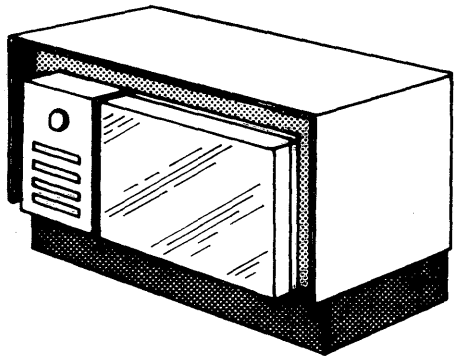

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Figure II-21. B 9491-2 10KB Magnetic Tape Unit

DATA SHEET 19 - B 9380 MAGNETIC TAPE CLUSTER (NRZ)

EQUIPMENT CHARACTERISTICS

Dimensions

Width ..... 36-1/4"
Depth ..... 30-1/4"
Height ..... 43"
Weight ..... 800 lbs.

Air Flow and Heat

CFM 800
Btu/h 9000
Internal Signal Cable Allowance... 60"
Signal Cable Bend Allowance ... 12"

Clearances

Front ..... 36"
Rear ..... 36"
Left ..... 36"
Right ..... 36"

Power

Operating Voltages...208/230V, single-phase, 50/60 Hz
Circuit Breaker 2-pole, 20A
KVA 2.70
L1 .....13.0A
L2 .....13.0A
Power Cord Rating ...20A
Power Cord .....2-wire & ground
Power Plug .....No. 5701 Arrow & Hart

UNIT DESCRIPTION

The B 9380 Magnetic Tape Cluster (figure II-22) is available with 2, 3, 4, 6, 7 or 8 tape stations. For B 1700 Systems, the Magnetic Tape Cluster must have the auto-load feature installed.

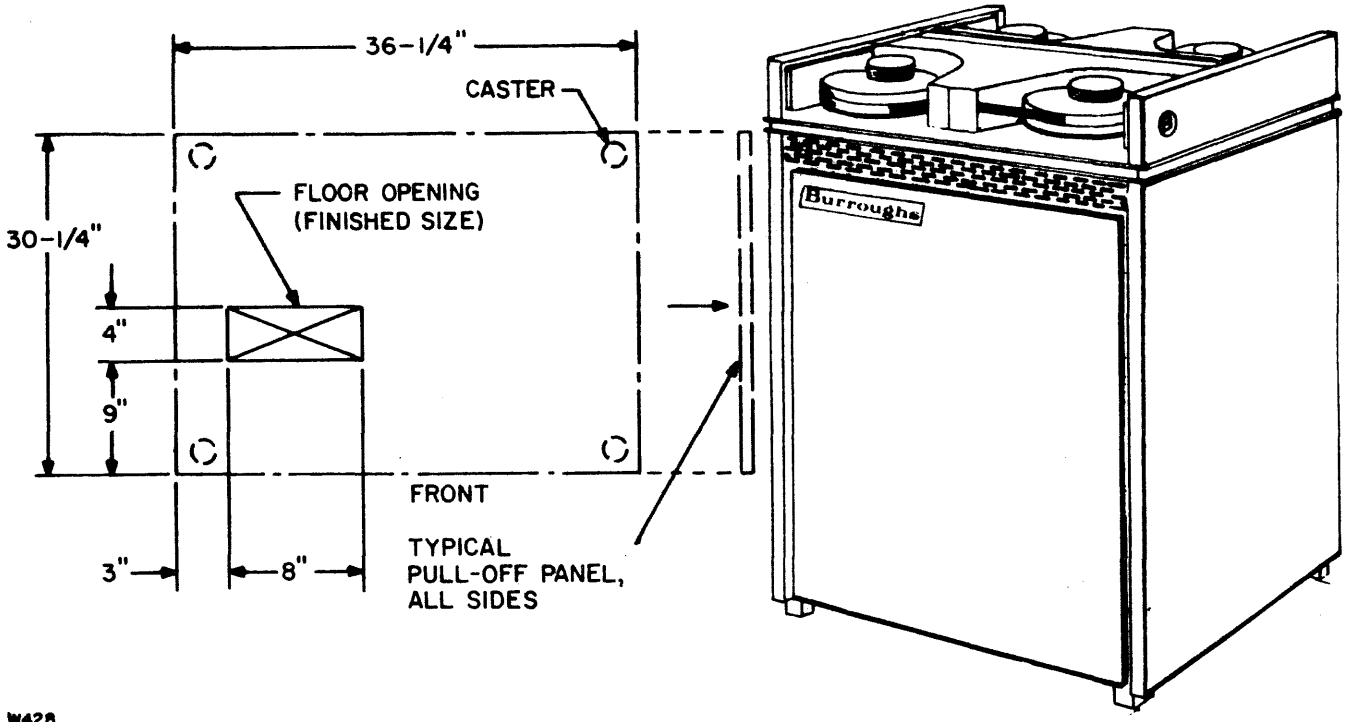


Figure II-22. B 9380 Magnetic Tape Cluster

FLOOR OPENINGS

The recommended location and the size of the floor openings are shown in figure II-22.

DATA SHEET 19 - B 9380 MAGNETIC TAPE CLUSTER (NRZ) (Cont)

AIR INTAKE AND EXHAUST VENTS

One 15-inch by 12-inch air intake vent is located at the bottom right side of the unit. Two 3-inch by 30-inch air exhaust vents are located at the front and rear of the unit (one at the front and one at the rear).

CABINET PLACEMENT

The B 9380 must be located within 40 feet of the peripheral control cabinet, when measured from floor opening to floor opening, if it is the master cluster. If the cluster is the slave, then it must be located within 20 feet of the master cluster unit, when measured from floor opening to floor opening. The cluster rests on four rubber wheel casters which may be removed if desired.

LOGIC CABLES

MASTER CLUSTER CABLES

The following cable kits are available for the master cluster. Each kit contains two cables with card connectors. One cable kit is required as determined by the distance between the cluster and the I/O control.

Cable No.	Length
1149 6874	25 feet
1149 6882	35 feet
1149 6890	50 feet

If the 2X (exchange) is installed in the cluster, then two sets of any one of the above kits are required.

SLAVE CLUSTER CABLES

Three 25-foot cables are required for master-to-slave coupling as follows:

Two 1145 7645 with card connectors,
One 1633 4526 with card connectors (DL-2 & -3 only); or
One 2006 2444 with card connectors (DL-4 only).

If a 2X adapter is installed in the master and the slave clusters, then three more of the above cables, as determined by the design level, are required for exchange operation.

MAGNETIC TAPE CLUSTER OPTIONS

The following two categories comprise the magnetic tape cluster options.

MASTER CLUSTER OPTIONS

The following options are available for the master cluster:

a. 50 or 60 Hz module.

b. Master electronics unit (for the master cluster only).

c. Master 2X adapter (allows the cluster to function with two I/O controls).

d. 7- or 9-track head modules.

e. Active or blank station module.

f. Density kit, 556 BPI maximum (for 7-track only; limits density to 556 BPI).

DATA SHEET 19 - B 9380 MAGNETIC TAPE CLUSTER (NRZ) (Cont)

SLAVE CLUSTER OPTIONS

The following options are available for the slave cluster:

a. 50 or 60 Hz module.

b. Slave electronics (makes the cluster the slave).

c. Slave 2X adapter (with the 2X adapter in the master and the slave, the units can interface with two I/O controls).

d. 7- or 9-track head modules.

e. Active or blank station module.

f. Density kit, 556 BPI maximum (for 7-track only; limits density to 556 BPI).

B 1700 SYSTEM CARD LOADING

Power for the logic cards in the B 1700 system is derived from the following: the +4.75/-2 volt dc logic power supply, the memory power supply, and the ±12 volt dc power supplies. The limiting factor is the load drawn from the logic power supply. Each logic power supply (one per cabinet) can supply up to 200 amperes. Since it is possible to overload the logic power supply within the constraints of the system configuration, the loading of each system (or cabinet) must be determined on an individual basis.

Charts III-1, III-2, and III-3 list the amount of current, in amperes, from the logic power supply that is required for each card or unit within the system (or cabinet).

WARNING

The field engineering maintenance philosophy for B 1700 Systems requires the use of the Field Card Tester. Therefore, 25.0 amperes from the logic power supply that supplies power to the central processor must be reserved for the Field Card Tester.

Chart III-1 lists the card and unit loads for any B 1710 series system.

Chart III-2 lists the card and unit loads for any B 1720 series system.

Chart III-3 lists the number of cards contained in the I/O controls for either a B 1710 series or a B 1720 series system. Chart III-3 also provides additional information regarding the top unit numbers, applicable peripheral devices, and other pertinent data.

NOTE

Since available I/O controls and peripherals are subject to modification and enhancements, chart III-3 is to be used for reference purposes only. For the availability of I/O controls and peripheral devices, refer to the latest issue of the Group III EDP Equipment Price Book and the applicable systems configuration book.

If the existing or proposed system configuration exceeds the capabilities of the existing or proposed logic power supplies, an additional logic power supply must be acquired for the system.

Chart III-1. B 1710 Series System Card and Unit Loads (S1 and S2)

Component	Load (Amperes)
S-Processor	75.0
Console Cassette Reader	1.4
S-Memory (per memory card)	2.0
I/O Base	2.6
I/O Base Extension	1.2
Field Card Tester (one per system)	25.0
Each I/O Control Card or Data Communication Adapter (refer to chart III-3)	6.0

Chart III-2. B 1720 Series System Card and Unit Loads (M1 and M2)

Component	Load (Amperes)
M-Processor (includes M-2 processor adapter)	125.0
Console Cassette Reader	1.4
M-Memory	
First card; 2K bytes	14.0
Each additional card; 2K bytes each	11.5
I/O Base	2.6
I/O Base Extension	1.2
Clock Module	2.0
Port Interchange	24.0
Port Adapter (each one)	1.9
S-Memory Base	8.0
S-Memory 16K Adapter	3.4 (2.4 for 8K only)
Multiline Control 1	21.1
Multiline Extension 1	1.2
Field Card Tester (one per system)	25.0
All other I/O Control Cards, with the exception of the MLC and MLE, or Data Communications Adapters (each one). (Refer to chart III-3.)	6.0

Chart III-3. B 1700 I/O Controls and Applicable Peripheral Devices

I/O CONTROL					APPLICABLE PERIPHERAL DEVICES				
TOP UNIT NUMBER	NAME (I/O)	NUMBER OF CARDS OF CONTROL	INDEPENDENT BACKPLANE POSITION	ADAPTERS	TOP UNIT NUMBER	B-NUMBER	NAME (I/O)	TYPE	DESCRIPTION
2200 5714	SPO Control 1	1	I/O Base		2552 8019	B 9340-1	Teletypewriter (TTY)		
2200 5656	Card Reader Control 1	1	I/O Base	80 Column	1090 2724	B 9115	Card Reader	80 Col	300 CPM
					1090 0777	B 9116	Card Reader	80 Col	600 CPM
					2101 0400	B 9117	Card Reader	80 Col	800 CPM
2205 7202	Card Reader Control 2	1	I/O Base	80 Column	1630 1251 (60 Hz)	B 9111	Card Reader	80 Col	800 CPM Adapter-1630 1301, 60 Hz; 1630 1939, 50 Hz
					1630 1269 (50 Hz)	B 9112	Card Reader	80 Col	1400 CPM Adapter-1630 1319, 60 Hz; 1630 1947 50 Hz
2205 0991	Card Reader Control 1	2	I/O Base	96 Column	2527 0067	B 9119-1	Card Reader	96 Col	300 CPM
2209 7802	Card Reader Control 2	2	I/O Base	96 Column	1090 2542	B 9119-2	Card Reader	96 Col	1000 CPM
2205 7228	Card Punch Control 2	1	I/O Base	80 Column	7 8502	B 9210	Card Punch	80 Col	100 CPM (1184 5195, 50 Hz)
1861 6391	Card Punch Control 1	1	I/O Base	80 Column (Liege)	1141 9934	B 9212	Card Punch	80 Col	150 CPM Module-1149 5462, 60 Hz, 1630 7456, 50 Hz
					1141 9934	B 9213	Card Punch	80 Col	300 CPM
1862 5258	Card Reader/Punch Control	2	I/O Base	80 Column (Liege)	2527 0141	B 9418-2	Card Reader/Punch	80 Col	200 CPM (Read), 45 CPM (Punch/Print)
2205 0991	Card Reader/Punch/Data Recorder 1	2	I/O Base	MFCU I/O Control, 96 column	2527 0034	B 9419-2	Card Reader/Punch/Data Recorder MFCU	96 Col	300 CPM (Read), 60 CPM (Punch/Print), Keyboard
					2527 0059	B 9419-6	Card Reader/Punch/Print/Sort MFCU	96 Col	300 CPM (Read), 60 CPM (Punch/Print), Keyboard
2209 7802	Card Reader/Punch/Data Recorder 2			MFCU I/O Control, 96 column		B 9419-2	Card Reader/Punch/Data Recorder MFCU	96 Col	300 CPM (Read), 60 CPM (Punch/Print), Keyboard
						B 9419-6	Card Reader/Punch/Print/Sort MFCU	96 Col	300 CPM (Read), 60 CPM (Punch/Print), Keyboard
2200 5698	Line Printer Control 2	2	I/O Base	Train	1090 0447	B 9247-3	Line Printer (Train)	Train	750 LPM, 132 Print Positions, 12-Channel Format Reader
					1090 0439	B 9247-12	Line Printer (Train)	Train	400 LPM, 132 Print Positions, 12 Channel Format Reader
					1090 0447	B 9247-13	Line Printer (Train)	Train	750 LPM, 132 Print Positions, 12 Channel Format Reader
					1090 0439	B 9247-2	Line Printer (Train)	Train	400 LPM, 132 Print Positions, 12-Channel Format Reader
2200 5706	Line Printer Control 3	1	I/O Base	Buffered Drum	1009 9364 (60 Hz)	B 9240-1	Line Printer	Buffered Drum	475 LPM (B 320) 1630 1012, 60 Hz
					1009 9372 (50 Hz)	B 9240-2	Line Printer	Buffered Drum	700 LPM (B 325)
						B 9240-3	Line Printer	Buffered Drum	1040 LPM (B 329)
2205 7244	Line Printer Control 4	1	I/O Base	Chain	2101 2232	B 9249-3	Line Printer (ODEC)	Chain	250 LPM (132 Print Positions) 1090 3920, 50 Hz
2211 1306	Line Printer Control 5	2	I/O Base	Train	2101 0947	B 9247-14	Line Printer	Train	1100 LPM (132 Print Positions)
2211 1298	Disk Pack Control 1	3	4-Card		2159 1656	B 9499-1	Disk Pack Electronics Control (DPEC)	1 x 4	174.4 MB, 300 ms Avg. Access
					2159 3405	B 9499-2	Disk Pack Electronics Control (DPEC)	1 x 8	87.2 MB, 30 ms Avg. Access
					2158 4123 (60 Hz)	B 9486-45	Disk Storage Drive	Single Drive	87.2 MB, 30 ms Avg. Access: 2158 4131 (50 Hz)
					2158 0516 (60 Hz)	B 9486-4	Disk Storage Drive	Dual Drive	174.4 MB, 30 ms Avg. Access: 2158 0584 (50 Hz)
2200 5730	Disk Cartridge Control 1	3	I/O Base		2155 1841	B 9480-12	Disk Cartridge Drive	Dual	4.6 MB, 80 ms Avg. Access (2155 1866, 50 Hz)
2208 2887	Disk Cartridge Control 2	3	I/O Base		2158 8439	B 9481-12	Disk Cartridge Drive	Dual	9.2 MB, 100 ms Avg. Access (2158 8454, 50 Hz)
2205 7335	Disk File Control 1	4	4-Card	Head-Per-Track	2017 2847	B 9371-7	Disk File Storage Unit/EU	1A-3	8.1 MB, 20 ms Storage (DFEU-1A 1633 4559)
2210 0325	Disk File Control II	4	4-Card	Head-Per-Track and S.M.	2017 2870	B 9371-14	Disk File Storage Unit/EU 1A-4	1A-4	14.4 MB, 40 ms Storage (DFEU-1A 1633 4559)
					2017 2870	B 9374-10	Disk File Storage Unit	1A-4	14.4 MB, 40 ms Storage
					2017 2847	B 9374-17	Disk File Storage Unit	1A-3	8.1 MB, 20 ms Storage
1861 9262	Magnetic Tape Control 1	6	8-Card	18/50 KC, 7-Track,	2017 3001	B 9370-3	Systems Memory	SM 1B	1.98 MB, (Disk File Control II only)
1862 0047	90 IPS Speed Adapter 1	1	MTC1	NRZ (Liege)	1630 1350	B 9390	Magnetic Tape Unit	7-Channel NRZ	18/50 KC, 200/556 BPI: 1630 1368, 50 Hz
1862 0039	45 IPS Speed Adapter 1	1	MTC1		1123 0919	B 9380-n	Magnetic Tape Cluster	7-Channel NRZ	9/25/36 KC, 200/556/800 BPI
2200 5748	Magnetic Tape Control II (9-Trk NRZ)	5	8-Card	9-Track NRZ					
2205 7301	12.5 IPS Speed Adapter	1 or 2	MTC II	1 Card First Two Units;	2012 0408	B 9491-2	10 KB Magnetic Tape Unit	9-Channel NRZ	10 KB, 800 BPI (1 to 4 units)
2209 8016	22.5 IPS Speed Adapter	1	MTC II	2 Cards 3 to 4 Units	2040 0875	B 9381-1n	Magnetic Tape Cluster	9-Channel NRZ	18 KB, 800 BPI (1 to 4 stations)
2205 7293	45 IPS Speed Adapter	1	MTC II		1123 0919	B 9381-2n	Magnetic Tape Cluster	9-Channel NRZ	36 KB, 800 BPI (1 to 4 stations)
2209 8008	120 IPS Speed Adapter	1	MTC II		1128 5343	B 9394-2	Magnetic Tape Unit	9-Channel NRZ	96 KB, 800 BPI (1 to 6) 1128 5350, 50 Hz
2209 7869	Magnetic Tape Control IV	3	4-Card	9-Track P.E.					
2212 8763	25 IPS Speed Adapter 3	0			Not Listed	B 9496-2	Magnetic Tape Unit	9-Channel PE	40 KB, 1600 BPI
2212 8771	50 IPS Speed Adapter 3	0			Not Listed	B 9496-4	Magnetic Tape Unit	9-Channel PE	80 KB, 1600 BPI
2212 8748	75 IPS Speed Adapter 3	0			2048 8334	B 9495-2	Magnetic Tape Unit	9-Channel PE	120 KB, 1600 BPI
2208 2838	Magnetic Tape Cassette Control I	2	I/O Base		2040 5098	B 9490-25	Magnetic Tape Cassette	10 IPS	
1861 3638	Paper Tape Reader Control 1	2	I/O Base	Addition 20 Volt	1189 9069	B 9120	Paper Tape Reader, 60 Hz		500/1000 characters per second } B 9926 input
1862 2936	Paper Tape Reader Control II	2	I/O Base	Power Supply	1189 9077	B 9120	Paper Tape Reader, 50 Hz		500/1000 characters per second } translator available
1861 4651	Paper Tape Punch Control I	2	I/O Base	Required (Liege)	1189 9085	B 9220	Paper Tape Punch, 60 Hz		100 characters per second } 1189 9093, 50 Hz
2205 5722	Reader/Sorter Control 1	2	I/O Base		1149 5470	B 9134-1	Reader/Sorter	4 Pocket	1625 DPM
2200 5771	Single Line Control 1	2	4-Card		Data Sets or				
2200 9765	Multiline Control 1	4	12-Card		Data Communica-				
2201 2314	Muitiline Extension I	1	10-Card		tions Line				
	Each SLC, MLC, or MLE Adapter	1	SLC/MLE/MLC						

GENERAL

The purpose of this section is to provide a guide to facilitate system installation. This guide indicates the steps to be taken from uncrating to power-on.

