

INSTALLATION PLANNING GUIDE

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**INFORMATION CONTAINED IN THIS
MANUAL IS SUBJECT TO DESIGN
CHANGE OR PRODUCT IMPROVEMENT**

INSTALLATION
PLANNING GUIDE

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INSTALLATION PLANNING GUIDE

1. PRE-INSTALLATION PLANNING

Customers planning an INTERDATA System installation should use this manual as a guide to determine the best way to prepare their site for the arrival and installation of the system's equipment. Careful advance planning makes it possible for a customer to install the equipment with little or no interruption to his normal operating routine. If the recommendations specified in this manual are followed, physical and environmental requirements should be satisfied before the equipment arrives.

INTERDATA Technical Support and Customer Engineers are available to the customers for consultation and to provide assistance when requested to do so.

2. SYSTEM ARRANGEMENT AND SPACE REQUIREMENTS

The INTERDATA arrangement of units reduces space requirements, reduces the need for raised floors, and provides convenient operator access to the equipment for efficient operation. Because data processing areas differ in room size and column spacing, and in different combinations of machines, equipment, and work areas, it is advisable to prepare a floor plan showing the proposed location and arrangement of all equipment to be installed. Other equipment such as work tables, desks, chairs, and storage cabinets should also be included in the floor plan for the system area. Enough space should be provided to prevent loss in operating efficiency. When planning the area, consider the possibility of future expansion to the initial installation, so that equipment may be added without costly and time-consuming revisions to the original plans or system area.

In summary, consider the following items when determining space requirements and unit locations:

- Work space
- Storage space
- Desk space
- Aisle space
- Service clearance
- Future expansion
- Weights and floor loading
- Heat dissipation
- Electrical requirements, including service and outlets.
- Doorway sizes, elevator capacities, and loading facilities used in getting the machines to their designated locations.

3. SCHEDULING

To insure that the equipment area is ready when the system is delivered, make a physical planning schedule. Because each installation differs in some respect from every other installation, it is not possible to provide a precise schedule in this publication. However, the following minimum lead time is suggested; one week before equipment delivery, building alterations should be complete and all planned modifications for wiring and environmental control should be complete and tested.

4. ENVIRONMENTAL CONSIDERATIONS

4.1 Temperature and Humidity

The temperature and humidity of a data processing area are influenced by many factors. These include:

- The heat loads produced by mechanical and electrical equipment.
- The volume of fresh air entering the room, including its temperature, humidity and air flow pattern.
- The amount of heat introduced or dissipated through the walls, ceilings, and floors.

As these factors change, varying amounts of heat and humidity may have to be introduced or dissipated by means of heating, cooling, and humidity-controlling equipment to maintain an acceptable environment.

Some units may have more or less restrictive temperature and relative humidity requirements and require special consideration.

Refer to Equipment Specification Table, Appendix 1. Although air conditioning equipment is usually not required for system operation, it may be needed in some cases due to extremes in temperature or humidity in the data processing area. When such equipment is required, it is recommended that it be designed to operate between 70°-75°F (21°-25°C) and 40%-50% relative humidity without condensation. These recommended ranges for temperature and humidity provide a large unit-available time buffer between the time that the temperature or humidity leave their respective range and reach the permitted extreme. The operator can use this time buffer to take corrective measures. These ranges also prove to be a generally acceptable personnel comfort level.

4.1.1 Temperature-Associated Problems. High temperature increases the rate of deterioration of virtually every material.

Thermal gradients induce temporary and permanent microscopic changes in material.

4.1.2 Humidity-Associated Problems. Extremes in relative humidity, if maintained for long periods of time, may have an adverse effect on the overall operating efficiency of the installation and should be avoided whenever possible.

4.1.3 High Humidity. Humidity levels approaching the maximum limit may cause improper feeding and stacking of punch cards and paper documents, physical discomfort, and condensation on windows and outside walls. This must be considered not only in the computer room, but anywhere punch cards or paper tapes are used or stored.

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

4.2 Dirt and Air Pollution

The amount of contamination usually found in air within a normal office environment will not interfere with the operation of the INTERDATA equipment. However, normal precautions should be taken to keep dust, dirt and other foreign matter away from the machines. If the system must be installed in an area having a high dust content, or where there is an exposure to abrasive materials or corrosive gases, contact INTERDATA Technical Support for advice and recommendations.

Airborne dust reduces the useful life of tapes and causes early data errors on disks and possible permanent damage. An accumulation of dust can cause failures on photoelectric readers and sensors.

4.3 Lighting and Acoustics

The recommended light intensity, including natural light, should be maintained at 420 to 538 lumens/M² measured at 30 inches above the floor. Emergency lighting (battery powered auto controlled) should be provided where necessary to protect personnel and equipment against a sudden lighting failure.

If cathode-ray tube peripheral devices are part of the system, the lighting in their area should be reducible so that the operator can observe the display.

4.3.1 Light-Associated Problems. High intensity direct light or direct sun light can cause problems with photoelectric readers and light sensors.

4.3.2 Acoustic Considerations. Some peripheral devices (such as line printers, card readers, paper tape punches and magnetic tape transports) are noise sources. If an installation is to use several high noise level devices, some acoustical treatment of the

data processing area is recommended. The following is presented as general information:

The use of absorptive materials to reduce the noise level. The greatest sound reduction is obtained by properly treating the ceiling. A dropped porous-type ceiling is the most effective.

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

If overhead duct work exists, precautions must be taken so that noise is not transmitted to adjacent areas.

4.4 Radiated Emissions

Sources of radiation such as FM or RADAR transmitters close to the computer system may affect the operation of the processor and related peripherals. The following is presented as general information:

To minimize these emissions, ground window screens and other large metal surfaces. Shield interconnecting cables with a grounded shield. Provide additional grounding to systems cabinets.

4.5 Vibration and Altitude

Vibration can cause slow degradation of mechanical parts and, if severe, may cause data errors on disks.

Systems operating at altitudes above 10,000 feet may require additional cooling. Disk subsystems have a maximum altitude specification of 12,000 feet.

5. PHYSICAL AND MECHANICAL CONSIDERATIONS

5.1 Safety

The safety precautions provided in this section are suggested for the following reasons:

To protect operating personnel from injury.
To comply with building and safety codes.
To protect the computer system and data that it is handling.

5.1.1 Personnel Fire Safety. Personnel should be trained in such emergency measures as:

- Calling the fire department
- Electrical shut-down procedures
- Use of fire extinguishers
- Evacuation of personnel

5.1.2 Personnel Safety Hazards. Many of the following examples can cause both injury to personnel and equipment damage:

- Exposed cabling on floor.
- Open doors on magnetic tapes, paper tape readers, line printers or system cabinets.
- Improper grounding of electrical devices.

5.1.3 Installation Precautions. After a system cabinet has been placed in its proper location within the computer room, the leveling feet at the base of the cabinet must be lowered to the floor before any peripheral (mag tape unit or disc) or power supply can be safely "hinged" out on the cabinet.

DANGER

INTERDATA recommends that no more than three power supply units be hinged out on any one cabinet at one time.

5.1.4 Equipment and Data Safeguards

- Monitoring of environmental conditions during non-working hours.
- All incoming services such as water, steam, and power should be checked regularly along with pipes for leaks or excess condensation.
- Waterproof electrical receptacles should be used under raised floors.
- Important records should be stored in metal cabinets and have duplicates stored elsewhere.

5.1.5 Fire Precautions. The location and installation of fire detection and extinguishing equipment requires considerable planning. Local experts in this field plus insurance safety engineers and building authorities must be contacted. The following is presented as general information:

5.1.6. Fire Prevention. The computer room should not be located where combustible materials are used or stored. If necessity dictates such a location, appropriate precautions should be taken.

Cleanliness in the computer room and smoking restrictions should prevent accidental fires. Do not overload power lines. A separate, easily accessible, master circuit breaker should be provided to remove all power from the computer system.

5.1.7 Fire Detection and Extinguishing. Various types of fire sensing and extinguishing systems may be installed. The heat sensitive, water type sprinkler system is generally the least expensive, but most likely to cause damage to equipment and records. If a sprinkler system is used, a "Dry Pipe" system is recommended.

WARNING

Most smoke sensing, gaseous flooding systems (carbon dioxide or hydrocarbon bromides) reduce system damage but require immediate (30 seconds) evacuation of personnel.