It is not to be used in place of the technical manuals, but is to be used in conjunction.

CABINET POSITIONING

As stated in Section I provisions should have been made to have a Rol-O-Lift available to position the main frame cabinet. In some instances arrangements can be made with the movers to position the main frame at the proper location.

UNCRATING

Refer to Figure IV-1 for this uncrating procedure.

1. Move loaded pallet to a level place before attempting to uncrate.
2. Remove Avis strap that holds corrugated cover to pallet base, and remove top lid. See Figure IV-1.

NOTE: Avis strap may be cut with diagonal cutters or knife.

3. Remove foam cushioning blocks, four places, inside at top of unit.
4. Lift corrugated sleeve up over top of system and lay it aside.
5. Cut #880 tape that holds corrugated portion of pallet base to unit and lay over to floor level. See Figure IV-2.

NOTE: Tape should be cut at each corner to allow corrugated bottom to lie horizontal.

6. When using forklift, screw leveling feet clockwise to raise system just enough to allow lift prongs to enter from side. Height from pallet base to unit frame should not exceed a maximum of two inches.

NOTE: Care should be taken not to screw leveling feet out of frame.

7. Lift unit off pallet from side. Make sure that lift forks protrude far enough to lift unit by frame, both sides.
8. Lift unit carefully and place in location desired; adjust leveling feet as required.
9. Remove rear skin and remove the four bolts that hold 2 by 4 beneath Logic Power Supply. Refer to Figure IV-3 for Component locations.
10. Remove tape that holds wood wedges at rear bottom of fan housing and remove wood wedges between fan and fan rail support.

UNCRATING (CONT)

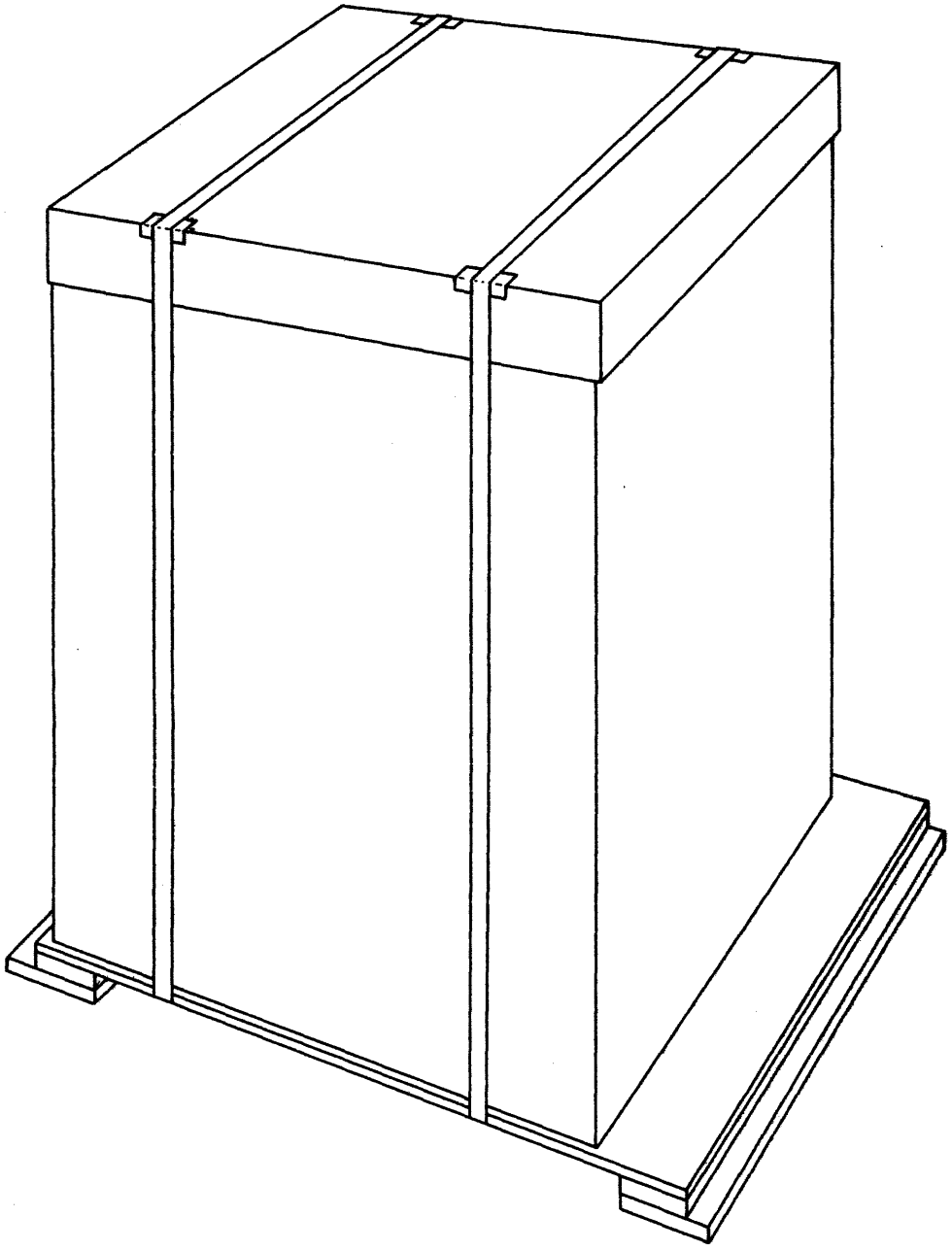


Figure IV-1. Palletted B 1712/B 1714 Main Frame

UNCRATING (CONT)

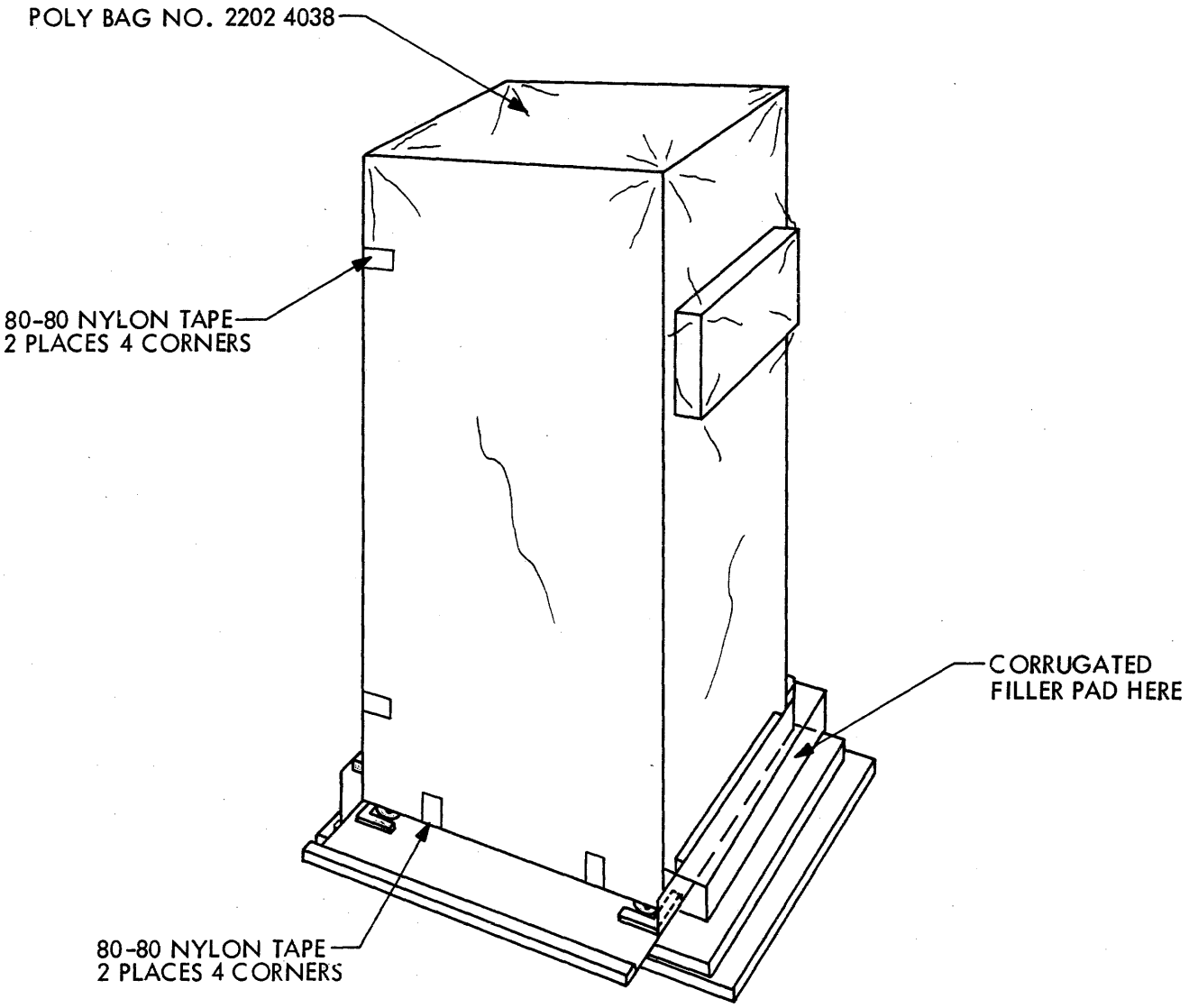


Figure IV-2. B 1712/B 1714 Inner Packing

UNCRATING (CONT)

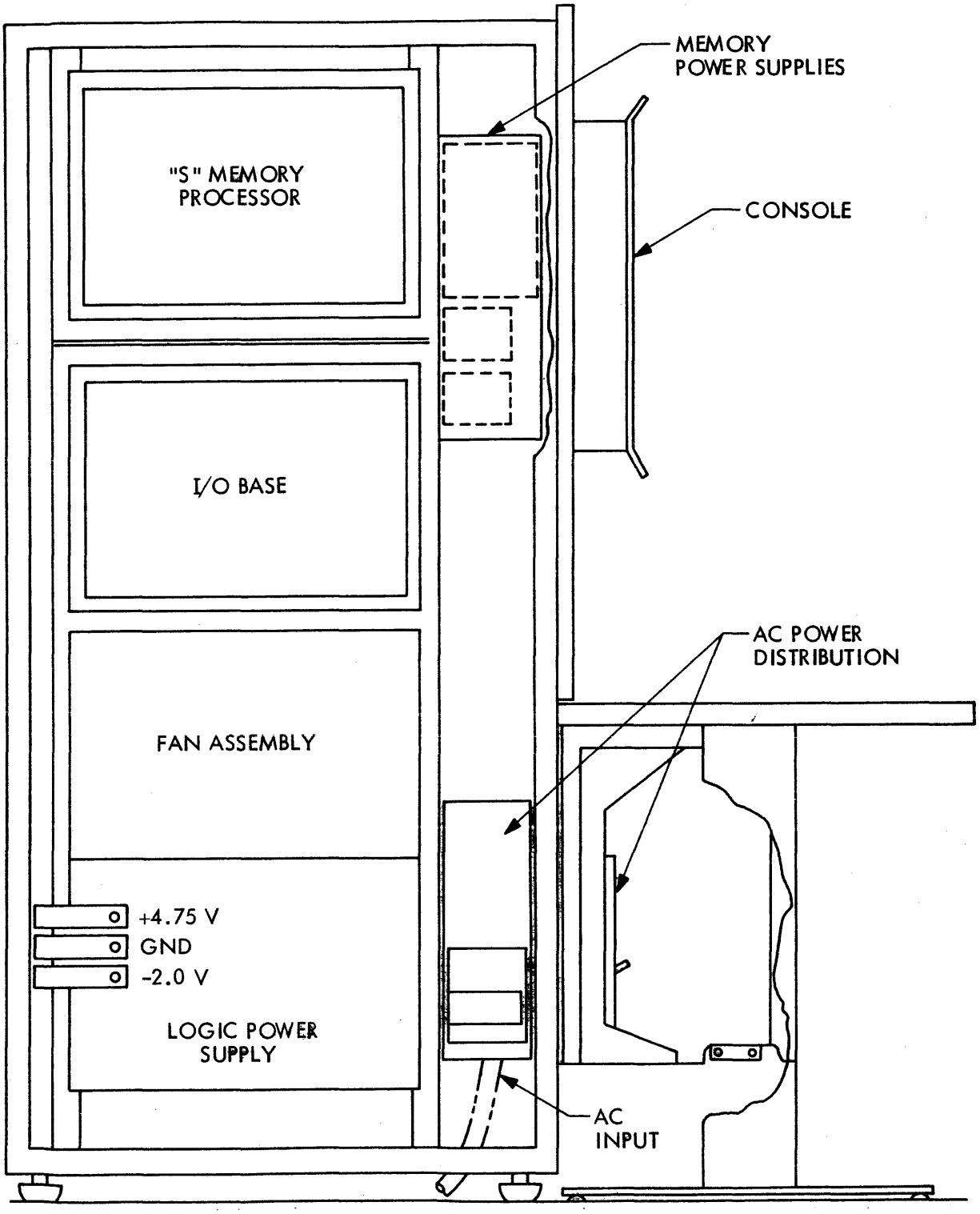


Figure IV-3. B 1712/B 1714 System (Side View) Sheet 1

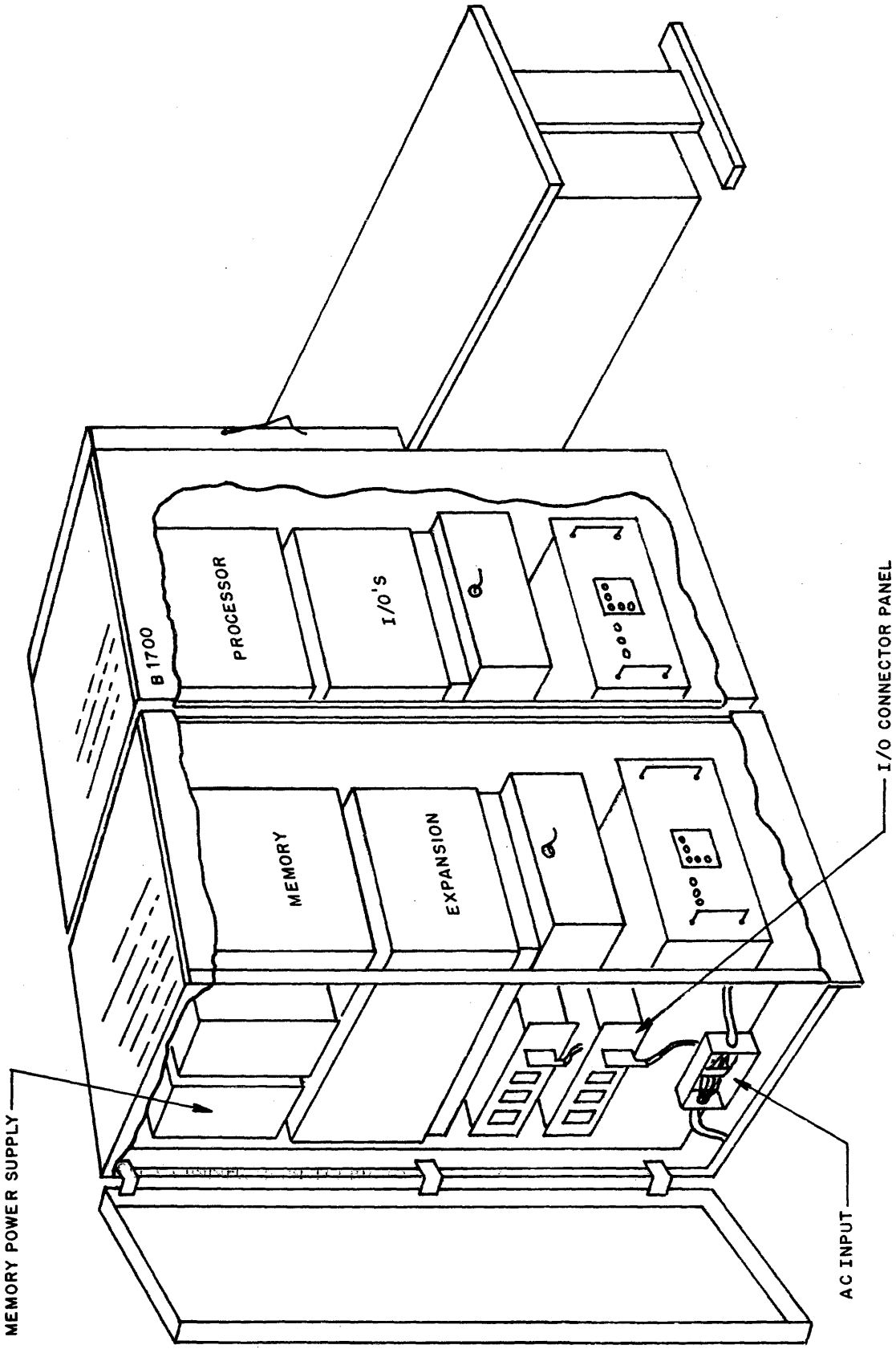


Figure IV-3. B 1726 System (Sheet 2)

INSTALLATION PROCEDURE

1. Remove all main frame skins and check for damage. Notify Branch Field Engineering Manager of any damage.

2. Uncrate table and corner table (if ordered) and inspect for damage.

3. The Field Engineer(s) will verify that the capacity/speed of each unit that is shipped matches that of the model listed on the Installation Register (Form *1904265). If the capacity/speed of the units shipped does not match that of the model shown on the Installation Register, the Field Engineer will immediately contact the Branch Field Engineering Manager, who will determine the cause of the discrepancy and decide what action should be taken.

   The Field Engineer(s) will insert serial numbers and arrival date(s) on the Installation Register and return the original immediately to the branch office. Two copies will be retained until the installation date can be completed.

   Standard installation time commences on the day after arrival of the equipment at the customer's office, as evidenced by signed receipt of the shipper. Such arrival date is to be inserted by the Field Engineer on the Installation Register. Standard installation times are given later in this section under SYSTEMS TURNOVER.

4. The Field Engineer(s) will indicate the Installation Report(Form **1902095). This form must be prepared for each day Field Engineering efforts are expended at the site, from the date of arrival of the equipment through the day the Installation Register, Form *1904265, is completed and signed by the Branch Manager.

5. Unpack all boxes and place all Test and Field documents next to their respective cabinets.

6. Using the packing list, verify that all items indicated have arrived at the site.

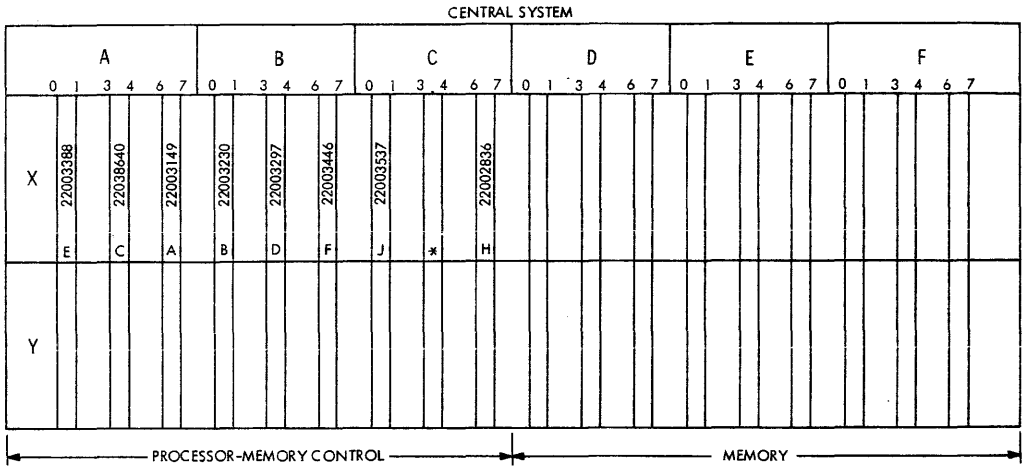
7. Check that no cables or cards are loose in the main frame cabinet. For card and cable locations, refer to Figures IV-4 and IV-5.

INTERNAL I/O SIGNAL CABLES

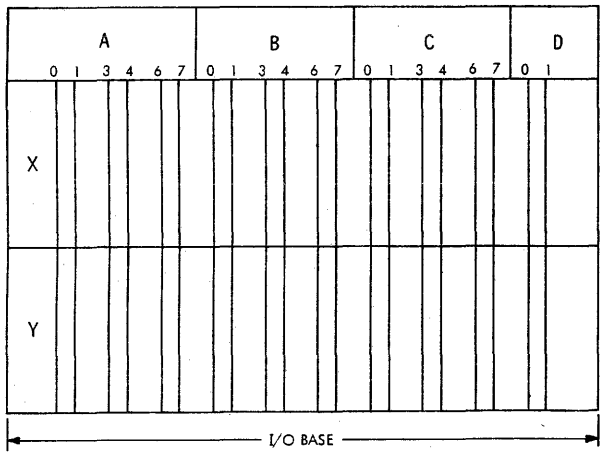
FROM	TO	PART NUMBER
96 Col. Control Card #	I/O Dist Panel	2207 6345
SPO	I/O Dist Panel	2206 4430
Drum Printer	I/O Dist Panel	2206 4448
B 9115/9116 Control	I/O Dist Panel	2207 2722
Cluster Control	I/O Dist Panel	2205 7293

* formerly form 2406
** formerly form 1565

INSTALLATION PROCEDURE (CONT)



CARD A 22003149
CARD B 22003230
CARD C 22038640
CARD D 22003297
CARD E 22003388
CARD F 22003446
CARD H 22002836
CARD J 22003537
* 4 MEG. ADAPT 22083158
2 MEG. ADAPT 22083141

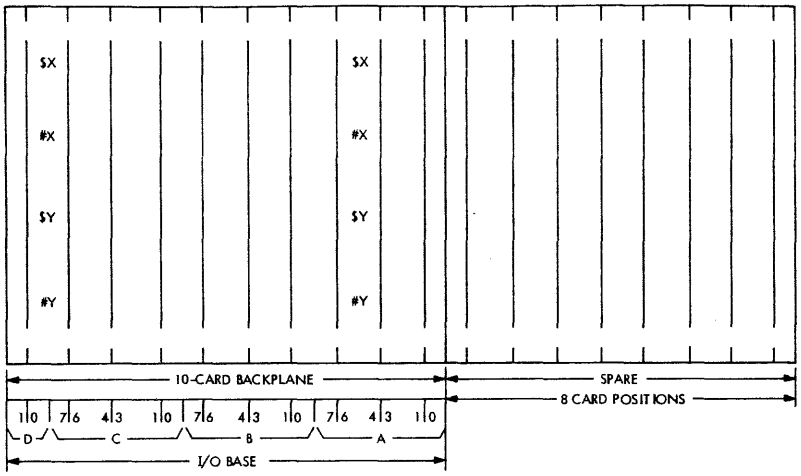


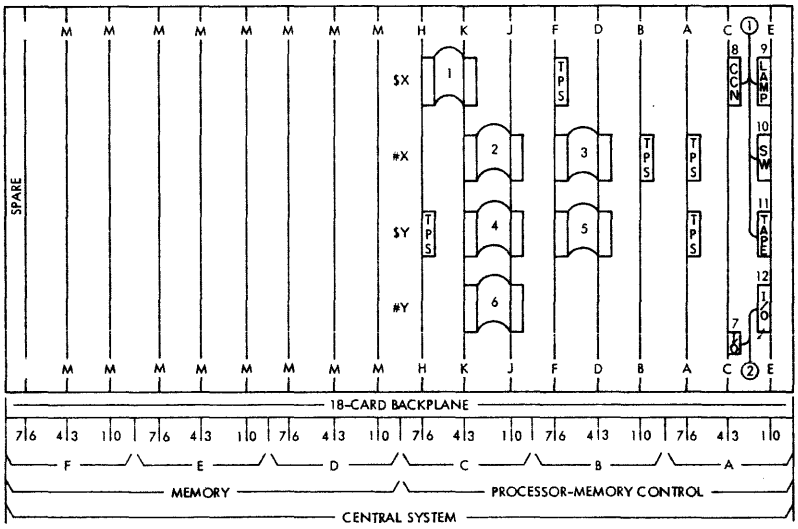
LOCATION

A0	DISTRIBUTION CARD 22005953 OR SUB-DISTRIBUTION CARD 22038228
A3	ANY SINGLE CARD FILE
A6	ANY SINGLE CARD FILE
B0	ANY DOUBLE CARD FILE OR SINGLE CARD
B3	ANY DOUBLE CARD FILE
B6	ANY DOUBLE CARD FILE OR SINGLE CARD
C0	ANY DOUBLE CARD FILE
C3	DISK CARTRIDGE CARD 1 22038319, IF DISK NOT USED ANY SINGLE CARD FILE IN C3
C6	DISK CARTRIDGE CARD 2 22038343
D0	DISK CARTRIDGE CARD 3 22038376
	CARD READER 22003081
	PRINTER 22003925
	S.P.O. 22038251
	M/F 96 CARD 1 22038467
	M/F 96 CARD 2 22038496
	SINGLE LINE 1 22003776
	SINGLE LINE 2 22003834
	SORTER READER 1 22038525
	SORTER READER 2 22038558

Figure IV-4. B 1712/B 1714 Card Locator

INSTALLATION PROCEDURE (CONT)





NOTES:
① CABLES TO CONTROL PANEL
② CABLES TO I/O

CABLE LOCATION

NO.	PART NO.	TYPE	LENGTH	FROM	TO
1	22071989	LOGIC	6" ± 1/2"	$XC6 PROC	$XC3 PROC
2	22071989	LOGIC	6" ± 1/2"	#XC3 PROC	#XC0 PROC
3	22071989	LOGIC	6" ± 1/2"	#XB6 PROC	#XB3 PROC
4	22071989	LOGIC	6" ± 1/2"	$YC3 PROC	$YC0 PROC
5	22071989	LOGIC	6" ± 1/2"	$YB6 PROC	$YB3 PROC
6	22071989	LOGIC	6" ± 1/2"	#YC3 PROC	#YC0 PROC
7	22071948	16 PIN	55" ± 1"	#XA3 PROC	I/O BASE
8	22071971	LOGIC	53" ± 1"	$XA3 PROC	CONTROL PANEL J3
9	22071963	LOGIC	57" ± 1"	$XA0 PROC	CONTROL PANEL J1
10	22071971	LOGIC	53" ± 1"	#XA0 PROC	CONTROL PANEL J2
11	22071955	LOGIC	63" ± 1"	$YA0 PROC	CONTROL PANEL J4
12	22073416	LOGIC	64" ± 1"	#YA0 PROC	#X I/O BASE
13	22070213	COAX	66" ± 1"	PROC	I/O BASE
14	22070213	COAX	66" ± 1"		

Figure IV-5. B 1712/B 1714 Cable Locator

INSTALLATION PROCEDURE (CONT)

8. Connect ac power to the main frame. Some local codes demand that all steps for cabling and power be performed by an electrician. If this is the case, such steps should be under the supervision of the Field Engineer. Refer to Figure IV-6. The power cable enters the cabinet at the front-bottom. The ac hot wires should be connected to the terminals labeled phase A and phase B. Neutral will go to neutral and ground will go to ground. Back out the terminal strip screw; insert the wire, with the insulation stripped about 5/16 of an inch, and tighten the screw. Ensure that all strands of the power wire enter the terminal strip hole. Tighten the clamp at the base of the AC Distribution Box.

9. AC power check. Turn off both circuit breakers on the AC Distribution Box. Turn off circuit breaker on the rear of the power supply. Turn on main circuit breaker. Measuring from phase A to phase B should give 208/240 VAC. Measure both phases A and B to neutral. The reading should be 115/120 volts. Turn off main circuit breaker.

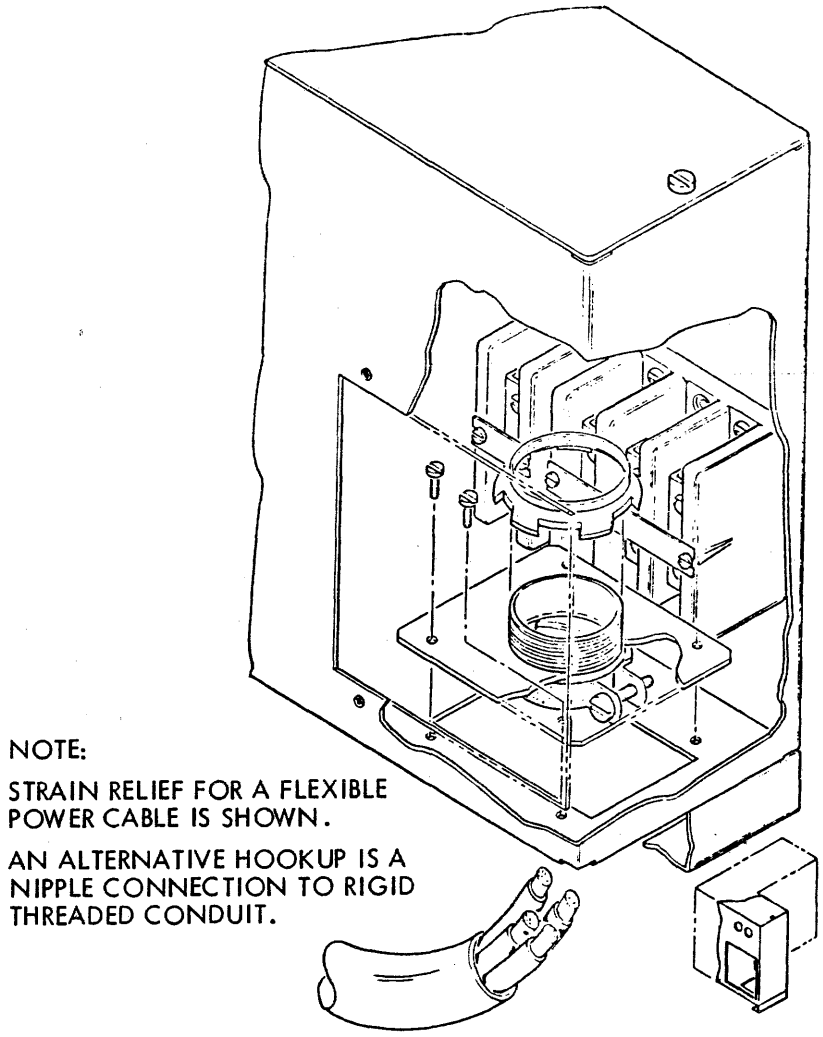


Figure IV-6. B 1712/B 1714 AC Power Terminals

INSTALLATION PROCEDURE (CONT)

10. Position the work table in front of the main frame. The table may be mounted to extend to either the left or right of the console. The normal position is for the overlay to extend to the left. Refer to Figure IV-7. Do not mount table at this time.

11. The I/O Distribution Panel is located, for shipment purposes, below the I/O Base. Remove this panel and swing it forward and into the table. Do not mount it at this time. Be sure to keep the ribbon cables free and clear.

12. Remove the four nuts on the studs extending from the main frame and push the table assembly over the studs. If the holes in the table assembly do not line up with the studs, raise or lower the table assembly with the leveling screws in the rear of the table feet. Install and tighten the retaining nuts on the four bolts.

13. If the table has been installed with the overlay to the left, the cable trough will be in the proper location. If the table was installed with the overlay to the right, the trough will have to be moved to the other side.

14. Mount the I/O Distribution panel. Keeping the ribbon cables in a flat bundle, lay them into the cable trough. The sides of the cable trough unsnap for insertion of the ribbon cables. Allow a slight bend in the cables from the I/O Base to the cable trough. Loop the surplus cable length below the I/O Distribution Panel. Snap together the cable trough. Leave the table skins off.

15. For standard configurations, refer to Figure IV-8 and Figure IV-9 (Sheets 1,2,3 and 4). If a corner table is to be used, place it into position.

16. As can be seen by the standard configuration figures, the devices that require consideration in the configuration are the B/9247 and B/9245 printers. The reason for this is that side clearance is needed to change the format tapes. This is the left side for the B/9245 and the right side for the B/9247. The B/9249 may go to either side.

17. Move the printer, disk drive, and 96-Col. Multifunction Card Unit (MFCU), or Interpreting Data Recorder into position.

18. Run the signal cables for the 96-Col. unit. One cable runs from J1 on the I/O Distribution panel to card 14 of the B/9319-2. This is the reader cable. The punch-printer cable runs from J2 to card 15 in the Interpreting Data Recorder. These cables should first be plugged into the Interpreting Data Recorder and then routed through the corner table, if applicable, and into the console table. If there is no corner table, route into the cable trough and up to the I/O Distribution Panel. Coil neatly extra cable length. String AC cable along side and plug into the AC Distribution Box.

19. Run the signal cable for the Disk Drive(s). The Disk cable plugs into the bottom rear of the Disk Drive. Route around the bottom of the drive and into the table trough. If two drives are ordered, the top connector (J1) on the I/O Distribution panel goes to Drive 0, and J2 to Drive 1. Where the B/9249 is placed between the Disk Drive and the table, route the Disk cable behind the feet of the printer. String the AC cable along the same route and plug into the AC Distribution Box. Coil neatly all surplus cable lengths.

INSTALLATION PROCEDURE (CONT)

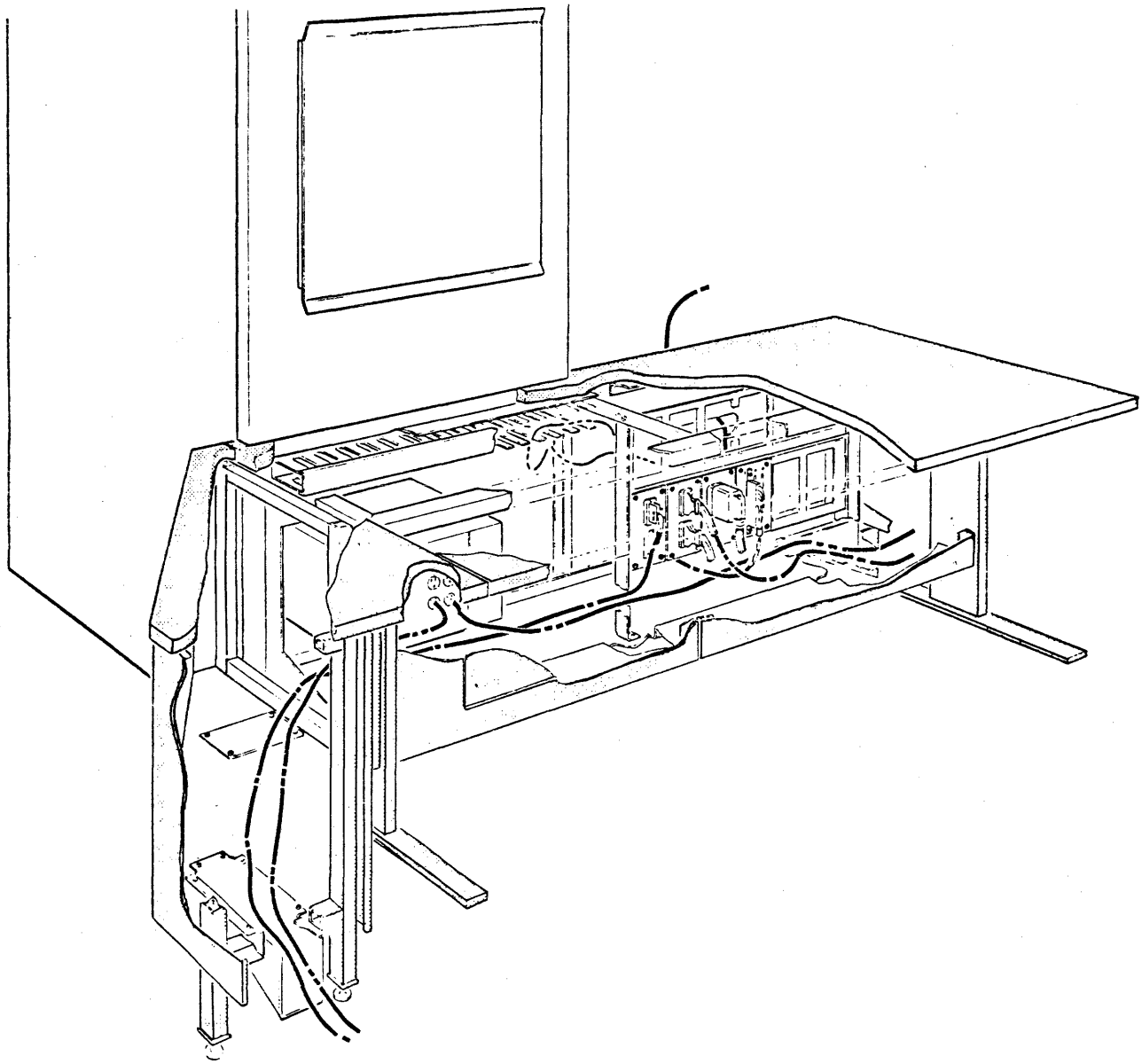


Figure IV-7. Table Kit Cutout

INSTALLATION PROCEDURE (CONT)

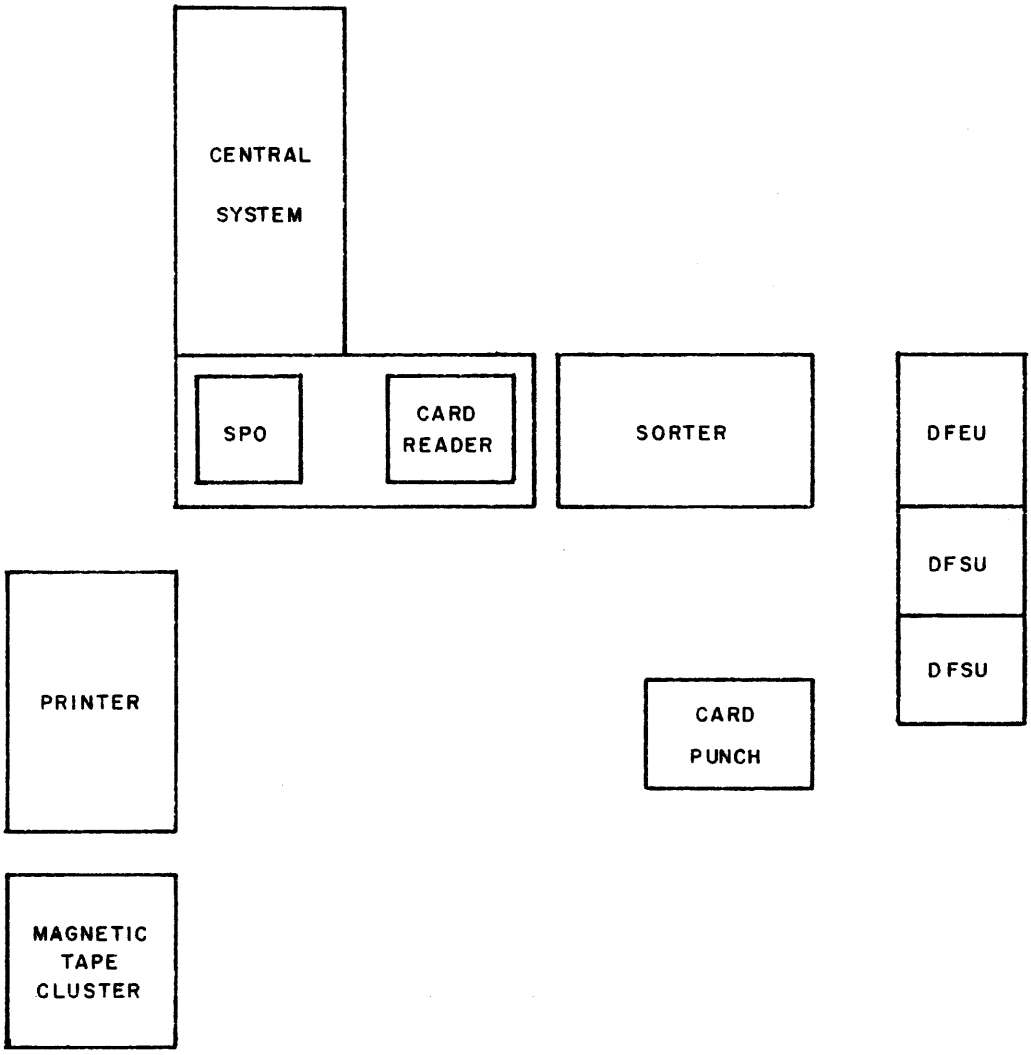


Figure IV-8. Typical B 1726 System Configuration

INSTALLATION PROCEDURE (CONT)