5.2 System Layout

The following points should be considered when planning the system layout:

- Availability of adequate electrical power receptacles.
- Locating of peripherals so the maximum cable lengths are not exceeded.
- Ease of operator control and visual observation of peripherals.
- Efficient work flow pattern.
- Adequate spacing to allow for ease of tape changing, printer paper loading and removal, and access for service.
- Allow space for future expansion.
- Communication requirements.

5.3 Room Layout

The following points should be considered when selecting a computer room:

- Loading capability of the floor.
- Raised floor requirement.
- Type of flooring material, location of doors, windows, air ducts, etc., pertaining to temperature changes, outside light and as sources of dirt.
- Type of ceiling and height.
- Ease of access for some of the more bulky pieces of computer equipment.
- Type of walls.

5.4 Cabling

If there is to be cabling between the computer system and external peripherals, some of the following points must be considered to protect the cabling:

- Cable ramps provide protection for cabling but decrease flexibility and could constitute a personnel safety hazard.
- Raised flooring provides excellent protection, clutter-free environment, safety, and allows for future change or expansion at minimum cost.

6. ELECTRICAL GUIDELINES

All reasonable design efforts have been made in the machine to insure satisfactory operation with the normal power supplied by most power companies. There are, however, many outside sources that can cause transient electrical noise signals which may affect machine operations.

The electrical power environment should be checked for unusual loads which might induce excessive noise into the branch circuit for the system. Switching heavy inductive loads or operating certain types of equipment near the system can cause problems, even though the source is on a different branch circuit. If such a condition is suspected, a thorough investigation should be made to determine whether corrective measures should be taken. In some cases, it may be advisable to provide a separate feeder for the system directly from the main building power. In extreme cases of electrical noise, it may be necessary to install an isolation transformer and/or RF filter. Some common sources of electrical noise are:

- Air conditioning devices
- Electrical welders
- Electrical furnaces
- Elevators
- Electrostatic copying machines
- Large, brush-type motors
- X-Ray machines

6.1 Power Distribution Requirements

Standard INTERDATA systems do not require special AC power distribution. The standard system can operate on feeders which are providing power to other loads if there are no unusual loads as discussed in the preceding paragraph. However, it is desirable to power any computer system from a dedicated source and this should be done when possible. See Figures 1 through 3 for typical types of AC connections.

All wiring installed should comply with national and local electrical codes.

6.2 System Cabinet and Power Requirements

Each M49-030 systems cabinet is equipped with an internal AC distribution panel which contains five duplex receptacles (used to provide power to systems power supplies, cabinet mounted peripheral devices and external peripheral devices such as the ASR-33 TTY terminal) (Ref. A 2-3) and a 30 ampere circuit breaker (Curve 10, trips between 30.3 and 37.5 amperes). Power is supplied via a 15-foot, 3-wire, power cable fitted with a Hubbell #2611 twist lock plug.

The power requirement for each systems cabinet is: single phase, 115 volts AC \pm 10%, 47-63HZ from a source capable of providing 30 amperes continuous current.

Although each cabinet may not require 30 amperes, this service is recommended for expandability. Power consumption for the configuration can be calculated using Appendix I data.

Power for each cabinet can be provided via a Hubbell #2610 twist lock receptacle or equivalent, or the power cable may be wired directly to a circuit breaker housed in a distribution box.

A.C. SOURCES AND CONNECTIONS

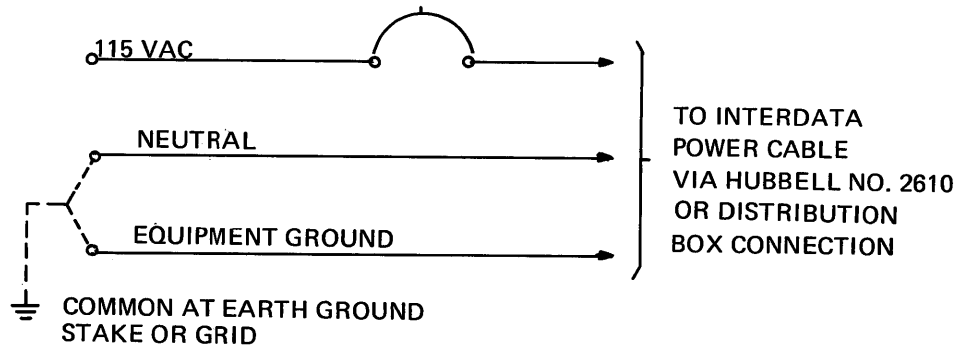
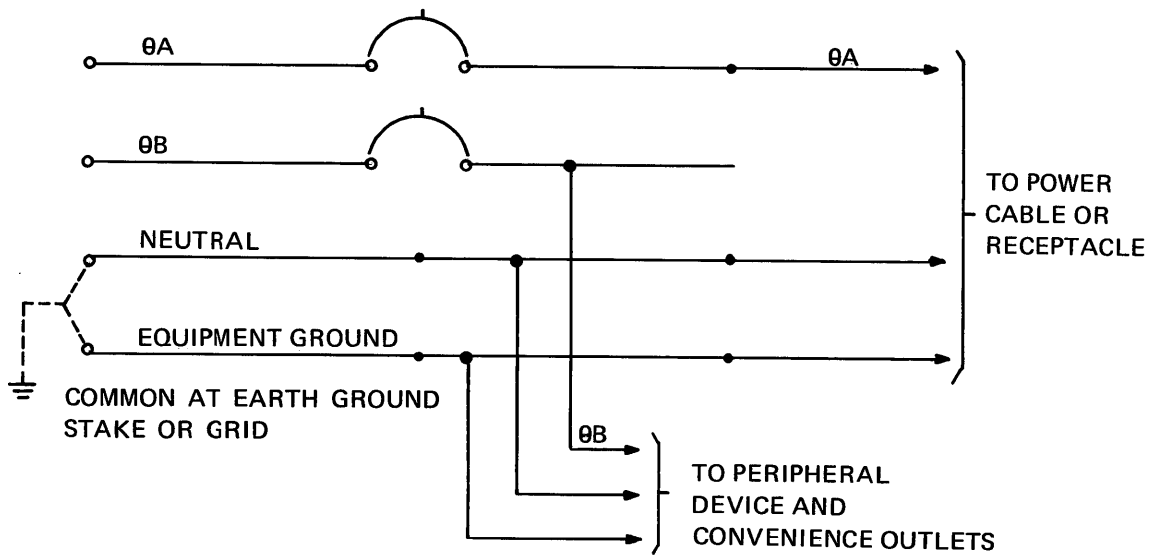


Figure 1. Single Phase, 3 Wire 115 VAC Connections



NOTE: 1
 PHASE LOAD BALANCE CAN BE ACCOMPLISHED BY CONSULTING APPENDIX I -
 ELECTRICAL REQUIREMENTS FOR EACH COMPONENT OF THE CONFIGURATION

Figure 2. Two Phase, 4 Wire 230 VAC Connections

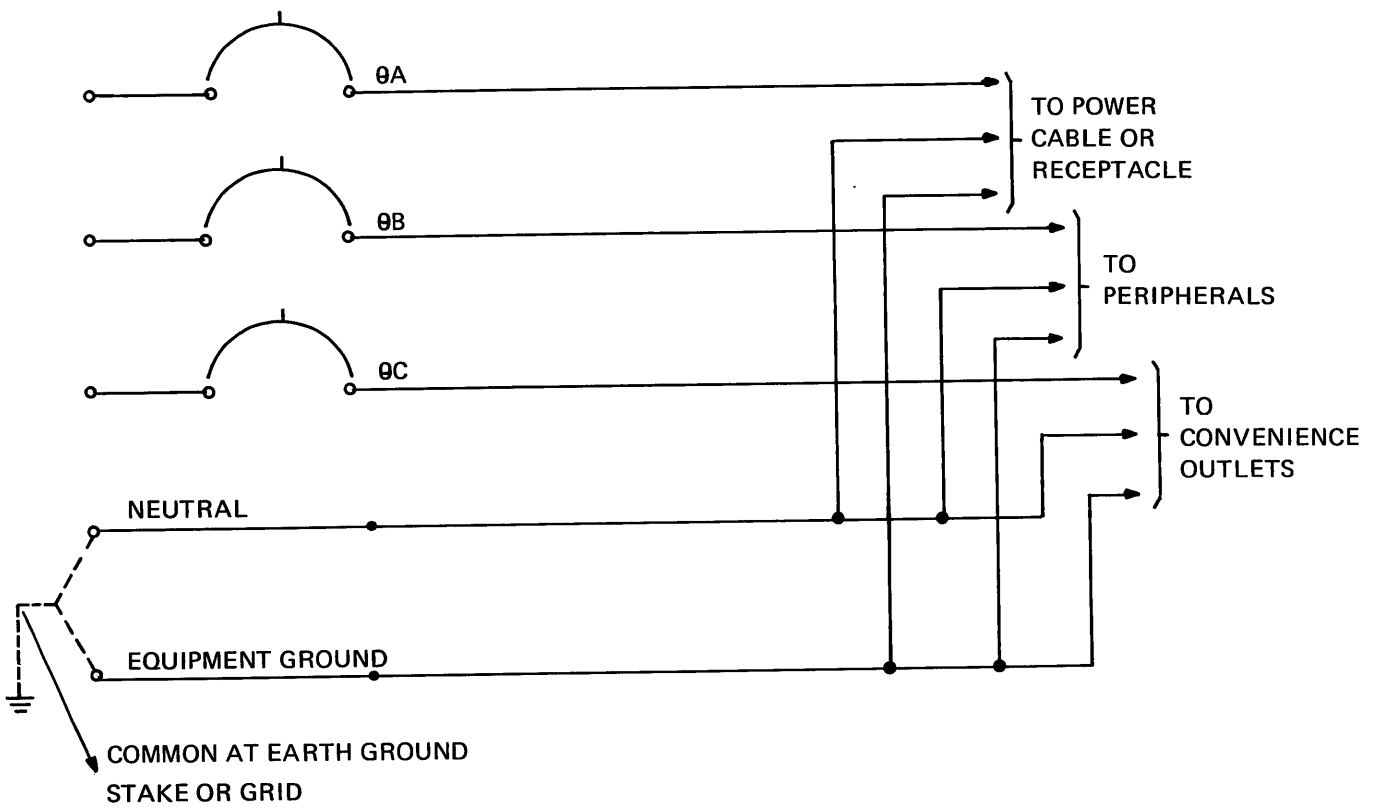


Figure 3. Three Phase, 5 Wire 208 VAC Connections

Although 30 ampere service (M49-030 systems cabinet) is recommended for future expansion, a 20 ampere service (M49-004 systems cabinet) is also available. The AC distribution panel for the 20 ampere service is identical to the 30 ampere service with the exception of the circuit breaker which is reduced to a 20 ampere breaker. Also, the power cable is fitted with a Hubbell #5364 plug which connects to a Hubbell #5352 receptacle.

6.2.1 Power Sources. The computer system can be powered from any of the common single phase, two phase or three phase power systems found in most areas. If more than one type of power is available it is recommended that a single source be used to power the entire system.

6.2.2 Multi Cabinet Configurations. Systems which contain multi cabinets have the following additional power requirements.

If each cabinet contains INTERDATA power supplies which are controlled from the display ON/OFF key, then:

Each cabinet must be powered by the same phase of the AC source.

6.3 Peripheral Devices

For those devices not in a main cabinet it may be necessary to provide power from an external source. Also in some cases 2 or 3 \emptyset power may be required for certain devices. Specific power requirements for those devices can be found in Appendix 1. Unless indicated, all peripherals require a standard three-prong, grounded receptacle, Hubbell Part #5352 or equivalent.

6.4 Grounding

Power cords supplied with each INTERDATA system have a green (or green with yellow trace) wire grounding conductor for equipment ground. Each customer-supplied branch circuit must have an insulated wire conductor, equal to the size of the phase conductors, for the purpose of grounding the equipment. All branch circuit grounding wires must be tied to a common ground point at the distribution panel, and a single grounding wire run from the distribution panel to service ground or suitable building ground. This is a non-current-carrying ground, not a neutral. Conduit must not be used as the only means of grounding the equipment.

6.5 Service Outlets

AC convenience outlets should be provided for test and repair equipment used in maintenance tasks. The outlets should be located within 10 feet of the system and its related equipment. These outlets should share a common ground with the system power, be separately fused and switch controlled, Hubbell Part #5352 or equivalent.

6.6 Power Regulation and Backup

In situations where power fluctuations are severe or power outages common, and system down time is critical, power regulation and backup

must be considered. Three remedies to these problems are:

1. A constant voltage transformer.
2. A motor generator with a large fly wheel (a mechanical regulator that does not respond quickly to voltage fluctuations).
3. A static inverter which stores energy in batteries and capacitors, thus maintaining close regulation over AC power.

7. SERVICING REQUIREMENTS

Consider space requirements related to servicing the equipment when making floor plans in the data processing area. Some guidelines to observe are:

1. Allow a service clearance of 25 to 30 inches on at least three sides of the installed equipment.
2. On the sides of the equipment containing doors, leave enough clearance to open doors fully.
3. Convenience AC power outlets should be provided in the equipment area to allow connection of test equipment.
4. Provide a centralized location in the computer facility, for the storing of manuals and maintenance documentation.

8. INSTALLATION PHASE

When a system is to be installed by INTERDATA, it is important that the areas of responsibility be defined in advance. An understanding of these responsibilities and any specific requirements that the customer/INTERDATA may have will help to assure successful installation.

8.1 Customer Responsibilities

8.1.1 Pre-Installation. Notify INTERDATA of any specific requirements, such as:

- Special power connector needed
- Installation during non-business hours
- Specific equipment delivery procedures
- Packaging restrictions, i.e., size or weight.

Verify that the site is ready for installation as outlined in the section on scheduling.

Arrange for security clearances for installation crew when security rules are in effect.

8.1.2 Equipment Arrival. Unpack the equipment and notify INTERDATA immediately if there appears to be any physical damage or shortages.

Physically locate equipment, i.e., printers, card readers or terminals on tables or stands and tape units or disk drives, etc., mounted in racks, cable customer-supplied equipment.

8.1.3 Installation. Insure that appropriate customer personnel are available to observe system operation procedures and tests, and to be escorts within customer facility when required.

8.2 INTERDATA Responsibilities

Notify the customer of any specific, unusual installation requirements:

- Verify line voltage(s).
- Perform pre-power checks.
- Demonstrate system operation and operating procedures.
- Perform system testing using standard INTERDATA diagnostics and exercises as the configuration permits.

NOTE: Testing is accomplished only on products supplied by INTERDATA.

9. ALTERNATE CONFIGURATIONS

Customers using system cabinets, other than those supplied by INTERDATA, must insure that the equipment is properly supported, complies with mounting restrictions, and allows equipment to be serviced.

The following is provided as general information on the mounting of INTERDATA-supplied hardware in customer-supplied cabinets:

Support

In most cases it is not sufficient to mount the equipment by the front panel mounting screws only. Some type of support rail should be used.

Mounting

Hardware that is hinged or on sliding rails requires special attention. Material strength and cabinet footing must be adequate to allow these items to be fully extended.

Service

Design must be such that service can be performed safely and without restriction.

10. SYSTEM EXPANSION

When adding equipment to your present configuration, contact the INTERDATA representative in your area to determine if additional hardware, support rails, cables, etc., are needed.

Support rails for INTERDATA-supplied system cabinets can be ordered by Product Number M49-018.

11. SITE MAINTENANCE

Proper maintenance will help insure optimum efficiency of your computer system.

11.1 Site Cleanliness

The following list of DOs and DON'Ts should be followed to deter avoidable downtime:

DON'T

- Obstruct the air flow on or around system cabinets.
- Allow dirt and debris to build up on or around hardware.
- Allow food or drink where they could contaminate hardware.
- Allow smoking while handling magnetic disks or tapes.
- Use metal nozzle when vacuuming electronic devices.

DO

- Have scheduled general cleanup--windows, under raised floor, air ducts, etc.
- Perform daily preventive maintenance on hardware.

11.2 Preventive Maintenance

Daily preventive maintenance consists mainly of cleaning read heads and removing dust accumulation. This is an operator responsibility. The more complex tasks must be accomplished by qualified maintenance personnel. Consult your local INTERDATA Service Office for recommendations and maintenance options.

12. DOCUMENTATION HANDLING

The documentation required to maintain the INTERDATA computer system is shipped with the system. This consists of a complete set of operating, programming and instruction manuals, logic diagrams and test packages as required for the system configuration.

The documentation supplied with a system should be maintained in an orderly manner near the computer system. This documentation is invaluable not only to the system personnel but also the INTERDATA Customer Engineer when performing preventive maintenance or service.