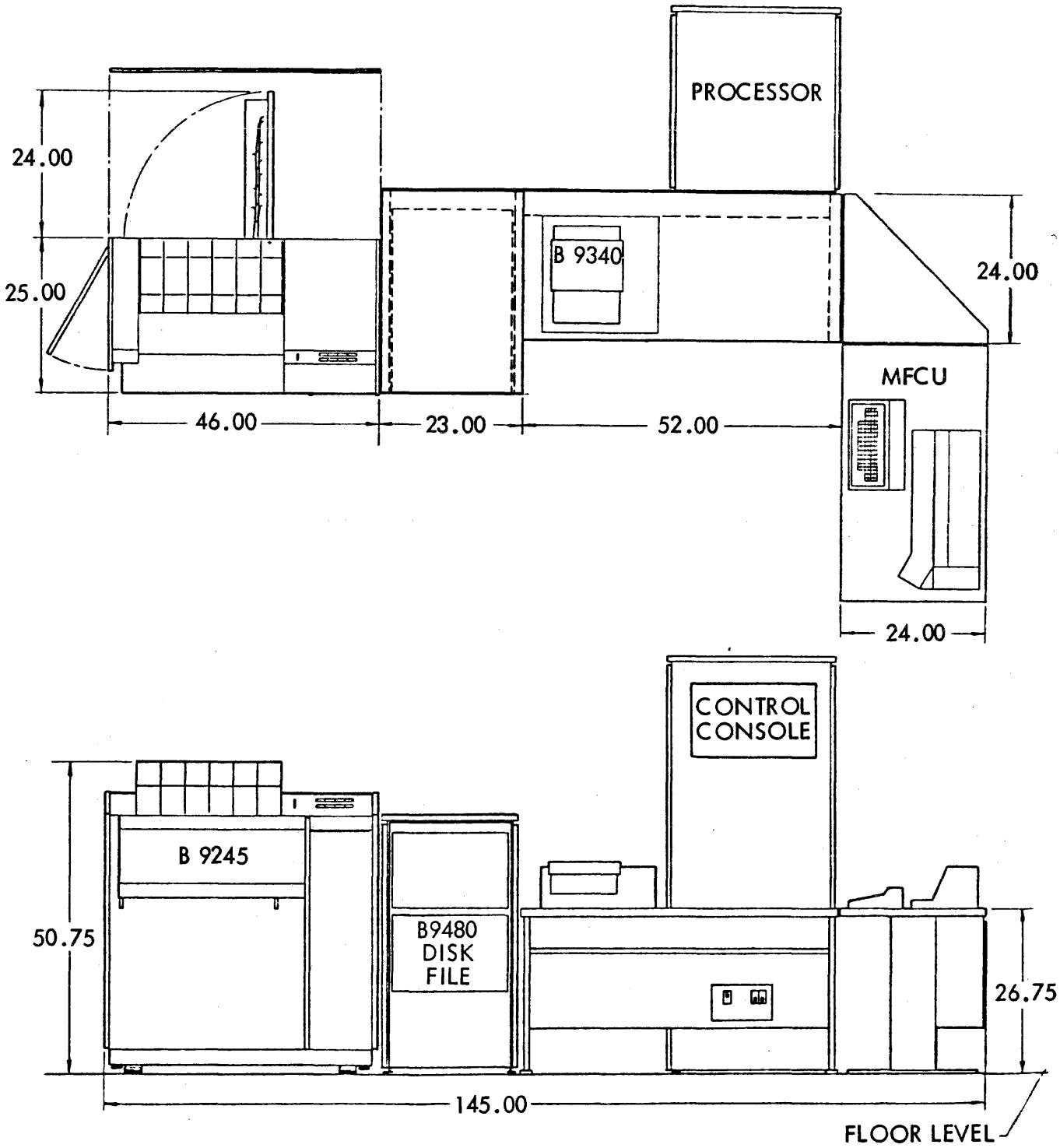


Figure IV-9. B 1712/B 1714 Corner Table with Printer to the Left (Sheet 1)

INSTALLATION PROCEDURE (CONT)

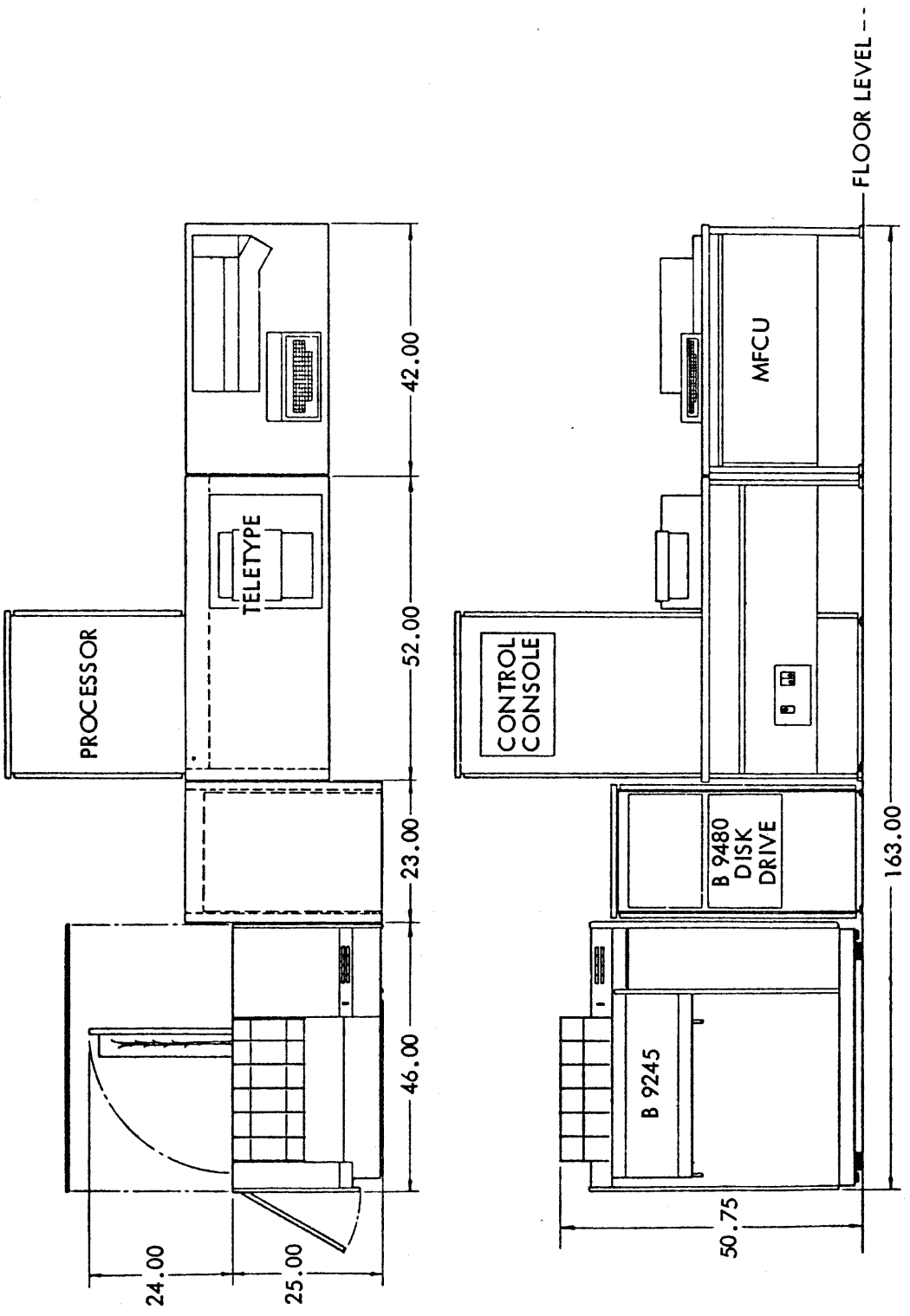


Figure IV-9. B 1712/B 1714 Straight Configuration With Printer to the Left (Sheet 2)

INSTALLATION PROCEDURE (CONT)

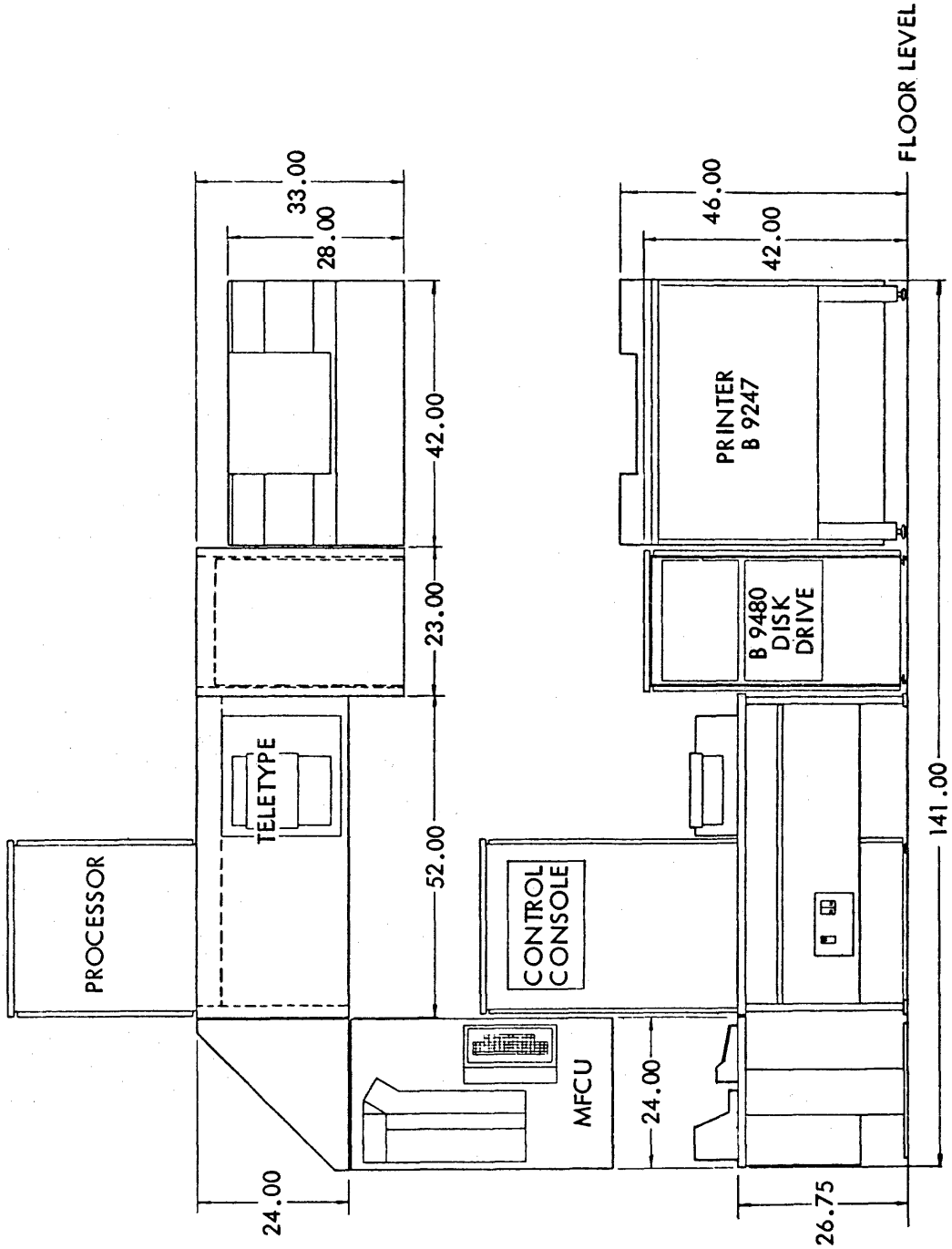


Figure IV-9. Corner Table With Printer to the Right (Sheet 3)

INSTALLATION PROCEDURE (CONT)

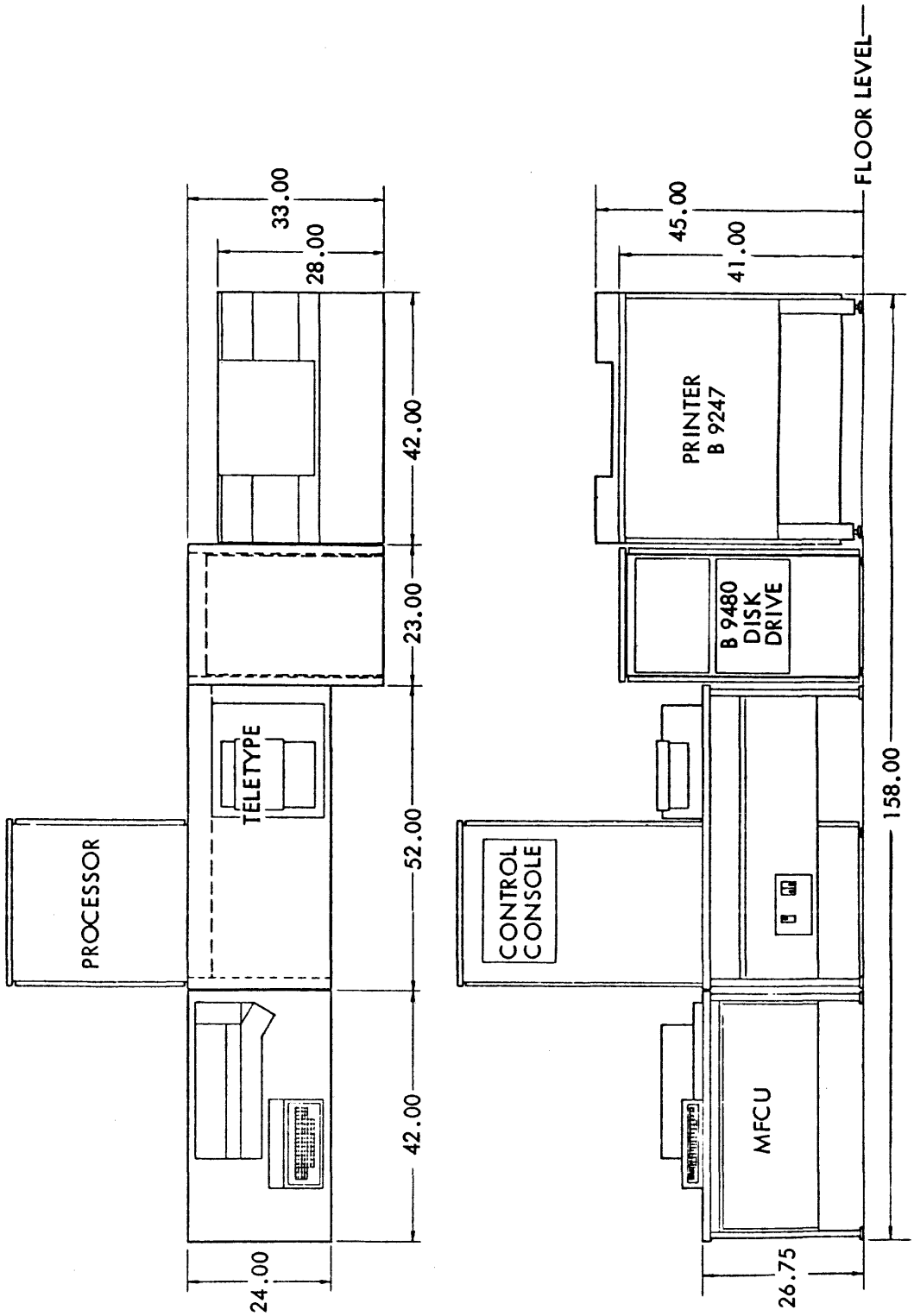


Figure IV-9. B 1712/B 1714 Straight Configuration With Printer to the Right (Sheet 4)

INSTALLATION PROCEDURE (CONT)

20. Route cable of printer around the back of the Disk Drive and then alongside of the Disk cable. Plug into the I/O Distribution Panel. Lay the AC power cord along side and plug into the AC Distribution Box. Coil neatly all surplus cable lengths. The B 9249 may be placed next to the table instead of the Disk Drive. At this point butt together the printer, Disk Drive, console table, corner cable, and MFCU.

21. Place the SPO (B 9340) on the console table. Route signal and AC cable to the rear and through the opening in the rear skin. Connect the signal cable to the I/O Distribution Panel and plug the AC cord into the AC Distribution Box. Coil neatly all surplus cable lengths.

22. System should be ready to turn on. AC power has been checked at the AC Distribution Box.

23. Leave peripheral circuit breaker off. Turn on circuit breaker at the rear of the power supply and the main frame breaker. OFF indicator, ON/OFF Switch should light.

24. Use a digital voltmeter to check DC voltages on powering up the system.

    Check the following voltages at the backplane: Refer to Chart IV-1.

CHART IV-1
BACKPLANE VOLTAGES

Voltage	Nominal Setting	Margin	
		High	Low
a. + 4.75	+ 4.85 ± 0.010	+ 5.00	+ 4.63
b. - 2.00	- 2.05 ± 0.010	- 2.10	- 1.95
c. +12.0	+12.0 ± 0.010	+12.5	+11.5
d. -12.0	-12.0 ± 0.10	-12.5	-11.5
e. +20.0	18.7 ± .10	+19.4	18.0
f. +23.0	3.6 ± .010 Diff	4.20 Diff	+ 3.0 Diff
g. - 5.0	- 5.00 ± 0.010	- 5.3	- 4.7

25. Power up system by depressing ON/OFF switch. Check DC voltages. If any voltage adjustments are needed or if there are any power problems, refer to the B 1700 Central System Field Engineering Technical Manual, Form No. 1053360 for trouble-shooting procedures.

26. The majority of peripheral equipment for the B 1712/B 1714 have variable input voltage taps. Do not power up the peripheral unit until the proper input taps have been verified. Refer to the appropriate Peripheral Unit Technical Manual.

27. After the central system and peripherals have been powered up, the applicable test routines should be run. Run the first three test routines first and in the order they are listed. Refer to Chart IV-2.

INSTALLATION PROCEDURE (CONT)

CHART IV-2

B 1700 Test Routines

Cassette Number	Listing Number	Name
CT 2210 0374	T 2210 1307	B 1714 Processor MTR
CT 2210 0382	T 2210 1315	B 1714 Processor Dynamic
CT 2210 1554	T 2210 1562	B 1726 M-Processor MTR
CT 2210 1539	T 2210 1547	B 1726 M-Processor Dynamic
CT 2210 1570	T 2210 1588	B 1700 S-Memory
CT 2210 1596	T 2210 1604	B 1726 M-Memory
CT 2210 0366	T 2210 1299	I/O Debug
CT 2210 0408	T 2210 1331	Console Printer (SPO)
CT 2210 0416	T 2210 1349	MFCU-96
CT 2210 0424	T 2210 1356	Line Printer
CT 2210 1612	T 2210 1620	PCH/RDR 80 Deck-RDR Alpha,CD 2209 5871 Deck-RDR Binary,CD 2209 5889
CT 2210 0465	T 2210 1372	Disk Cartridge-MIL
CT 2210 1473	T 2210 1380	Mag Tape-2
CT 2210 1521	T 2210 1513	Disk File
CT 2210 4442	T 2210 4454	RDR-Sorter-1
CT 2210 6413	T 2210 6421	Single Line Control
CT 2210 7346	T 2210 7338	Line Printer-Katakana
CT 2210 2370	T 2210 2388	Cassette Control

SYSTEM TURNOVER

Standard installation times are shown on Chart IV-3. Within the standard installation time, the field engineers must have installed the equipment so that it is ready for operation and the running of any applicable field engineering test routines.