APPENDIX 1

EQUIPMENT SPECIFICATION TABLE

General Guidelines

Product Number and Description

Additional product information is available from the INTERDATA representative in your area.

Electrical Specifications

When the starting and running ampere ratings are both given, the starting current is the top figure.

BTU/HR

<u>Unit/Component</u>	<u>BTU Per Hour Load</u>
Exterior wall areas excluding windows	5 to 11 BTU/hr per sq. ft. dependent on exposure to sun
Thermopane window areas, clear glass, no protection	27 to 77 BTU/hr per sq. ft. dependent on exposure to sun
Thermopane window areas, glass with shades, blinds, tint	21 to 51 BTU/hr per sq. ft. dependent on exposure to sun
Roof areas with ceiling underneath	4 to 7 BTU/hr per sq. ft. dependent on exposure to sun
Interior wall areas exposed to unconditioned areas	8 to 14 BTU/hr per sq. ft. dependent on exposure to sun
Ceiling areas exposed to unconditioned areas	4 BTU/hr per sq. ft.
Floor areas exposed to unconditioned areas	5 to 9 BTU/hr per sq. ft. dependent on office/factory environment
Lighting	3.4 BTU/hr per watt
Personnel	500 BTU/hr per person
Fresh air ventilation @ 15 CPM per person	340 to 825 BTU/hr per person dependent on condition of incoming air
Computer and peripheral equipment	3.4 BTU/hr per watt
Growth and Safety Factor	30% of Total BTU/hr Calculated
Total Cooling Load	130% of Total BTU/hr Calculated
Minimum Sensible Cooling	85% of Total Cooling Load

Weight

If a separate power supply is indicated, the weight for the total configuration is given.

Cables

Power: Indicates usable length.

Signal: Indicates actual cable length.

Humidity

All specifications are without condensation.

EQUIPMENT SPECIFICATION TABLE

NOTES

- | | |
|------------------|---|
| 1. Processor | (T) Indicates twin chassis. |
| 2. Signal Cable | (E) Indicates exterior cable-- cable from the convenience panel (bottom rear of system cabinet) to peripheral. Most of the cable is usable.

(D) Indicates direct cable-- cable from the interface (internal front of systems cabinet) to peripheral. As much as half of the cable may not be usable. |
| 3. Peripheral | Requires stand or table. |
| 4. Options | (A) Indicates 230 volt optional.
(B) Indicates 50 HZ optional. |
| 5. Special Power | (C) Frequency must be as indicated.

(F) Power cable from CKT panel to within 15 feet of device. Requires connector Amphenol #MS 3101A-24-2S. |

EQUIPMENT SPECIFICATION TABLE

A1-4

PRODUCT NUMBER	DESCRIPTION	RACK MOUNT	ELECTRICAL			ENVIRONMENTAL (OPERATIONAL)			WT. (LBS)	DIMENSIONS (INCHES)			CABLE (LENGTHS)		NOTES
			VAC	HZ	AMPS	TEMP. (AMBIENT)	HUMIDITY (RELATIVE)	BTU PER HOUR		H	W	D	POWER	SIGNAL	
M74-000	MODEL 74	yes	115 ± 10% A	47 to 63	5	32°F-122°F	to 90%	2000	70	7	19	28	6ft		4
M70-000	MODEL 70	yes	115 ± 10% A	47 to 63	5	32°F-122°F	to 90%	2000	80	7	19	28	6ft		4
M70-002	MODEL 70 T	yes	115 ± 10% A	47 to 63	9	32°F-122°F	to 90%	3500	90	14	19	28	6ft		1,4
M50-000	MODEL 50	yes	115 ± 10% A	47 to 63	5	32°F-122°F	to 90%	2000	80	7	19	28	6ft		4
M50-002	MODEL 50 T	yes	115 ± 10% A	47 to 63	10	32°F-122°F	to 90%	3900	90	14	19	28	6ft		1,4
M55-000	MODEL 55	yes	115 ± 10% A	47 to 63	10	32°F-122°F	to 90%	3900	150	14	19	28	6ft		4
M80-000	MODEL 80	yes	115 ± 10% A	47 to 63	13	32°F-122°F	to 90%	5100	150	14	19	28	6ft		4
M85-000	MODEL 85	yes	115 ± 10% A	47 to 63	13	32°F-122°F	to 90%	5100	170	14	19	28	6ft		4
M60-000	MODEL 60	yes	115 ± 10% A	47 to 63	13	32°F-122°F	to 90%	5100	170	14	19	28	6ft		4
M71-011	MODEL 7/16	yes	115 ± 10% A	47 to 63	5	32°F-122°F	to 90%	2000	70	7	19	28	6ft		4
M71-021	MODEL 7/16 T	yes	115 ± 10% A	47 to 63	9	32°F-122°F	to 90%	3500	90	14	19	28	6ft		1,4
M72-023	MODEL 7/32 T	yes	115 ± 10% A	47 to 63	9	32°F-122°F	to 90%	3500	90	14	19	28	6ft		1,4

EQUIPMENT SPECIFICATION TABLE

PRODUCT NUMBER	DESCRIPTION	RACK MOUNT	ELECTRICAL			ENVIRONMENTAL (OPERATIONAL)			WT. (LBS)	DIMENSIONS (INCHES)			CABLE (LENGTHS)		NOTES
			VAC	HZ	AMPS	TEMP. (AMBIENT)	HUMIDITY (RELATIVE)	BTU PER HOUR		H	W	D	POWER	SIGNAL	
	EXPANSION POWER SUPPLIES														
M49-002	POWER SUPPLY 34-012 P5 @ 50 AMP	yes	115 ± 10% A	47 to 63	7	32°F- 122°F	to 90%	2800	55	7	19	9	6ft	3ft	4
M49-022	POWER SUPPLY 34-015 P5 @ 50 AMP	yes	115 ± 10% A	47 to 63	9	32°F- 122°F	to 90%	3500	55	7	19	9	6ft	3ft	4
M49-024	POWER SUPPLY 34-017 P5 @ 24 AMP	yes	115 ± 10% A	47 to 63	5	32°F 122°F	to 90%	2000	25	7	19	7	9ft	3ft	4
M49-026	POWER SUPPLY 34-020 P5 @ 50 AMP	yes	115 ± 10% A	47 to 63	9	32°F 122°F	to 90%	3500	25	7	19	7	9ft	3ft	4
	SYSTEM CABINETS AND CHASSIS														
M49-004	SYSTEMS CABINET	N/A	115 ± 10% A	47 to 63	N/A	N/A	N/A	N/A	315	70	24	32	15ft		4
M49-000	SYSTEM CHASSIS 6 EA. 10" BOARDS	yes	N/A	N/A	N/A	N/A	N/A	N/A	8	7	19	16		4" 30"	
M49-020	SYSTEM CHASSIS 8 EA. 15" BOARDS	yes	N/A	N/A	N/A	N/A	N/A	N/A	8	7	19	19		4" 30"	