SYSTEM TURNOVER (CONT)

CHART IV-3
STANDARD INSTALLATION TIMES

MODEL	DESCRIPTION	STANDARD INSTALLATION TIME IN HOURS
B 1712/B 1714	Main Frame	10
B 1726	Main Frame	16
B 9115	Card Reader	4
B 9119	Card Reader	4
B 9319	Reader/Punch	5
B 9419	Interpreting Data Recorder	5
B 9210	Card Punch	7
B 9340	Console Printer	4
B 9240	Line Printer	6
B 9245	Line Printer	8
B 9247	Line Printer	8
B 9249	Line Printer	4
B 9480	Disk Cartridge Drive	6
B 9491	12.5 IPS 9-Tr Mag Tape	6
B 9381	Mag Tape Cluster	9
B 9134/B 9135	Reader/Sorter	30
B 9136	Reader/Sorter	

After running the applicable test routines in Chart IV-2 without error, the Field Engineer should request the system technical representative to run system software.

The execution of system software without errors terminates the installation. When installation of the equipment is completed, the Field Engineer will insert the installation data in the Installation Register, sign, and immediately return both copies to the office for further processing, approval signature by the Branch Manager and the Branch Field Engineering Manager, and then for distribution. The branch office will immediately send one copy with approval signatures to Marketing Accounting, Equipment Order Acceptance.

Burroughs

PUBLICATION CHANGE NOTICE

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Description

Provides the information necessary for B 1700 series systems installation.

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Cover Page
v thru viii
I-5 thru I-8
II-1 thru II-8
II-11, II-12

Adds new pages 6A thru 6J

LIST OF EFFECTIVE PAGES

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v thru viii	PCN-001
I-1 thru I-4	Original
I-5 thru I-8	PCN-001
I-9 thru I-26	Original
II-1 thru II-8	PCN-001
II-9, II-10	Original
II-11, II-12	PCN-001
II-13 thru II-38	Original
IV-1 thru IV-19	Original
IV-20	Blank

B 1700

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Burroughs

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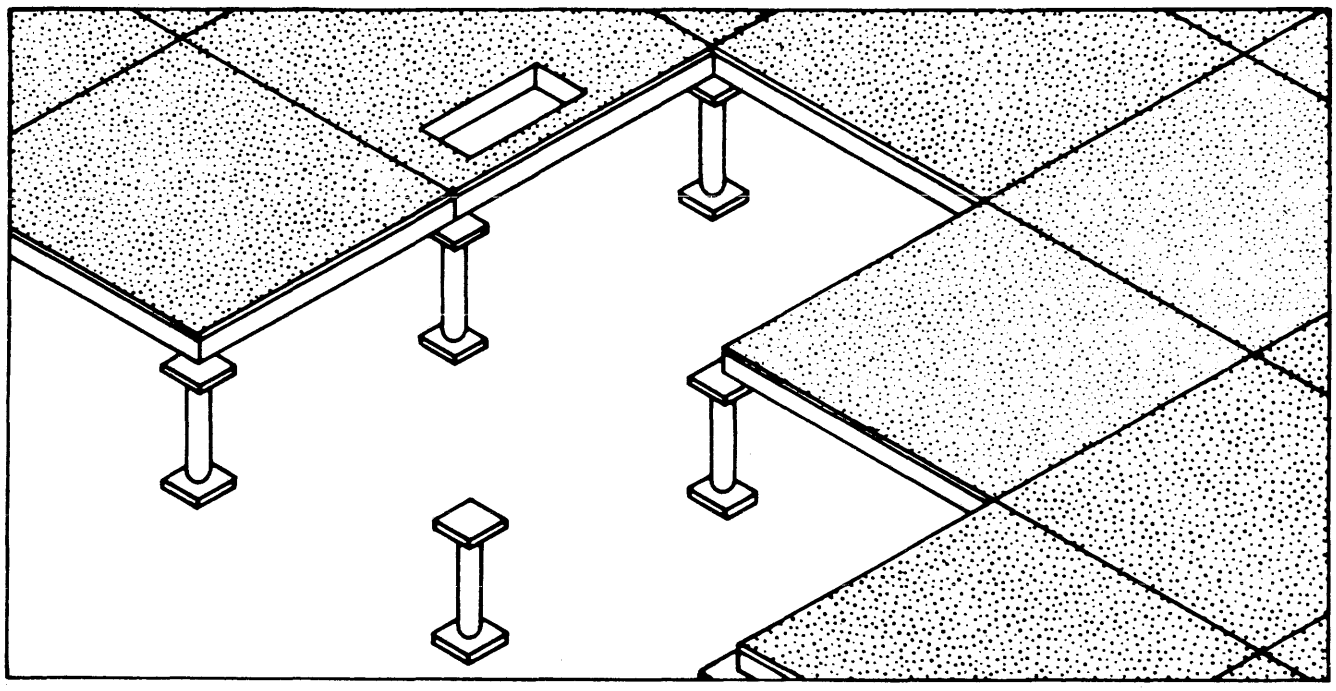
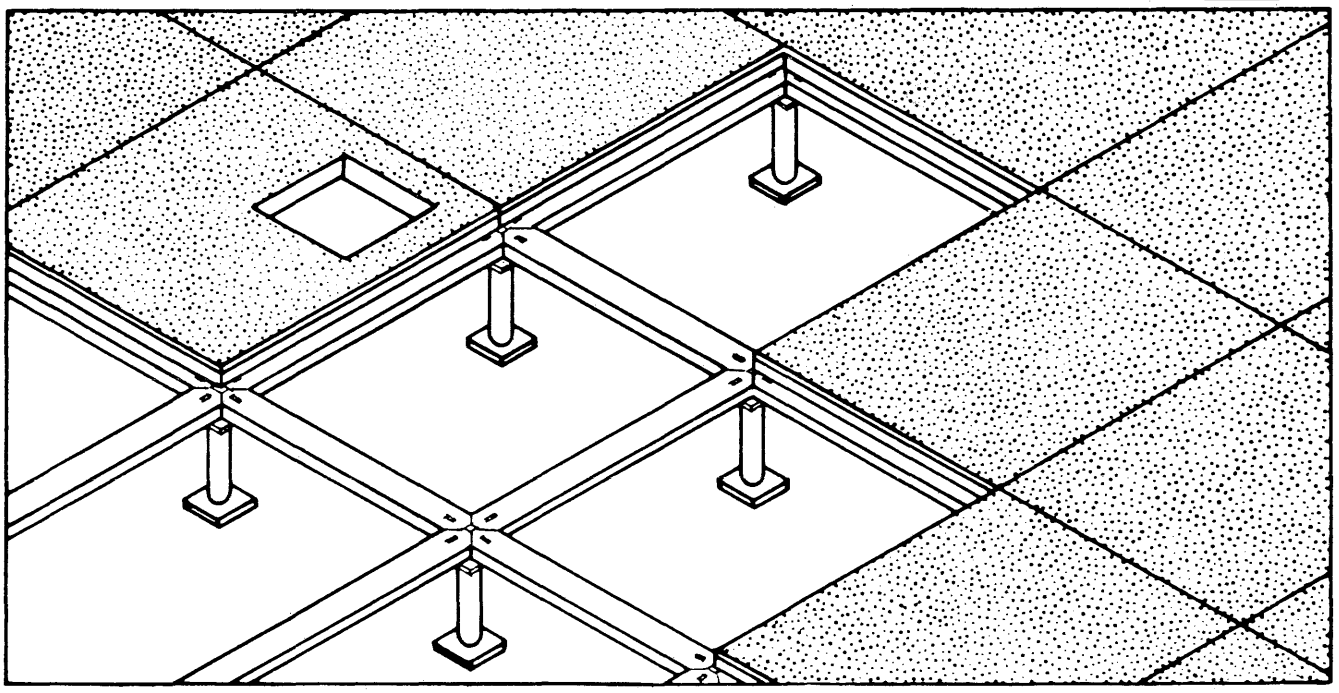
NOTE

Information for the Sections not included in this manual will be supplied when available.



Without Stringer Members



With Removable Stringer Members

Figure I-2. Elevated Floor

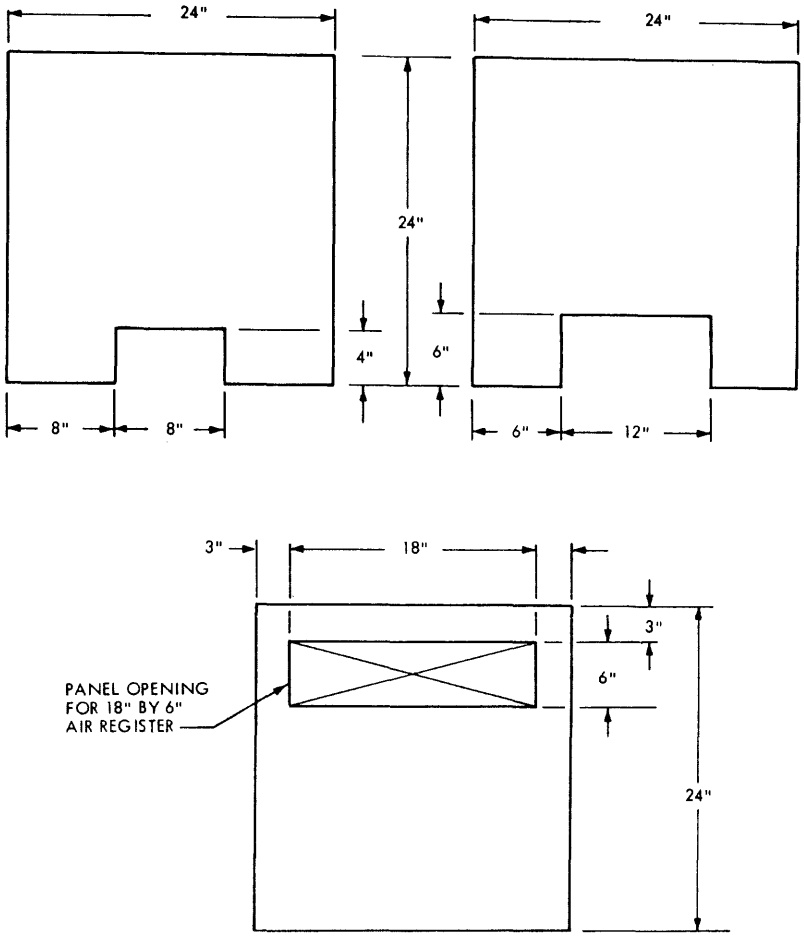


Figure I-3. Typical Floor Openings for Cables and Air Register

FLOOR FINISH

Burroughs recommends that the floor of the computer room be finished with 1/8-inch rubber or vinyl-asbestos tile, constructed with anti-static material. This type of floor prevents the base of the equipment from coming in contact with any metal surfaces of the building, thus providing safety for personnel while working on energized electrical circuits. It also provides a surface that can be readily cleaned with a damp mop or vacuum cleaner and is as static free as possible.

Anti-static floor wax should be used on this type of flooring. The resistance between the wearing surface of the finished floor and ground should be a minimum of 50K ohms.

Burroughs recommends carpeting be avoided wherever possible, due to its high static potential. If carpeting is used, it must be a computer room type carpet containing wire that has been woven into the fabric.

Burroughs Technical Standard 1257 5700, Rev. A, page 17, paragraph 5, defines the requirements for suitable carpet fabrics that minimize static electricity. Additional information on static electricity is contained in NFPA 77-1966 Static Electricity, available from the National Fire Protection Agency, 60 Batterymarch Street, Boston, Mass. 02110.

FLOORING (CONT)

UNDERFLOOR TREATMENT

When the space beneath the floor is used as an air plenum and the surface of the subfloor is concrete, then the subfloor should be sealed with a concrete hardener or painted with a non-cracking paint.

GROUNDING ELEVATED FLOOR

Safety requires that the metal components of the elevated floor (panels, pedestals, pedestal caps, stringers, etc.) be securely connected to building ground or the building metal structural members in order to effectively ground the entire elevated floor surface. The resistance between metal surfaces of the elevated floor and ground should not exceed 10 ohms. This elevated floor should not be directly connected to system ground. Refer to Figure I-4.

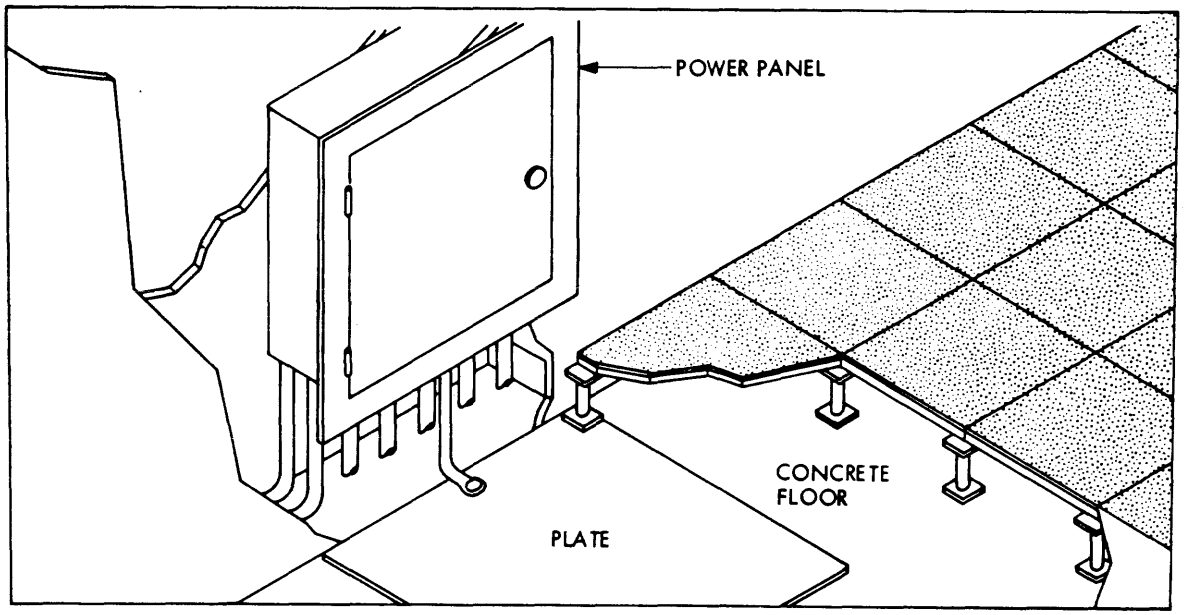


Figure I-4. Elevated Floor Grounding

CABLE TROUGH

In many areas the local codes require that cable troughs be installed to route system cables. In these instances, the cable trough is actually treated as conduit and must be grounded in a similar manner to the elevated floor.

Careful consideration of signal cable length and underfloor air-conditioning allowances must be an important factor when cable troughs are used.

CABLE ALLOWANCE

The majority of the peripherals are provided with a 25-foot cable. A 35- or 50-foot cable (Chart I-2) can be specified when the peripheral is ordered. In certain instances longer (special) cables may be ordered. The maximum distance any peripheral may be from its I/O control will depend on the length of signal cable. Allowances must be made for internal cable lengths within the unit (both the peripheral and central system), cable paths, and any cable bends. Cable allowances are shown in Chart I-3.

CHART I-2. EXTERNAL PERIPHERAL SIGNAL CABLES

A and/or B MODEL NO.	DESCRIPTION	CABLE PART NUMBERS FOR AVAILABLE LENGTHS 15'	25'	30'	35'	50'	100'
9111/9112	Card Reader	NA	1178 0889	1178 0871	1178 9633	1197 1439	NA
9115/9116	Card Reader	2471 3042	2471 3059	2471 3067	2471 3075	2471 3083	2471 3091
9119	96-Col. Card Reader	2471 3042	2471 3059	2471 3067	2471 3075	2471 3083	2471 3091
9131	Reader Sorter	NA	1178 0889	1178 0871	1178 9633	1197 1439	NA
9134/9135/ 9136	Reader Sorters	NA	1089 6702	1090 1312	1090 1320	1090 1338	1090 1346
9210	80-Col. Card Punch	NA	1178 0889	1178 0871	1178 9633	1197 1439	NA
9240	Line Printer	NA	1178 9625	1180 5710	1178 0863	1197 0209	NA
9245	Line Printer	NA	1178 9625	1180 5710	1178 0863	1197 0209	NA
9247	Line Printer	NA	NA	1090 1908	1090 1916	1090 1924	NA
9249	Line Printer	NA	2209 7489	NA	NA	NA	NA
9319	96-Col. Reader/ Punch	2471 3042	2471 3059	2471 3067	2471 3075	2471 3083	2471 3091
9340	Console Printer	1941 7369	NA	NA	NA	1904 0625	NA
9371/9374	Disk File (IA)	NA	2005 6461	NA	2005 6487	2005 6495	NA
9373/9375	Disk File (IC)	NA	1635 8731	NA	1635 8756	1635 8764	NA
9381	Mag. Tape Cluster	NA	1149 6874	NA	1149 6882	1149 6890	NA
* 9390	Mag. Tape Unit	NA	1178 9625	NA	1178 0863	1197 0209	NA
9419	96-Col. Interp. Data Recorder	2471 3042	2471 3059	2471 3067	2471 3075	2471 3083	2471 3091
** 9480/9481	Disk Cart. Drive	NA	1446 6072	NA	NA	NA	NA
9486	Disk Pack Drive	NA	NA	NA	NA	1744 1346	1744 1353
9491	Mag Tape Unit	NA	2210 0127	NA	NA	NA	NA
	Data Set (2 cables)	NA	2209 7976	NA	NA	2209 7984	NA

*Part number for the 6' cable on B9390 units is 1180 5702.
**Part number for the 10' cable on 9480/9481 units is 2158 4826.

GENERAL

This section contains the necessary information to determine the input power and air conditioning requirements for a B 1700 system. These requirements can be determined by the use of the Power and Heat Calculation charts (charts II-1 through II-4), and the data sheets. The data sheets are located at the end of this section.

ENVIRONMENT

The B 1700 system requires certain environmental conditions to provide reliable system operation. These requirements are as follows:

a. Input power must be free from excessive fluctuations. This can be achieved in most installations by using an isolation transformer for the B 1700 system.

b. Temperature and humidity must be controlled to prevent the specified range and rate of change from being exceeded.

Chart II-1. B 1710 Series System Single-Phase Power and Heat Calculation

A/B NUMBER B 17--	NAME BASIC CENTRAL PROCESSOR	APPARENT POWER KVA
	INPUT/OUTPUT CONTROLS	
	PERIPHERAL UNITS	

Single-Phase Power Subtotal	
System Expansion Factor (25% is recommended)	x1.25
Total Single-Phase Power requirement	
Total System Power Factor	x0.85
Total System Power in kilowatts	kW
KW-to-Btu/h conversion factor	x3400.
Total system Btu/h	
Single-Phase input voltage	kV
Total system current requirement	A

Chart II-2. B 1710 Series System Three-Phase Power and Heat Calculation

A/B NUMBER B 17--	NAME BASIC CENTRAL PROCESSOR	APPARENT POWER KVA
	INPUT/OUTPUT CONTROLS	
	PERIPHERAL UNITS	

Three-Phase Leg-to-Leg Power Subtotal	
Factor for all three Leg-to-Leg combinations	x3.0
Existing System Three-Phase power subtotal	
System Expansion Factor (25% is recommended)	x1.25
Total Three-Phase power requirement	
Total system power factor	x0.85
Total system power in kilowatts	KW
KW to Btu/h conversion factor	x3400.
Total system Btu/h	Btu/h
Three-Phase Leg-to-Leg voltage	KV
Three-Phase Leg-to-Leg apparent current	A
Three-Phase correction factor	x1.73
Three-Phase corrected input leg current	A

Chart II-3. B 1720 Series System Mainframe Power and Heat Calculation

A/B NUMBER B 17--	NAME BASIC CENTRAL PROCESSOR	APPARENT POWER KVA
	INPUT/OUTPUT CONTROLS	
A-to-B Leg and B-to-C Leg Power Subtotal		KVA
A-to-B-to-C Leg Convenience Outlets Load		KVA
A-to-B-to-C Leg Power Total		KVA
		÷ 2.0
Total A-to-B or B-to-C Leg Load		KVA

Chart II-4. Series System Total System Power Requirements

A-TO-B LEG LOADS			B-TO-C LEG LOADS			C-TO-A LEG LOADS		
B NUMBER	NAME	KVA	B NUMBER	NAME	KVA	B NUMBER	NAME	KVA
B 1720 Series	Central Processor		B 1720 Series	Central Processor		B 1720 Series	Central Processor	
Total System A-to-B Leg Load			Total System B-to-C Leg Load			Total System C-to-A Leg Load		

Largest numerical Leg-to-Leg Load	KVA
Multiply by three	x3
Total system load	KVA
System Expansion Factor (25% is recommended)	x1.25
Total system input power requirements	KVA
Total system power factor	x.85
Total system kilowatts	KW
Btu/h conversion factor	x3400.
Total system Btu/h	Btu/h
Largest numerical Leg-to-Leg load current	A
Three-Phase correction factor	x1.73
Total system input current (for any leg)	A

	Largest Numerical Leg Load Current
Largest Numerical Leg Load, Leg-to-Leg Kilovolts	Largest Numerical Leg Load

INPUT POWER REQUIREMENTS

Input power for the B 1700 system must be relatively free from transients, line surges, and noise. Input power requirements are as follows:

Static Line Variation -- line voltage ±5%, not to exceed 188-230V or 108-132V.

Transient Line Minimum -- 0.7 times normal line voltage for 2 cycles.

Transient Line Maximum -- 2.0 times normal line voltage for 0.5 cycles (8 milliseconds) OR
3.0 times normal line voltage for 5 milliseconds.

Frequency -- 49.5 Hz to 50.5 Hz OR 5 9.4 Hz to 60.6 Hz.

Line Voltage (188 to 230V) is measured from leg-to-leg of a single-phase input power source or from one leg to any other leg of a three-phase input power source. Line voltage (108 to 130V) is measured from either leg of a single-phase input power source to neutral or from any leg of a three-phase input power source to neutral.

INPUT POWER ISOLATION

The input power source to a B 1700 series system must be isolated from all other electrically powered devices. System power isolation is accomplished by the use of an isolation transformer connected between the B 1700 system input power source and the main power source. If the B 1700 system uses both a three-phase power source and a single-phase power source, both input sources require an isolation transformer.

TERMPERATURE AND HUMIDITY REQUIREMENTS

The B 1700 system is designed to operate in a class B environment. Class B environment is defined as an ambient temperature range of 60 to 100 degrees fahrenheit and a relative humidity range of 10 to 90 percent. However, the actual temperature and humidity limits for class B environment are shown in figure II-1.

For reliable operation, system media (punched cards and magnetic tape) must be stored and used in a class C environment. A class C environment is defined as an ambient temperature of 65 to 80 degrees fahrenheit and a relative humidity of 40 to 60 percent. Therefore, to achieve the greatest system reliability, it is recommended that a class C environment be provided for the B 1700 system. The class C environment limits are shown in figure II-1.

There are also requirements on the rate of environmental change. The ambient temperature must not be cycled from one extreme to the other in less than eight hours. Relative humidity must not be cycled from one extreme to the other in less than four hours.

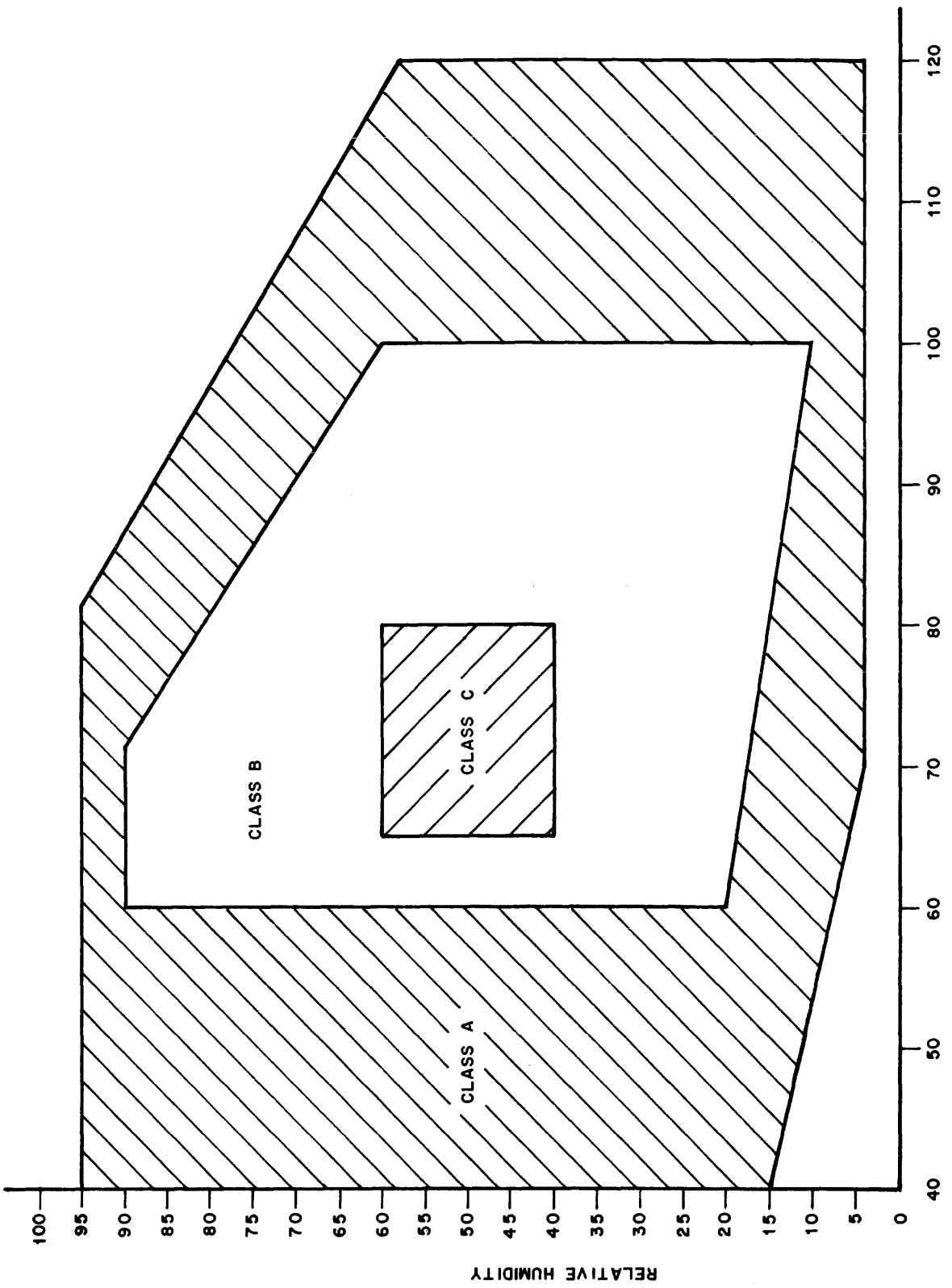


Figure II-1. Class A, B, and C Environments

INPUT POWER SOURCES

Input power for a B 1710 series central system can be derived from either a single-phase power source (approximately 220 Vac) or two legs of a three-phase power source (approximately 208 Vac).

Input power for a B 1720 series central system must be derived from a three-phase power source (approximately 208 Vac).

Input power for an auxiliary cabinet (used in a B 1728 system) can be derived from either a single-phase power source or two legs of a three-phase power source. If this power source is derived from the same three-phase power source that is used as input power to the central processor, a separate circuit breaker must be used.

SINGLE-PHASE POWER SOURCE

If the input power source to a B 1710 series system is derived from a single-phase power source, the input power and air conditioning requirements can be approximated by using the following procedure:

a. Calculate the total kVA load by adding the kVA load of each piece of equipment connected to the single-phase input power source. The equipment kVA loads are contained in the data sheets.

b. Multiply the total kVA load by 1.25 to compensate for future system expansion. The product of this calculation is the total system kVA requirements.

c. Multiply the total system kVA requirements by 0.85 (system power factor) to obtain total system kW.

d. Multiply total system kW by 3400 to obtain total system Btu/h.

THREE-PHASE POWER SOURCE

If the input power source to a B 1700 series system is derived from a three-phase power source, the following conditions are required:

a. If the B 1700 system is located in the United States of America (domestic), the power transformer input to the system must by wye connected.

b. If the B 1700 system is located outside of the United States of America (international), the power transformer input to the system can be either wye or delta connected.

c. The load on each of the three leg-to-leg combinations must be identical or nearly identical (load balancing).

The input power and air conditioning requirements for a B 1700 system connected to a three-phase input power source can be approximated by using the following procedures:

a. Calculate the total kVA load by adding the kVA load of each piece of equipment on all three leg-to-leg combinations (A-to-B, B-to-C, and C-to-A). Include in this total the kVA loads of the 117/120 Volt equipment. Mainframe and peripheral equipment kVA ratings are contained in the data sheets.

b. Multiply the total kVA load by 1.25 to compensate for future system growth. The product of this calculation is the total system kVA requirements.

c. Multiply the total system kVA requirements by 0.85 (system power factor) to obtain total system kW.

d. Multiply the total system kW by 3400 to obtain total system Btu/h.

POWER AND HEAT CALCULATIONS

The power and heat calculation procedures for a B 1700 system are divided into five sections:

a. B 1710 series systems, single-phase input power source.

b. B 1710 series systems, three-phase input power source.

c. B 1720 series systems, three-phase input power source.

d. B 1728 Auxiliary Cabinet, single-phase input power source.

e. B 1728 Auxiliary Cabinet, three-phase input power source.

B 1710 SERIES SYSTEMS, SINGLE-PHASE INPUT POWER SOURCE

Input power and air conditioning requirements for a B 1710 series system connected to a single-phase input power source can be determined by using the following procedure:

a. Use the B 1710 Series System Single-Phase Power and Heat Calculation chart (chart II-1) for all calculations.

b. Use chart II-5 (contained in DATA SHEET 1) for all central processor kVA ratings.

c. List the kVA rating of the basic central processor. (The basic central processor contains 16,384 bytes of S-memory.)

d. List the kVA rating of each additional memory module.

e. List the kVA rating of each I/O base extension.

f. List the kVA ratings of each I/O control.

g. List the kVA ratings of each peripheral unit (refer to the appropriate data sheet). Include both the devices that are connected to the convenience outlets of the central processor and the devices that are connected to the same single-phase power source that furnishes input power to the central processor.

h. Add the listed kVA ratings to obtain the single-phase power subtotal (kVA).

i. Multiply the single-phase power subtotal (kVA) by the system expansion factor to obtain the total single-phase power requirement. The recommended expansion factor is 25 percent; however, the actual system expansion factor must be determined on an individual basis.

j. Multiply the total single-phase power requirement by the system power factor (0.85) to obtain total system power in kilowatts (kW).

k. Multiply the total system power (kW) by the kW-to-Btu/h conversion factor (3400) to obtain total system Btu/h.

l. Measure the single-phase input voltage in kilovolts (approximately 0.22 kV).

m. Divide the total single-phase power requirement figure (kVA) by the single-phase input voltage (kV) to obtain the total system current requirement in amperes (A). The total system current requirement is used to determine the wire size that must be used to furnish input power to the system.

B 1710 SERIES SYSTEM, THREE-PHASE INPUT POWER SOURCE

If a B 1710 series system is powered by a three-phase input power source, the components of the system must provide a balanced load to the input power source. A balanced load is achieved when the loads connected between each pair of the three input power legs are equal (A-to-B, B-to-C and C-to-A). Load balancing is accomplished by connecting the central processor between two legs of the input power source (for example, A-to-B) and connecting the peripheral devices equally between the other legs of the input power source (for example, B-to-C and C-to-A).

Although it is generally not possible to achieve a perfect load balance, the field engineer must attempt to equalize the three loads within the limits of the available system components.

Input power and air conditioning requirements for a three-phase input power source can be determined by using the following procedure:

a. Use the B 1710 Series System Three-Phase Power and Heat Calculation chart (chart II-2) for all calculations. Three charts are required; one for the A-to-B leg load, one for the B-to-C leg load, and one for the C-to-A leg load. The first chart incorporates steps b through h of this procedure.

b. Use chart II-5 (contained in DATA SHEET 1) for all central processor kVA ratings.

c. List the kVA rating for the basic central processor. (The basic central processor contains 16,384 bytes of S-Memory).

d. List the kVA rating of each additional memory module.

e. List the kVA rating of each I/O base extension.

f. List the kVA rating of each I/O control.

g. List the kVA ratings of all of the other devices that are connected between the same two legs of the input power source. (Include those devices that are connected to the central processor convenience outlets.)

h. Add the listed kVA ratings to obtain one of the three-phase, leg-to-leg power subtotals.

i. Use another copy of the B 1710 Series Three-Phase System Power and Heat Calculation chart to list the load ratings of the second input power leg-to-leg combination.

j. List the kVA ratings of all devices that are connected to the leg-to-leg combination selected in step i of this procedure.

k. Add the listed kVA ratings to obtain the second three-phase, leg-to-leg power subtotal.

l. Use another copy of the B 1710 Series Three-Phase System Power and Heat Calculation chart to list the load ratings of the third input power leg-to-leg combination.

m. List the kVA ratings of all devices that are connected to the leg-to-leg combination selected in step l of this procedure.

n. Add the listed kVA ratings to obtain the third three-phase, leg-to-leg power subtotal.

o. Select the B 1710 Series Three-Phase System Power and Heat Calculation chart that has the largest (numerical value), three-phase, leg-to-leg power subtotal.

p. Multiply the three-phase, leg-to-leg power subtotal (selected in step o of this procedure) by 3 to obtain the existing system three-phase power subtotal (kVA).

q. Multiply the existing system three-phase power subtotal (kVA) by the system expansion factor to obtain the total three-phase power requirement. (Although the recommended system expansion factor is 25 percent, the actual system expansion factor must be determined on an individual basis.)

r. Multiply the total three-phase power requirement figure by the total system power factor (0.85) to obtain total system power in kilowatts (kW).

s. Multiply the total system power (kW) by 3400 to obtain total system Btu/h.

t. Measure the leg-to-leg voltage (approximately 0.208 kV) of the input power phase selected in step o of this procedure.

u. Divide the leg-to-leg three-phase input power subtotal (obtained in step o) by the leg-to-leg kilovolts (obtained in step t) to obtain the three-phase leg-to-leg apparent current of the selected phase.

v. Multiply the three-phase leg-to-leg apparent current by 1.732 to obtain a three-phase corrected input leg current. The three-phase input leg corrected current is used to determine the wire size that must be used to furnish input power for the system.

B 1720 SERIES SYSTEMS, THREE-PHASE INPUT POWER SOURCE

The B 1720 series system must provide a balanced load to the three-phase input power source. A balanced load is achieved when the loads connected between each pair of the three input power legs are equal (A-to-B, B-to-C and C-to-A).

Although it is generally not possible to achieve a perfect load balance, the field engineer must attempt to equalize the three loads within the limits of the available system components. The B 1720 series system ac distribution is connected to provide a partial load balance. The master logic power supply is connected between legs A and B of the three-phase input power supply. The slave logic power supply is connected between legs B and C. The S-memory power supply(s), the two blowers (fans), and the ac distribution control are connected between legs C and A. Load balancing for a B 1720 series system is accomplished by connecting the peripheral devices to the appropriate leg-to-leg combination so that the loads on each leg-to-leg combination are identical.

Input power and air conditioning requirements for a B 1720 series system can be determined by using the following procedure:

a. Use the B 1720 Series System Mainframe Power and Heat Calculation chart (chart II-3) to determine the central processor A-to-B leg and B-to-C to determine the leg load. The procedures for determining the A-to-B leg and B-to-C leg loads is contained in steps b through j of this procedure.

b. Use chart II-5 (contained in DATA SHEET 2) for the central processor kVA ratings.

c. List the kVA rating for the basic central processor. (The basic central processor contains 2,048 bytes of M-memory.)

d. List the kVA rating of each additional M-memory module.

e. List the kVA rating of each I/O base extension.

f. List the kVA rating of each I/O control.

g. Add the listed kVA ratings to obtain the A-to-B leg and B-to-C leg power subtotal.

WARNING

Remove all input power to the central processor before performing the next step of this procedure. Switch the two circuit breakers located in the ac distribution box to the OFF position. Also, switch the master (wall or panel board) circuit breaker that supplies input power to the central processor to the OFF position. Failure to perform this operation can result in serious injury or death to the person that performs the next step of this procedure (step h).

h. Determine the phase leg that is connected to each set of convenience outlets. The three sets of convenience outlets are mounted on the ac distribution box. Convenience outlets J1 are connected to leg A; convenience outlets J2 are connected to leg B, and convenience outlets J3 are connected to leg C. The J1, J2, and J3 identifiers are silk screened on the inside of the ac distribution box.

   1. Use the back of the chart II-3 for the calculations to be performed in steps h2 through h9.

   2. Calculate the kV rating(s) of the peripheral device(s) that is connected to the phase A convenience outlets (refer to the data sheets contained in this section). This calculation will provide the total leg A-to-neutral load.

   3. Calculate the total leg B-to-neutral load and the total leg C-to-neutral load by using the methods contained in step h2.

   4. Write the following three headings on the calculation sheet; A-to-B leg, B-to-C leg, and C-to-A leg.

   5. List 1/2 of the total leg A-to-neutral load under both the A-to-B leg leading and the C-to-A leg heading.

   6. List 1/2 of the total leg B-to-neutral load under both the A-to-B leg heading and the B-to-C leg heading.

   7. List 1/2 of the total leg C-to-neutral load under both the C-to-A leg heading and B-to-C leg heading.

   8. Add the figures in each listing to provide three leg-to-leg loads.

   9. Add the totaled A-to-B leg load to the totaled B-to-C leg load and list this sum on the front of the chart II-3 as the A-to-B-to-C leg convenience outlets load.

i. Add the A-to-B leg and B-to-C leg power subtotal (determined in step h) to the A-to-B-to-C convenience outlets load to obtain the A-to-B-to-C leg power total (kVA).

j. Divide the A-to-B-to-C leg input power total by 2 to obtain either the total A-to-B or the total B-to-C leg load.

k. List the total A-to-B and total B-to-C leg loads on chart II-4.

l. Calculate the C-to-A leg load rating by using the procedures in steps m through r.

m. Use the B 1710 Series System Three-Phase Power and Heat Calculations chart (chart II-2) for all calculations.

n. Use chart II-5 (contained in DATA SHEET 2) for the central processor kVA ratings except list 2.5 kVA in the place reserved for the basic central processor kVA rating.

o. List the kVA ratings of each additional S-memory module.

p. Add the listed kVA ratings to obtain the C-to-A leg input power subtotal (kVA).

q. Add the C-to-A legs input power subtotal to the C-to-A leg convenience outlets load (determined in step h8) to obtain the C-to-A leg load.

r. List the C-to-A leg load on chart II-4. This chart is to be used for the remaining steps of this procedure.

s. List in the appropriate columns of chart II-4 the kVA ratings of all other devices that are connected between any two of the three legs of the three-phase input power source.

t. Add each of the leg-to-leg loads to determine the largest numerical leg-to-leg load.

u. List the largest numerical leg-to-leg load and multiply this load by three to obtain the total system load in kVA.

v. Multiply the total system load by the system expansion factor to obtain the total system input power requirements. Although 25 percent is the recommended system expansion factor, the actual system expansion factor percentage must be determined on an individual basis.

w. Multiply the total system input power requirements (kVA) by the total system power factor (0.85) to obtain total system kilowatts (kW).

x. Multiply the total system kilowatts by 3400 to obtain the total system Btu/h. The total system Btu/h value must be used to determine the air conditioning requirements for the system.

y. Use chart II-4 and the following procedure to determine the largest numerical leg load current of the three-phase input supply.