EQUIPMENT SPECIFICATION TABLE

A1-6

PRODUCT NUMBER	DESCRIPTION	RACK MOUNT	ELECTRICAL			ENVIRONMENTAL (OPERATIONAL)			WT. (LBS)	DIMENSIONS (INCHES)			CABLE (LENGTHS)		NOTES
			VAC	HZ	AMPS	TEMP. (AMBIENT)	HUMIDITY (RELATIVE)	BTU PER HOUR		H	W	D	POWER	SIGNAL	
	BULK STORAGE EQUIPMENT														
M46-400	INTERTAPE CASSETTE 1000 CPS - 500 KB	yes	115 ± 10% A	47 to 63	/ 2	60°F- 90°F	40%- 80%	800	33	7	19	28	8ft	D 12ft	2,4
M46-460 M46-461	MAGNETIC TAPE, 9 TRACK 800 CPI, 45 IPS	yes	115 + 10% A	48 to 400	/ 2.6	35°F- 122°F	10%- 95%	1200	95	24	19	17	10ft	D 10ft	2,4
M46-465 M46-466	MAGNETIC TAPE, 9 TRACK 1600 CPI, 45 IPS Formatter	yes	115 ± 10% A	47 to 63	/ 3.6	60°F- 90°F	40%- 80%	1600	120	28	19	20	10ft	D 10ft	2,4
M46-467 M46-468	MAGNETIC TAPE, 9 TRACK EXP. DRIVE 1600 CPI 45 IPS	yes	115 ± 10% A	47 to 63	/ 2.6	60°F- 90°F	40%- 80%	1200	95	24	19	17	10ft	D 10ft	2,4
M46-476 M46-477	MAGNETIC TAPE, 7 TRACK 556/800 CPI, 45 IPS	yes	115 ± 10% A	47 to 63	/ 3.6	60°F- 90°F	40%- 80%	1200	95	24	19	17	10ft	D 10ft	2,4
M46-410 M46-414	REMOVABLE CARTRIDGE DISK 2.5 MB/POWER SUPPLY	yes	115 + 10% A	47 to 63	/ 2.0	60°F- 90°F	40%- 80%	600	73	16	19	28	5ft	D 9ft	2,4
M46-411	REMOVABLE CARTRIDGE DISK 2.5 MB EXP. DRIVE	yes	115 ± 10%	47 to 63	/ 2.0	90°F	80%	600	43	11	19	28	5ft	D 9ft	2,4
M46-416 M46-417	REMOVABLE CARTRIDGE DISK 10 MB/POWER SUPPLY	yes	115 ± 10%	47 to 63	/ 3.7	0°F- 55°F	40%- 80%	1800	120	16	19	28	5ft	D 9ft	2,4
M46-429 M46-430	40 MEGA BYTE DISC DRIVE W/CONTROLLER	no	3 phase 208 ± 10% A	60 HZ B, C	/ 20 3.7	60°F- 90°F	10%- 80%	3100	500	36	21.5	36.5	F 20ft	E 20ft	2,4,5
M46-431 M46-432	40 MEGA BYTE DISC EXPANSION	no	3 phase 208 ± 10% A	60 HZ B, C	/ 20 3.7	60°F- 90°F	10%- 80%	3100	500	36	21.5	36.5	F 20ft	E 20ft	2,4,5

EQUIPMENT SPECIFICATION TABLE

PRODUCT NUMBER	DESCRIPTION	RACK MOUNT	ELECTRICAL			ENVIRONMENTAL (OPERATIONAL)			WT. (LBS)	DIMENSIONS (INCHES)			CABLE (LENGTHS)		NOTES
			VAC	HZ	AMPS	TEMP. (AMBIENT)	HUMIDITY (RELATIVE)	BTU PER HOUR		H	W	D	POWER	SIGNAL	
	TERMINALS														
M46-000	ASR 33 TTY	no	115 ± 10%	60+ .45HZB	9 / 2.4	40°F-110°F	to 95%	950	57	33	22	19	9ft	E 12ft	2,3,4
M46-001	ASR 35 TTY	no	115 ± 10%	60+ .45HZB	12 / 4	40°F-110°F	to 95%	1550	225	39	40	24	6ft	E 12ft	2,4
M46-100 M46-101	VIDEO DISPLAY UNIT TTY REPLACEMENT	no	115 ± 10% A	50 or 60	1.5	10°C-40°C	10%-80%	600	68	13	17	27	6ft	E 25ft	2,3,4
M46-102 M46-103	VIDEO DISPLAY UNIT EDITING	no	115 ± 10% A	50 or 60	1.5	10°C-40°C	10%-80%	600	68	13	17	27	6ft	E 25ft	2,3
M46-108 M46-109	GRAPHIC DISPLAY TERMINAL	no	115 ± 10% A	48 to 400	1.7	10°C-40°C	10%-80%	800	78	42	19	29	6ft	E 50ft	2,3,4
	PRINTERS														
M46-204 M46-205	FULLY BUFFERED 60-200 LPM 132 COLS. 64 CHAR.	no	115 ± 10% A	60+ 10% B	15 / 3.7	40°F-100°F	5%-90%	1500	156	12	28	20	7ft	E 20ft	2,3,4
M46-207 M46-208	FULLY BUFFERED 200 LPM 132 COLS. 64 CHAR.	no	115 ± 10% A	60+ 10% B	30 / 6	40°F-100°F	5%-90%	2400	375	45	36	28	6ft	E 20ft	2,3,4
M46-209 M46-210	FULLY BUFFERED 600 LPM 132 COLS. 64 CHAR.	no	115 ± 10% A	60+ 10% B	40 / 6	40°F-100°F	5%-90%	2400	650	44	36	25	6ft	E 20ft	2,3,4

AI-8

EQUIPMENT SPECIFICATION TABLE

PRODUCT NUMBER	DESCRIPTION	RACK MOUNT	ELECTRICAL			ENVIRONMENTAL (OPERATIONAL)			WT. (LBS)	DIMENSIONS (INCHES)			CABLE (LENGTHS)		NOTES
			VAC	HZ	AMPS	TEMP. (AMBIENT)	HUMIDITY (RELATIVE)	BTU PER HOUR		H	W	D	POWER	SIGNAL	
	CARD EQUIPMENT														
M46-230	CARD READER 400 C.P.M.	no	115 ± 10% A	60+ 1HZB	10 3	65°F- 80°F	30%- 65%	1200	68	13	23	13	9ft	E 10ft	2,3,4
M46-236 M46-237	CARD READER 1000 C.P.M.	no	115 ± 10% A	60+ 1HZB	14.3 5.2	50°F- 100°F	30%- 90%	2000	77	17	24	18	9ft	E 10ft	2,3,4
	PAPER TAPE EQUIPMENT														
M46-240 M46-241	PAPER TAPE READER 300 CPS UNI-DIRECTIONAL	yes	115 ± 10% A	47 to 63 B	2	32°F- 122°F	10%- 90%	800	27	7	19	7	7ft	D 10ft	2,4
M46-242 M46-243	COMBINATION READER PUNCH 300/75 CPS	yes	115 ± 10% A	47 to 63 B	3	32°F- 122°F	10%- 90%	1200	60	11	19	12	7ft	D 10ft	2,4

EQUIPMENT SPECIFICATION TABLE

PRODUCT NUMBER	DESCRIPTION	RACK MOUNT	ELECTRICAL			ENVIRONMENTAL (OPERATIONAL)			WT. (LBS)	DIMENSIONS (INCHES)			CABLE (LENGTHS)		NOTES
			VAC	HZ	AMPS	TEMP. (AMBIENT)	HUMIDITY (RELATIVE)	BTU PER HOUR		H	W	D	POWER	SIGNAL	
	DIGITAL MULTIPLEXORS SUBSYSTEMS														
M07-864	DIGITAL MULTIPLEXOR WITH I/O MODULES	yes							8	5.25	19	11		D 18ft	2
M48-604	2 WIRE SCREW TERMINATION PANEL	yes							15	12	19	2			
M48-007	28 VOLT SUPPLY	yes	115 ± 10%	47 to 63	2	30°F-122°F	to 90%	800	30	7	6	6ft			
M48-004	RELAY CLOSURE PANEL	yes	115 ± 10%	47 to 63	1	30°F-122°F	to 90%	800	20	7	6	6ft			
M48-008	48 VOLT SUPPLY	yes	115 ± 10%	47 to 63	2	30°F-122°F	to 90%	400	10	7	19	6ft			
	COMMUNICATION EQUIPMENT														
M49-021	PROG. ASYN, LINE SYS. CHASSIS	yes							20	7	19	16		E 50ft	2

EQUIPMENT SPECIFICATION TABLE

AI-10

PRODUCT NUMBER	DESCRIPTION	RACK MOUNT	ELECTRICAL			ENVIRONMENTAL (OPERATIONAL)			WT. (LBS)	DIMENSIONS (INCHES)			CABLE (LENGTHS)		NOTES
			VAC	HZ	AMPS	TEMP. (AMBIENT)	HUMIDITY (RELATIVE)	BTU PER HOUR		H	W	D	POWER	SIGNAL	
	CONVERSION EQUIPMENT ADC-DAC														
M48-608	UNIVERSAL CHASSIS WITH POWER SUPPLY	yes	115 ± 10% A	60-400 B	.5	30°F-122°F	10% to 80%	195	50	7	19	18	6ft	10ft 2ft	
M48-250	LOW LEVEL CHASSIS WITH POWER SUPPLY	yes	115 ± 10% A	60-400 B	.5	30°F-122°F	10% to 80%	195	50	7	19	18	6ft	10ft 2ft	
M48-300	WIDE RANGE SYSTEMS CHASSIS	yes				30°F-122°F	10% to 80%		30	7	19	12			