   1. List the largest numerical leg load (determined in step t) as the dividend.

   2. Measure and list the largest numerical leg load kilovolts (leg-to-leg kV) as the divisor.

   3. Perform a division to obtain the largest numerical leg load amperage (A).

   4. List the largest numerical leg load current.

   5. Multiply the largest numerical leg load current by the three-phase correction factor (1.73) to obtain the total system input current requirements for each leg of the three-phase input power supply.

z. Repeat the procedure outlined in step y to obtain the current of any three-phase input supply leg on a given piece of equipment. The only change of procedure is that the largest numerical leg load (step y1) must be that of the given piece of equipment.

B 1728 SERIES AUXILIARY CABINET, SINGLE-PHASE INPUT POWER SOURCE

Input power and air conditioning requirements for a B 1728 auxiliary cabinet may be obtained by using the B 1710 Series Single-Phase Power and Heat Calculation chart (chart II-1).

a. List the kVA rating for the basic auxiliary cabinet. This rating is 1.6 kVA.

b. List the kVA rating of each I/O base extension located in the auxiliary cabinet (refer to chart II-6, DATA SHEET 2).

c. List the kVA rating of each I/O control located in the auxiliary cabinet (refer to chart II-6, DATA SHEET 2).

d. List the kVA ratings of each S-memory modules located in the auxiliary cabinet.

e. Add the listed kVA ratings to obtain single-phase power subtotals (kVA).

f. Multiply the single-phase power subtotal by the system expansion factor to obtain the total single-phase power requirement. Although the recommended system expansion factor is 25 percent, the actual system expansion factor percentage must be determined on an individual basis.

g. Multiply the total single-phase power requirement (kVA) by the system power factor (0.85) to obtain total system power in kilowatts (kW).

h. Multiply the total system power (kW) by 3400 to obtain total system Btu/h.

i. Measure the single-phase input voltage in kilovolts.

j. Divide the single-phase power requirement (kVA) by the single-phase input voltage (kVA) to obtain the total single-phase current requirement in amperes (A). The total single-phase current requirement is used to determine the wire size that must be used to furnish input power to the auxiliary cabinet.

B 1728 AUXILIARY CABINET, THREE-PHASE INPUT POWER SOURCE

It is assumed that the three-phase input power source to the B 1728 auxiliary cabinet is the same power source that furnishes input power to the B 1728 central processor.

Input power and air conditioning requirements for a B 1728 auxiliary cabinet connected to one phase of a three-phase power supply can be determined by using the following procedure:

a. Use the B 1710 Series System Three-Phase Power and Heat Calculation chart (chart II-2) for initial calculations (steps b through g).

b. Use chart II-6 (contained in DATA SHEET 2) for kVA ratings.

c. List the kVA rating for the basic auxiliary cabinet. This rating is 1.6 kVA.

d. List the kVA rating of each I/O base extension located in the auxiliary cabinet.

e. List the kVA ratings of each I/O control.

f. List the kVA ratings of each S-memory module.

g. Add the listed kVA ratings to obtain the three-phase, leg-to-leg power subtotal.

h. List the auxiliary cabinet three-phase, leg-to-leg power subtotal to the appropriate column on chart II-4.

DATA SHEET 1 - B 1712/B 1714 CENTRAL SYSTEM

EQUIPMENT CHARACTERISTICS

Dimensions	CP*	Table	Clearances**	
Width	27.75"	52"	Front	36"
Depth	32.75	24"	Rear	36"
Height	64.00	26.75"	Left	36"
Weight	720 lbs.	180 lbs.	Right	36"

Air Flow	60Hz	50Hz	Power and Heat
CFM	900	710	Refer to chart II-2 for power and Btu/h calculations.

*Includes cover dimensions.

**All clearances are specified from the Central Processor. Table arrangement will denote actual front clearances requirement.

INPUT POWER CABLING

The input power to the B 1712/B 1714 central processor is either 50 Hertz, single-phase, 208/240 VAC, three-wire service or 60 Hertz, single-phase, 208/240 VAC, four-wire service. The location of the central processor power cable is shown in figure II-2.

PERIPHERAL SIGNAL CABLING

The peripheral signal cabling interface is located in a panel mounted underneath the operator's table. Cables from the I/O controls and the peripheral units are routed to this area. Refer to figure II-2 for cable entrance locations.

PERIPHERAL POWER CABLING

A power distribution panel containing circuit breakers and four receptacles is located adjacent to the peripheral signal cabling interface area.

One of the circuit breakers (30 amperes) is used for the central processor; the other circuit breaker (35 amperes) is used for the four outlets. A 60 Hertz system provides 115/120 VAC at the four Hubbell, type 5264, outlets. A 50 Hertz system provides 208/230 VAC at the four Pass and Seymour, type 5874, outlets.

Chart II-5. B 1712/B 1714 Central System Power and Heat

NUMBER	UNIT	KVA	Btu/H
B 1712/ B 1714	Basic Central Processor containing ... Processor Main Memory (16,384 bytes) One I/O Base, Power Supplies and fans.	2.500	8,500
B 1012-XX/ B 1014-XX	Additional S- Memory adapters (8,192 bytes)	0.061	207
A 1305	I/O Base Extension	0.014	48
A 1340	Console Printer Control	0.060	204
A 1115	Card Reader Control, 300 CPM-80 Column	0.060	204
A 1116	Card Reader Control, 600 CPM-80 Column	0.060	204
A 1119-1	Card Reader Control, 300 CPM-96 Column	0.120	408
A 1210-1	Card Punch Control, 80 Column, 100 CPM	0.060	204
A 1319-2	Card Reader/Punch/Print Control, 96 Col., 300-60-60	0.120	408
A 1319-4	Card Reader/Punch/Print Ctrl, 96 Col., 500-120-120	0.120	408
A 1419-2	Card Reader/Punch/Print Ctrl, 96 Col., 300-60-60	0.120	408
A 1419-6	Card Reader/Punch/Print/Sort 96 Col., 300-300-300- 6 Pocket	0.120	408
A 1245-16	Printer Control, 300 LPM, 132 print positions	0.060	204
A 1245-19	Printer Control, 400 LPM, 132 print positions	0.060	204
A 1247-2	Printer Control, 400 LPM, 120 print positions	0.120	408
A 1247-3	Printer Control, 750 LPM, 120 print positions	0.120	408
A 1249-1	Printer Control, 90 LPM, 132 print positions	0.060	204
A 1249-2	Printer Control, 180 LPM, 132 print positions	0.060	204
A 1381	Tape Cluster Control	0.300	1,020
A 1491-2	10 KB Tape Control	0.420	1,428
A 1480	Disk Cartridge Control, 2.3/4.6 Megabytes	0.180	612
A 1481	Disk Cartridge Control, 4.6/9.3 Megabytes	0.180	612
A 1135	Reader Sorter Control, 900 DPM	0.120	408
A 1136	Reader Sorter Control 600 DPM	0.120	408
A 1351	*Single Line Control	0.120	408
	*For a Line Adapter add:	0.060	204

Chart II-6. B 1726 Central System Power and Heat

NUMBER	UNIT	KVA	BTU/H
B 1726	Basic Central Processor containing Processor Main Memory (24,576 bytes) Control Memory (2,048 bytes) I/O Base Power Supplies and fans	3.200	10,880
B 1305	I/O Base Extension	0.014	48
B 1026-XX	Additional S- Memory adapters (8192 bytes)*	0.061	207
B 1026-2	Additional M- Memory adapter (2048 bytes)	0.071	241
B 1340	Console Printer Control	0.060	204
B 1111	Card Reader Control, 800/1400 CPM, 80 Column	0.060	204
B 1115	Card Reader Control, 300/600/800 CPM, 80 Column	0.060	204
B 1119-1	Card Reader Control, 300 CPM, 96 Column	0.120	408
B 1210	Card Punch Control, 100 CPM, 80 Column	0.060	204
B 1213	Card Punch Control, 300 CPM, 80 Column	0.120	408
B 1319	Card Reader/Punch/Print Control, 300/500-60/120-6/120, 96 Column	0.120	408
B 1419	Card Reader/Punch/Print Control, 300-60-60, 96 Col.	0.120	408
B 1240	Printer Control, 475/700/1,040 LPM	0.060	204
B 1247	Printer Control, 400/750 LPM	0.120	408
B 1381	Tape Cluster Control	0.300	1,020
B 1390 B 1491 B 1394-2	18/50/72 KC 7-Channel Tape Control 10 KB Tape Control 9-Channel Tape Control	.420	1,428
B 1480	Disk Cartridge Drive Control, 2.3/4.6 Megabytes	0.180	612
B 1481	Disk Cartridge Drive Control, 4.6/9.3 Megabytes	0.180	612
B 1486	Disk Pack Drive Control, 95.5 Megabytes	0.180	612
B 1484-4	Disk Pack Drive Control, 175 Megabytes	0.180	612
B 1374	Head-Per-Track Disk File Control	0.240	816
B 1131	Reader Sorter Control, 13 Pocket, 1000 DPM	0.120	408
B 1134	Reader Sorter Control, 4 Pocket, 1625 DPM	0.120	408
B 1135	Reader Sorter Control, 8/12 Pocket, 900 DPM	0.120	408
B 1136	Reader Sorter Control, 8/12 Pocket, 600 DPM	0.120	408
B 1351	** Singleline Control	0.120	408
B 1352	** Multiline Control	0.240	816
B 1353	** Multiline Control Extension	0.240	816
B 1120	Paper Tape Reader Control	0.120	408
B 1220	Paper Tape Punch Control	0.120	408

*Add 0.198 KVA for each 64 K bytes of main memory with the exception of the first 64 K bytes.

** Each Line Adapter add: 0.060 204

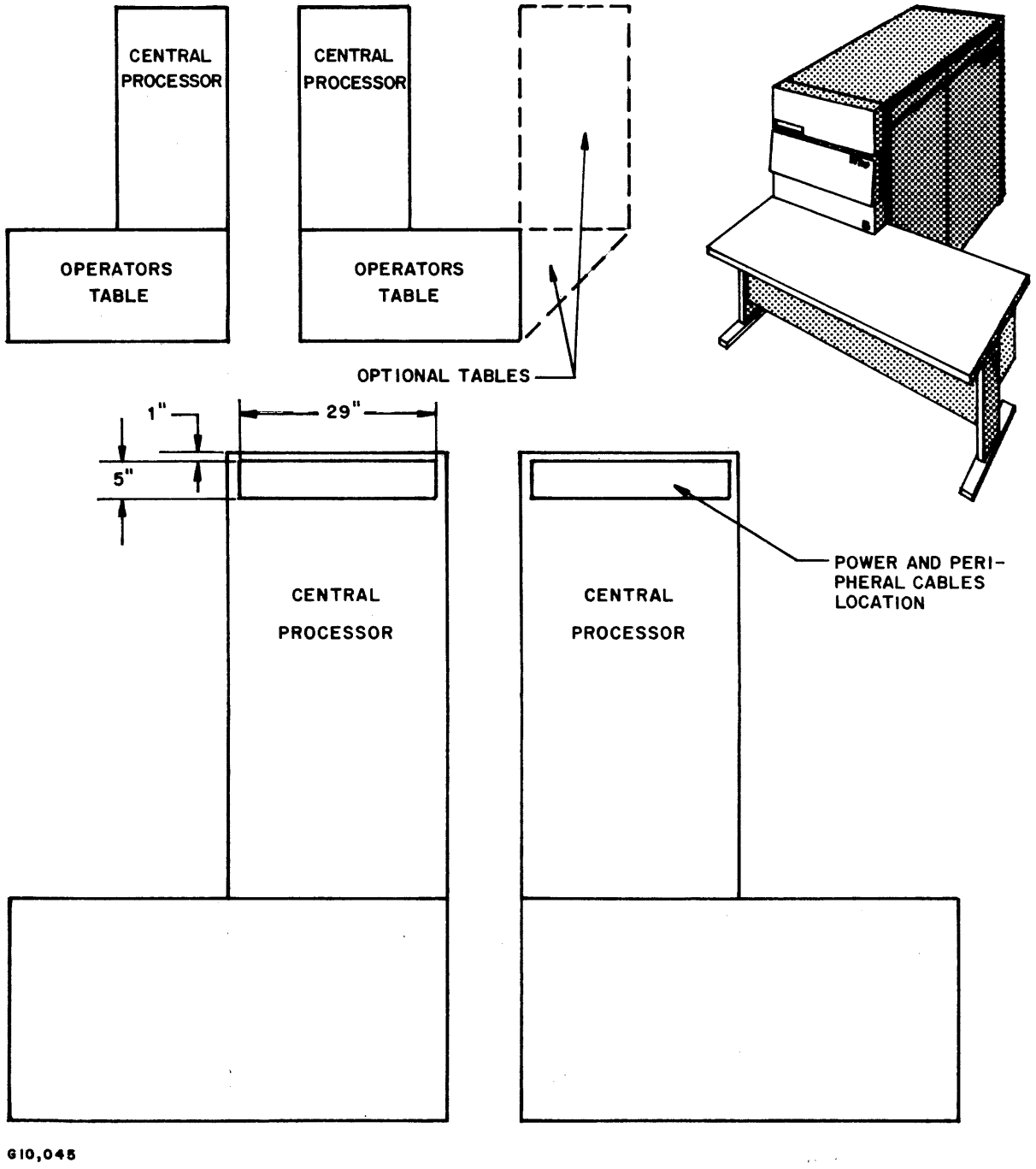


Figure II-3. B 1726 Central System

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PUBLICATION CHANGE NOTICE

PCN No.: PCN 1053378-002 Date: 8/76
Publication Title: B 1700 Planning and Installation Manual

Other Affected Publications: None

Supersedes: See below

Description

Provides the information necessary for B 1700 series systems installation.

Adds new pages III-1 thru III-4

LIST OF EFFECTIVE PAGES

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iii, iv	PCN-002
v thru vii	PCN-001
viii	PCN-002
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I-5 thru I-8	PCN-001
I-9 thru I-26	Original
II-1 thru II-8	PCN-001
II-9, II-10	Original
II-11, II-12	PCN-001
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NOTE

Information for the Sections not included in this manual will be supplied when available.

B 1700 SYSTEM CARD LOADING

Power for the logic cards in the B 1700 system is derived from the following: the +4.75/-2 volt dc logic power supply, the memory power supply, and the ±12 volt dc power supplies. The limiting factor is the load drawn from the logic power supply. Each logic power supply (one per cabinet) can supply up to 200 amperes. Since it is possible to overload the logic power supply within the constraints of the system configuration, the loading of each system (or cabinet) must be determined on an individual basis.

Charts III-1, III-2, and III-3 list the amount of current, in amperes, from the logic power supply that is required for each card or unit within the system (or cabinet).

WARNING

The field engineering maintenance philosophy for B 1700 Systems requires the use of the Field Card Tester. Therefore, 25.0 amperes from the logic power supply that supplies power to the central processor must be reserved for the Field Card Tester.

Chart III-1 lists the card and unit loads for any B 1710 series system.

Chart III-2 lists the card and unit loads for any B 1720 series system.

Chart III-3 lists the number of cards contained in the I/O controls for either a B 1710 series or a B 1720 series system. Chart III-3 also provides additional information regarding the top unit numbers, applicable peripheral devices, and other pertinent data.

NOTE

Since available I/O controls and peripherals are subject to modification and enhancements, chart III-3 is to be used for reference purposes only. For the availability of I/O controls and peripheral devices, refer to the latest issue of the Group III EDP Equipment Price Book and the applicable systems configuration book.

If the existing or proposed system configuration exceeds the capabilities of the existing or proposed logic power supplies, an additional logic power supply must be acquired for the system.

Chart III-1. B 1710 Series System Card and Unit Loads (S1 and S2)

Component	Load (Amperes)
S-Processor	75.0
Console Cassette Reader	1.4
S-Memory (per memory card)	2.0
I/O Base	2.6
I/O Base Extension	1.2
Field Card Tester (one per system)	25.0
Each I/O Control Card or Data Communication Adapter (refer to chart III-3)	6.0

Chart III-2. B 1720 Series System Card and Unit Loads (M1 and M2)

Component	Load (Amperes)
M-Processor (includes M-2 processor adapter)	125.0
Console Cassette Reader	1.4
M-Memory	
First card; 2K bytes	14.0
Each additional card; 2K bytes each	11.5
I/O Base	2.6
I/O Base Extension	1.2
Clock Module	2.0
Port Interchange	24.0
Port Adapter (each one)	1.9
S-Memory Base	8.0
S-Memory 16K Adapter	3.4 (2.4 for 8K only)
Multiline Control 1	21.1
Multiline Extension 1	1.2
Field Card Tester (one per system)	25.0
All other I/O Control Cards, with the exception of the MLC and MLE, or Data Communications Adapters (each one). (Refer to chart III-3.)	6.0