APPENDIX 2

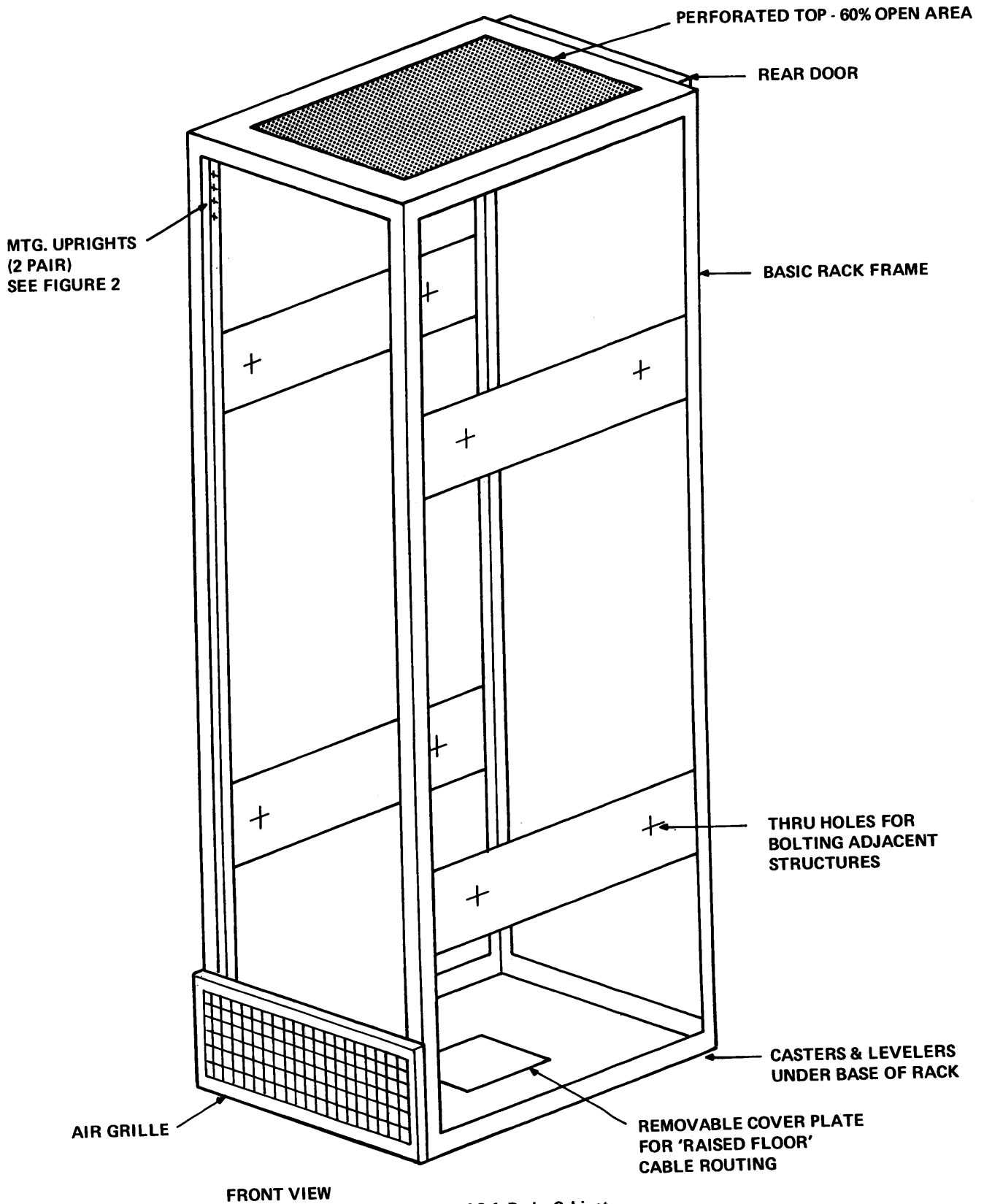


Figure A2-1 Basic Cabinet

APPENDIX 2 (Continued)

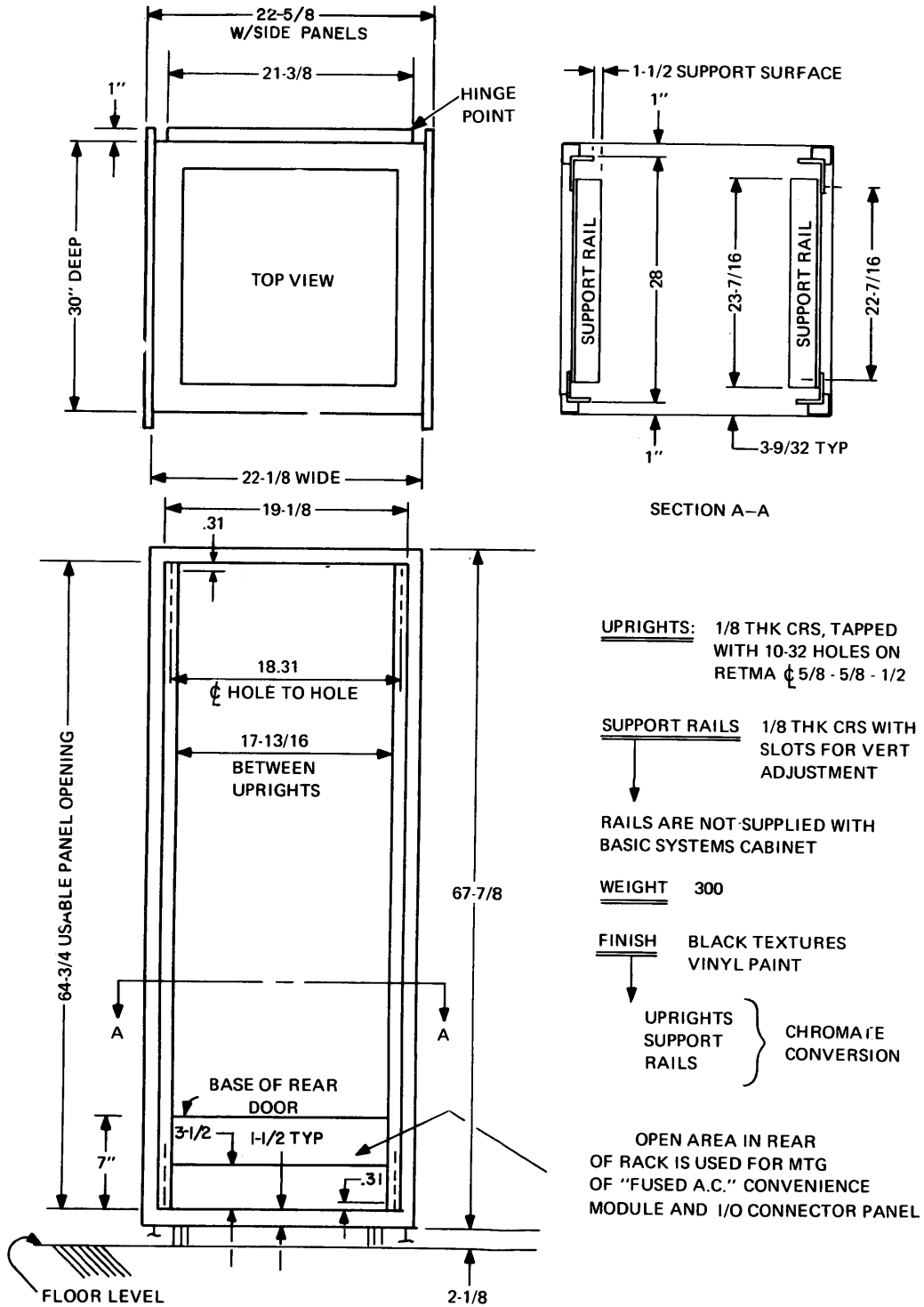


Figure A2-2 Basic Cabinet Physical Dimensions

APPENDIX 2 (Continued)