Chart III-3. B 1700 I/O Controls and Applicable Peripheral Devices

I/O CONTROL					APPLICABLE PERIPHERAL DEVICES				
TOP UNIT NUMBER	NAME (I/O)	NUMBER OF CARDS OF CONTROL	INDEPENDENT BACKPLANE POSITION	ADAPTERS	TOP UNIT NUMBER	B-NUMBER	NAME (I/O)	TYPE	DESCRIPTION
2200 5714	SPO Control 1	1	I/O Base		2552 8019	B 9340-1	Teletypewriter (TTY)		
2200 5656	Card Reader Control 1	1	I/O Base	80 Column	1090 2724	B 9115	Card Reader	80 Col	300 CPM
					1090 0777	B 9116	Card Reader	80 Col	600 CPM
					2101 0400	B 9117	Card Reader	80 Col	800 CPM
2205 7202	Card Reader Control 2	1	I/O Base	80 Column	1630 1251 (60 Hz)	B 9111	Card Reader	80 Col	800 CPM Adapter-1630 1301, 60 Hz; 1630 1939, 50 Hz
					1630 1269 (50 Hz)	B 9112	Card Reader	80 Col	1400 CPM Adapter-1630 1319, 60 Hz; 1630 1947 50 Hz
2205 0991	Card Reader Control 1	2	I/O Base	96 Column	2527 0067	B 9119-1	Card Reader	96 Col	300 CPM
2209 7802	Card Reader Control 2	2	I/O Base	96 Column	1090 2542	B 9119-2	Card Reader	96 Col	1000 CPM
2205 7228	Card Punch Control 2	1	I/O Base	80 Column	7 8502	B 9210	Card Punch	80 Col	100 CPM (1184 5195, 50 Hz)
1861 6391	Card Punch Control 1	1	I/O Base	80 Column (Liege)	1141 9934	B 9212	Card Punch	80 Col	150 CPM Module-1149 5462, 60 Hz, 1630 7456, 50 Hz
					1141 9934	B 9213	Card Punch	80 Col	300 CPM
1862 5258	Card Reader/Punch Control	2	I/O Base	80 Column (Liege)	2527 0141	B 9418-2	Card Reader/Punch	80 Col	200 CPM (Read), 45 CPM (Punch/Print)
2205 0991	Card Reader/Punch/Data Recorder 1	2	I/O Base	MFCU I/O Control, 96 column	2527 0034	B 9419-2	Card Reader/Punch/Data Recorder MFCU	96 Col	300 CPM (Read), 60 CPM (Punch/Print), Keyboard
					2527 0059	B 9419-6	Card Reader/Punch/Print/Sort MFCU	96 Col	300 CPM (Read), 60 CPM (Punch/Print), Keyboard
2209 7802	Card Reader/Punch/Data Recorder 2			MFCU I/O Control, 96 column		B 9419-2	Card Reader/Punch/Data Recorder MFCU	96 Col	300 CPM (Read), 60 CPM (Punch/Print), Keyboard
						B 9419-6	Card Reader/Punch/Print/Sort MFCU	96 Col	300 CPM (Read), 60 CPM (Punch/Print), Keyboard
2200 5698	Line Printer Control 2	2	I/O Base	Train	1090 0447	B 9247-3	Line Printer (Train)	Train	750 LPM, 132 Print Positions, 12-Channel Format Reader
					1090 0439	B 9247-12	Line Printer (Train)	Train	400 LPM, 132 Print Positions, 12 Channel Format Reader
					1090 0447	B 9247-13	Line Printer (Train)	Train	750 LPM, 132 Print Positions, 12 Channel Format Reader
					1090 0439	B 9247-2	Line Printer (Train)	Train	400 LPM, 132 Print Positions, 12-Channel Format Reader
2200 5706	Line Printer Control 3	1	I/O Base	Buffered Drum	1009 9364 (60 Hz)	B 9240-1	Line Printer	Buffered Drum	475 LPM (B 320) 1630 1012, 60 Hz
					1009 9372 (50 Hz)	B 9240-2	Line Printer	Buffered Drum	700 LPM (B 325)
						B 9240-3	Line Printer	Buffered Drum	1040 LPM (B 329)
2205 7244	Line Printer Control 4	1	I/O Base	Chain	2101 2232	B 9249-3	Line Printer (ODEC)	Chain	250 LPM (132 Print Positions) 1090 3920, 50 Hz
2211 1306	Line Printer Control 5	2	I/O Base	Train	2101 0947	B 9247-14	Line Printer	Train	1100 LPM (132 Print Positions)
2211 1298	Disk Pack Control 1	3	4-Card		2159 1656	B 9499-1	Disk Pack Electronics Control (DPEC)	1 x 4	174.4 MB, 300 ms Avg. Access
					2159 3405	B 9499-2	Disk Pack Electronics Control (DPEC)	1 x 8	87.2 MB, 30 ms Avg. Access
					2158 4123 (60 Hz)	B 9486-45	Disk Storage Drive	Single Drive	87.2 MB, 30 ms Avg. Access: 2158 4131 (50 Hz)
					2158 0516 (60 Hz)	B 9486-4	Disk Storage Drive	Dual Drive	174.4 MB, 30 ms Avg. Access: 2158 0584 (50 Hz)
2200 5730	Disk Cartridge Control 1	3	I/O Base		2155 1841	B 9480-12	Disk Cartridge Drive	Dual	4.6 MB, 80 ms Avg. Access (2155 1866, 50 Hz)
2208 2887	Disk Cartridge Control 2	3	I/O Base		2158 8439	B 9481-12	Disk Cartridge Drive	Dual	9.2 MB, 100 ms Avg. Access (2158 8454, 50 Hz)
2205 7335	Disk File Control 1	4	4-Card	Head-Per-Track	2017 2847	B 9371-7	Disk File Storage Unit/EU	1A-3	8.1 MB, 20 ms Storage (DFEU-1A 1633 4559)
2210 0325	Disk File Control II	4	4-Card	Head-Per-Track and S.M.	2017 2870	B 9371-14	Disk File Storage Unit/EU	1A-4	14.4 MB, 40 ms Storage (DFEU-1A 1633 4559)
					2017 2870	B 9374-10	Disk File Storage Unit	1A-4	14.4 MB, 40 ms Storage
					2017 2847	B 9374-17	Disk File Storage Unit	1A-3	8.1 MB, 20 ms Storage
1861 9262	Magnetic Tape Control 1	6	8-Card	18/50 KC, 7-Track,	2017 3001	B 9370-3	Systems Memory	SM 1B	1.98 MB, (Disk File Control II only)
1862 0047	90 IPS Speed Adapter 1	1	MTC1	NRZ (Liege)	1630 1350	B 9390	Magnetic Tape Unit	7-Channel NRZ	18/50 KC, 200/556 BPI: 1630 1368, 50 Hz
1862 0039	45 IPS Speed Adapter 1	1	MTC1		1123 0919	B 9380-n	Magnetic Tape Cluster	7-Channel NRZ	9/25/36 KC, 200/556/800 BPI
2200 5748	Magnetic Tape Control II (9-Trk NRZ)	5	8-Card	9-Track NRZ					
2205 7301	12.5 IPS Speed Adapter	1 or 2	MTC II	1 Card First Two Units;	2012 0408	B 9491-2	10 KB Magnetic Tape Unit	9-Channel NRZ	10 KB, 800 BPI (1 to 4 units)
2209 8016	22.5 IPS Speed Adapter	1	MTC II	2 Cards 3 to 4 Units	2040 0875	B 9381-1n	Magnetic Tape Cluster	9-Channel NRZ	18 KB, 800 BPI (1 to 4 stations)
2205 7293	45 IPS Speed Adapter	1	MTC II		1123 0919	B 9381-2n	Magnetic Tape Cluster	9-Channel NRZ	36 KB, 800 BPI (1 to 4 stations)
2209 8008	120 IPS Speed Adapter	1	MTC II		1128 5343	B 9394-2	Magnetic Tape Unit	9-Channel NRZ	96 KB, 800 BPI (1 to 6) 1128 5350, 50 Hz
2209 7869	Magnetic Tape Control IV	3	4-Card	9-Track P.E.					
2212 8763	25 IPS Speed Adapter 3	0			Not Listed	B 9496-2	Magnetic Tape Unit	9-Channel PE	40 KB, 1600 BPI
2212 8771	50 IPS Speed Adapter 3	0			Not Listed	B 9496-4	Magnetic Tape Unit	9-Channel PE	80 KB, 1600 BPI
2212 8748	75 IPS Speed Adapter 3	0			2048 8334	B 9495-2	Magnetic Tape Unit	9-Channel PE	120 KB, 1600 BPI
2208 2838	Magnetic Tape Cassette Control I	2	I/O Base		2040 5098	B 9490-25	Magnetic Tape Cassette	10 IPS	
1861 3638	Paper Tape Reader Control 1	2	I/O Base	Addition 20 Volt	1189 9069	B 9120	Paper Tape Reader, 60 Hz		500/1000 characters per second B 9926 input
1862 2936	Paper Tape Reader Control II	2	I/O Base	Power Supply	1189 9077	B 9120	Paper Tape Reader, 50 Hz		500/1000 characters per second translator available
1861 4651	Paper Tape Punch Control I	2	I/O Base	Required (Liege)	1189 9085	B 9220	Paper Tape Punch, 60 Hz		100 characters per second 1189 9093, 50 Hz
2205 5722	Reader/Sorter Control 1	2	I/O Base		1149 5470	B 9134-1	Reader/Sorter	4 Pocket	1625 DPM
2200 5771	Single Line Control 1	2	4-Card		Data Sets or Data Communications Line				
2200 9765	Multiline Control 1	4	12-Card						
2201 2314	Multiline Extension I	1	10-Card						
	Each SLC, MLC, or MLE Adapter	1	SLC/MLE/MLC						

Burroughs

PUBLICATION CHANGE NOTICE

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viii	PCN 002
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I-9 thru I-18	Original
I-19 thru I-21	PCN 003
I-22 thru I-26	Original
II-1 thru II-5	PCN 001
II-6	PCN 003
II-7, II-8	PCN 001
II-9 thru II-10	Original
II-11 thru II-12	PCN 001
II-13 thru II-38	Original
III-1 thru III-3	PCN 002
III-4	Blank
IV-1 thru IV-19	Original
IV-20	Blank

POWER (CONT)

ELECTRICAL DISTRIBUTION SYSTEM

The customer should provide an electrical distribution system that is connected to a single power source. The main feeder conductors and ground conductors should be dedicated to the exclusive use of the B 1700 System. Branch circuits for lighting, convenience outlets, elevators, and air-conditioning systems should not be connected to the system panelboard.

The amount of power required for each system may be calculated by adding up the kVA ratings for the individual units in the system (Section II data sheets). Allowances must be made for future growth.

COMMERCIAL POWER INPUT

Input power requirements are specified in section II, page 6 of this manual, under the heading "INPUT POWER REQUIREMENTS." These specifications must be met by the power source.

Alternate input power and/or source isolation may be required at locations subject to brownouts or continuing transients (for example, in regions of high thunderstorm activity).

Alternate Input power may be supplied by the use of a motor-generator set when brief power interruptions are to be expected. If the power interruptions tend to be long in duration, consideration should be given to the use of an uninterruptable power supply (UPS).

If line voltage variations or transients are expected to be a continuing problem, isolation transformers should be considered. If used, isolation transformers should be provided for all source inputs.

PANELBOARDS

The customer should provide a panelboard that includes a branch circuit breaker for each unit requiring facility supplied power. More than one panelboard may be used. However, if more than one panelboard is used, they should be located adjacent to the same source. A typical panelboard circuit breaker arrangement is shown in Figure I-6. The panelboard should contain a solid grounding bar that is not connected to the neutral conductor and is isolated from the metal enclosure. The specific size of the paneboard depends upon the equipment used and anticipated future equipment needs.

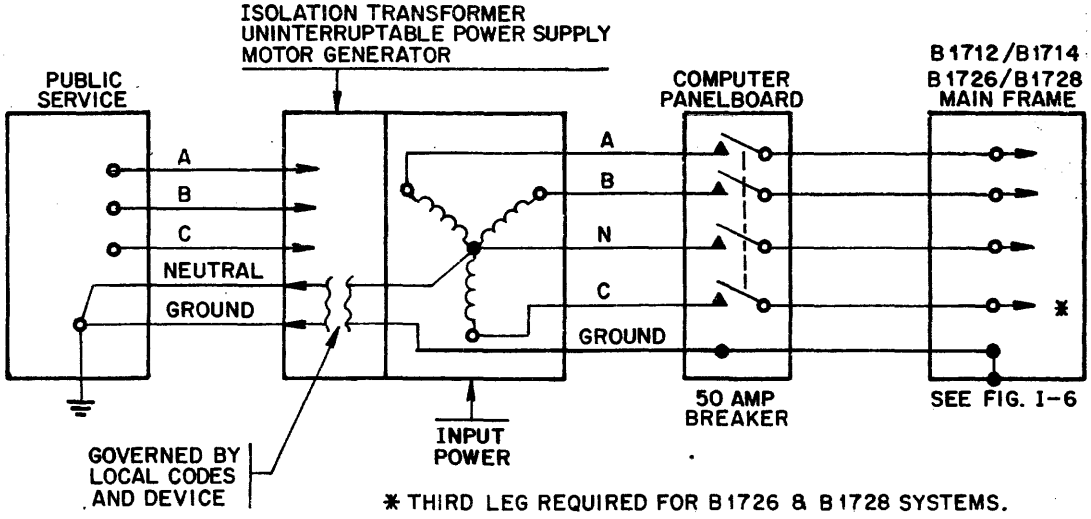

Figure I-6. Input Power and Panelboard

POWER (CONT)

NOTE

All electrical power requirements for data processing equipment should be based on 100 per cent demand loads.

PANELBOARD LOCATION AND DIRECTORY

The panelboard should be conveniently located in an accessible location within the data-processing room. Each panelboard should have a directory that clearly identifies each branch circuit.

BRANCH CIRCUIT WIRING

Branch circuit wiring should conform to Articles 300,310, and 645 of NFPA Bulletin No. 70 (1968). When the underfloor is used as an air plenum, most local codes state that branch circuit conductors should be enclosed in conduit, electrical metallic tubing.

ELECTRICAL INTERFACE

The customer shall furnish wiring direct to the panelboards.

Electrical connection shall be made to Burroughs equipment with the supervision of the Burroughs site engineer.

RECEPTACLE OUTLETS

Some of the peripheral devices used with the B 1712/B 1714 system may be plugged into the AC distribution box of the processor/Main Frame. Chart I-6 identifies these devices. For other devices or remote location of any device, the customer should furnish receptacle outlets. Each receptacle outlet should be identified as to the equipment served, plus the breaker to which it is connected.

RECEPTACLE LOCATION

Receptacle outlets should be located within five (5) feet of the equipment unit it is intended to serve and be accessibly located under a removable floor panel.

SERVICE OUTLETS (Convenience Outlets)

The customer should provide service outlets conveniently located to all equipment units. One outlet may serve more than one equipment unit, but in all cases, there should be a minimum of one receptacle outlet within eight feet of the front of the service outlets for the main frame cabinet.

GROUNDING

Grounding the equipment is an important facility requirement. Therefore, the customer should place particular emphasis on providing an effective and safe grounding system. The following paragraphs describe in detail the requirements for providing an adequate grounding system.

Equipment Grounding Conductors

The grounding conductors to all equipment units shall be installed and finished to show a continuous green color or a continuous green with one or more yellow stripes; they are installed as part of a branch system that supplies the equipment unit or system.

Receptacle Grounding

Equipment unit receptacles should be as specified in Chart I-4. For the best ground, the grounding terminal of the receptacle is not connected to the neutral conductor, outlet box, or any metal surface except the grounding conductor.

CHART I-4. CONNECTOR REQUIREMENTS

MODEL NUMBER	DESCRIPTION	BURROUGHS-PROVIDED PLUG	BURROUGHS-PROVIDED CABLE	CUSTOMER-SUPPLIED CONNECTOR	PHASE WIRE SIZE	NEUTRAL WIRE SIZE	GROUND WIRE SIZE	ELECTRICAL INTERFACE (SEE NOTES)
B 1712/14	Processor/Main Frame	No	No	No	See Note 4			See Detail "A" (Fig. I-5) and Note 1 below.
B 1726	Processor/Main Frame	No	No	No				See Detail "B".
B 9115	80-Col. Card Reader	5264	14779839	5262				Type 1, Note 2.
B 9119	96-Col. Card Reader	5264		5262				Type 1, Note 2.
B 9319	96-Col. Reader/Punch	5264		5262				Type 1, Note 2.
B 9419	96-Col. Interp. Data Recorder	5264		5262				Type 1, Note 2.
B 9210	80-Col. Card Punch	5333	10823417	5331				Type 2, Note 3.
B 9340	Console Printer	5264		5262				Type 1, Note 2.
B 9240	Line Printer	5333	10823433	5331				Type 3, Note 3.
B 9245	Line Printer	5375	21021100	5374				Type 7, Note 2.
B 9247	Line Printer	5375	10876829	5374				Type 7, Note 2.
B 9249	Line Printer	5264		5262				Type 1, Note 2.
B 9480	Disk Cartridge Drive	5264		5262				Type 1, Note 2.
B 9491	9-Track Mag. Tape 12.5 IPS	5264		5262				Type 1, Note 2.
B 9381	Mag. Tape Cluster	5701	11452836	5700				Type 5, Note 3.
B 9134	Reader/Sorter	3765	10816833	3764				Type 6, Note 3.
B 9135	Reader/Sorter	3765	10816833	3764				Type 6, Note 3.

NOTES: (1) B 1712/14 Main Frame is hand wired to power cable; see detail A, Fig. I-5.

(2) See Fig. I-5 for description of plugs. This device is normally plugged into AC distribution box of the B 1712/14 mainframe.

(3) See Fig. I-5 for description of plugs.

(4) Wire size to the processor/mainframe is determined by UL requirements and local codes. Line current for the processor/mainframe can be determined by means of the Power and Heat Calculation charts in Section II of this manual.

POWER (CONT)

Solid Grounding Bar

Equipment-grounding conductors should be connected securely to a solid grounding bar. This bar should be located in the panelboard cabinet(s) that serve the system. The solid grounding bar is in addition to the solid neutral bar.

EMERGENCY POWER OFF

The customer should furnish a means for the disconnect of all electrical power to the data-processing equipment and shut off the fan motor(s) of the air-conditioning system(s) that supply air to the data-processing room in the event of an emergency (fire, earthquake, discharging sprinkler system, etc.). This may be accomplished by the following methods. (Refer to NFPA No. 70, Section 645, dated 1968.)

1. A remote-type switch, relay (latch type) mechanically held or main circuit breaker equipped with a shunt trip device should be installed in the main feeders that supply power to the panelboard(s) serving the data-processing equipment. The emergency power-off device should not interrupt the data-processing room lighting circuits.
2. Provide a method of turning off air-conditioning that serves the computer room.
3. The disconnecting means mentioned above shall be controlled from locations readily accessible to the operator and at designated exit doors from the data processing room. The B 1700 is equipped with circuit breakers to control AC power to the Main Frame and devices plugged into the AC Distribution Box. These breakers are under the access panel located below the table.

PRE-INSTALLATION SCHEDULE AND CHECK LIST

The successful installation of the B 1700 system will demand close attention and supervision long before the system arrives. The following steps are meant as a guide and should be adhered to as closely as possible.

AFTER ORDER IS CONFIRMED

1. Field Engineering (F.E.) personnel responsible for the site should review the order to determine the equipment units desired.
2. Read this planning and installation manual.
3. Determine the prospective location of the system. Make a preliminary layout of the proposed installation.
4. Discuss with customer or consultant all phases of the proposed installation. The discussion should include the size of the proposed room, physical layout of the equipment, floor loadings, the use of raised floors, and electrical power and air conditioning requirements.
5. Advise Burroughs of security or other restrictions.
6. The customer should study local delivery quotations on power, air conditioning, customer-supplied cable, and other equipment to determine when each item must be ordered.
7. Order necessary cables. Refer to form 1903812(formerly form 2280).

Chart II-4. Series System Total System Power Requirements

A-TO-B LEG LOADS			B-TO-C LEG LOADS			C-TO-A LEG LOADS		
B NUMBER	NAME	KVA	B NUMBER	NAME	KVA	B NUMBER	NAME	KVA
B 1720 Series	Central Processor		B 1720 Series	Central Processor		B 1720 Series	Central Processor	
Total System A-to-B Leg Load			Total System B-to-C Leg Load			Total System C-to-A Leg Load		

Largest numerical Leg-to-Leg Load	KVA
Multiply by three	x3
Total system load	KVA
System Expansion Factor (25% is recommended)	x1.25
Total system input power requirements	KVA
Total system power factor	x.85
Total system kilowatts	KW
Btu/h conversion factor	x3400.
Total system Btu/h	Btu/h
Largest numerical Leg-to-Leg load current	A
Three-Phase correction factor	x1.73
Total system input current (for any leg)	A

	Largest Numerical Leg Load Current
Largest Numerical Leg Load, Leg-to-Leg Kilovolts	Largest Numerical Leg Load

INPUT POWER REQUIREMENTS

Input power for the B 1700 system must be relatively free from transients, line surges, and noise. Input power requirements are as follows:

Static Line Variation -- line voltage ±5%, not to exceed 188-230V or 108-132V.

Transient Line Minimum -- 0.7 times normal line voltage for 2 cycles.

Transient Line Maximum -- 2.0 times normal line voltage for 0.5 cycles (8 milliseconds) OR
3.0 times normal line voltage for 5 milliseconds

Frequency -- 49.5 Hz to 50.5 Hz OR 5 9.4 Hz to 60.6 Hz.

Line Voltage (188 to 230V) is measured from leg-to-leg of a single-phase input power source or from one leg to any other leg of a three-phase input power source. Line voltage (108 to 130V) is measured from either leg of a single-phase input power source to neutral or from any leg of a three-phase input power source to neutral.

INPUT POWER ISOLATION

The input power source to a B 1700 series system must be isolated from all other electrically powered devices.

TEMPERATURE AND HUMIDITY REQUIREMENTS

The B 1700 system is designed to operate in a class B environment. Class B environment is defined as an ambient temperature range of 60 to 100 degrees fahrenheit and a relative humidity range of 10 to 90 percent. However, the actual temperature and humidity limits for class B environment are shown in figure II-1.

For reliable operation, system media (punched cards and magnetic tape) must be stored and used in a class C environment. A class C environment is defined as an ambient temperature of 65 to 80 degrees fahrenheit and a relative humidity of 40 to 60 percent. Therefore, to achieve the greatest system reliability, it is recommended that a class C environment be provided for the B 1700 system. The class C environment limits are shown in figure II-1.

There are also requirements on the rate of environmental change. The ambient temperature must not be cycled from one extreme to the other in less than eight hours. Relative humidity must not be cycled from one extreme to the other in less than four hours.

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