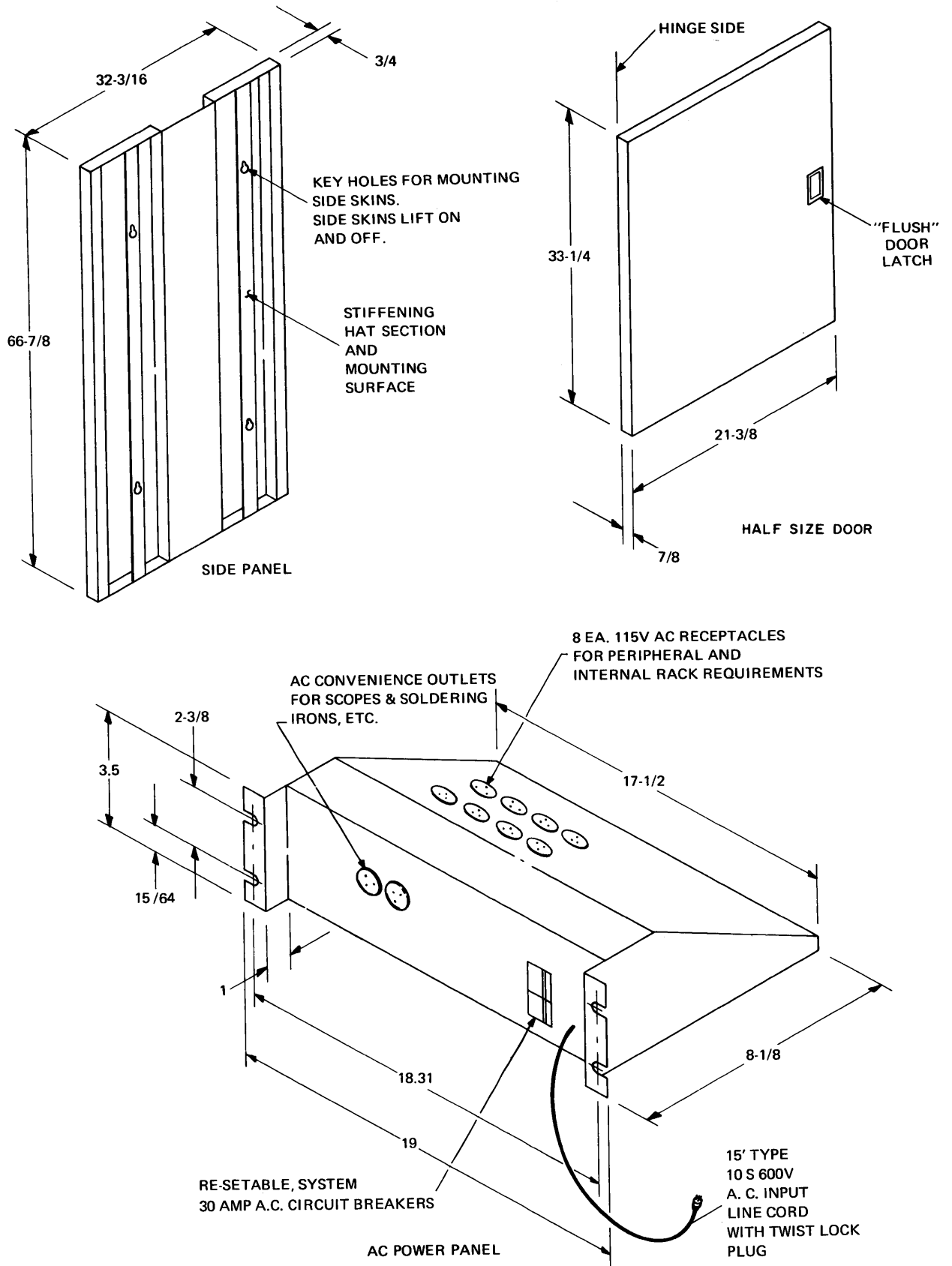


Figure A2-3 Cabinet Accessories, Sheet 1 of 2

APPENDIX 2 (Continued)

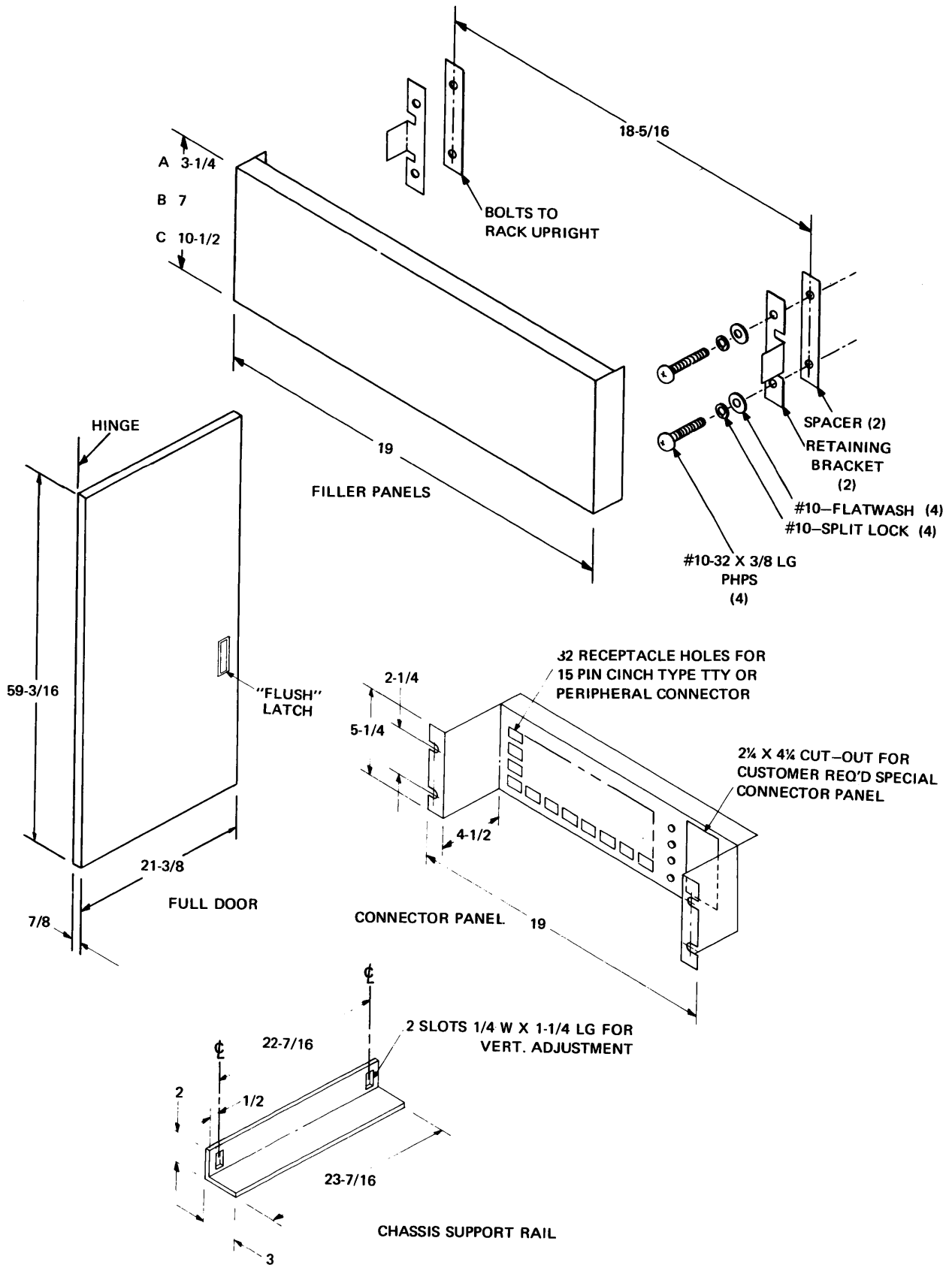


Figure A2-3 Cabinet Accessories, Sheet 2 of 2

APPENDIX 2 (Continued)

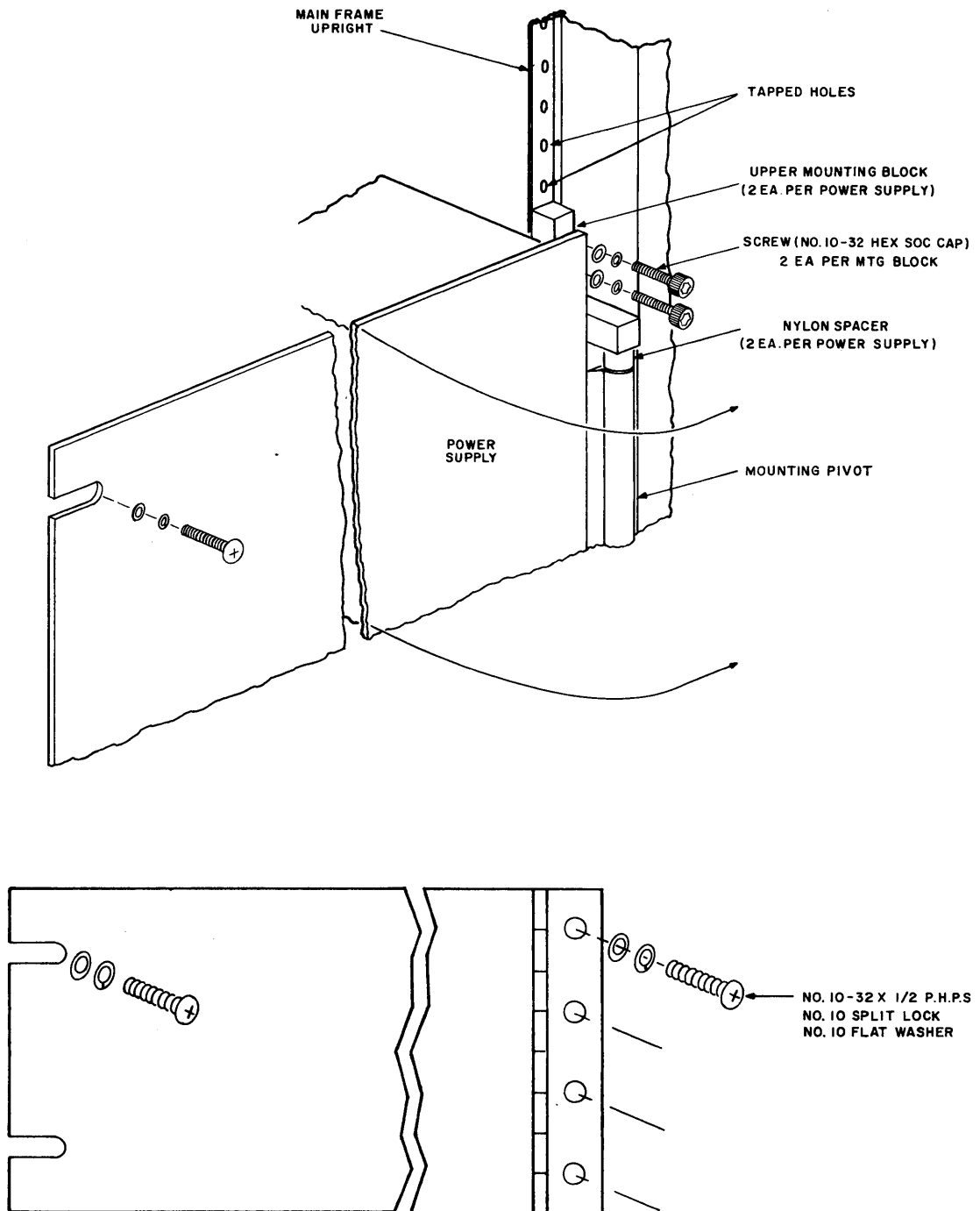


Figure A2-4 Power Supply Mounting

REVISIONS

NO	BY	DATE	DESCRIPTION
1	...	...	...
2	...	...	...
3	...	...	...
4	...	...	...
5	...	...	...

NOTE 2 READ WHEN CONNECTING POWER SUPPLIES IN PARALLEL USE JUMPER 17-182 PER DETAIL B. SHT. 3 WAS NOT SPECIFIED.

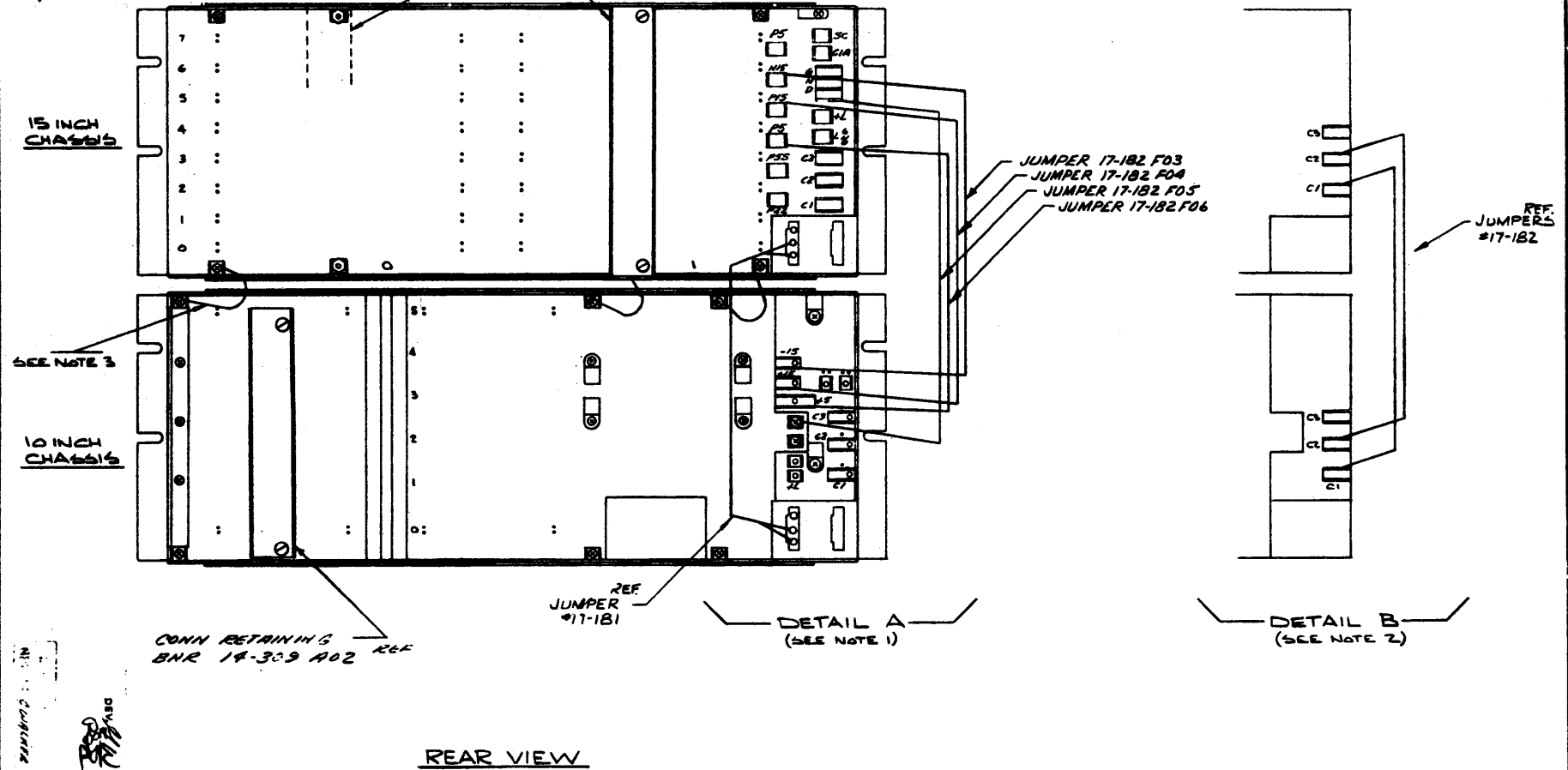
CONN RETAINING BAR REF #14-312 A02

CONN RETAINING BAR REF #14-309 A02

REAR VIEW

LOC 64 67 ADDED JUMPER IDENT, NOTE 1 WAS... #17-182 4 REQD 1 FAN...
 SHT 3: LOC 4E ADD NOTE FOR RACKO/TACKO PRIORITY. LOC 4M 4N ADDED NOTE FOR USE OF 17-166 17-214 CABLES. LOC 9J CONNECTOR (10" EXP. CHASS.) WAS IN SLOT 5. ADDED NOTE 1. SHT 4: LOC D15 ADD CONNECTOR (15" EXPAN. CHASSIS) IN PHANTOM. ADDED NOTE PERTAINING TO PHANTOM CONNECTOR.
 2075 14 2-15-74 204

- NOTES:
1. WHEN POWERING TWO CHASSIS FROM ONE POWER SUPPLY USE JUMPER'S #17-182 F03, F04, F05, F06 FAN JUMPER #17-181 1 REQD PER DETAIL A
 2. WHEN CONNECTING TWO 3A-012 POWER SUPPLIES IN PARALLEL USE JUMPER 17-182 PER DETAIL B.
 3. ADJACENT CHASSIS MUST USE GROUND JUMPERS #17-016 F00 AS STATED BELOW
 4. ADJACENT 15 IN. CHASSIS TO USE 4 JUMPERS
 5. CHASSIS ADJACENT TO 10 IN CHASSIS TO USE 3 JUMPERS.



APPENDIX 2 (Continued)

Figure A2-5. DC Power Interconnections (Sheet 1 of 2)

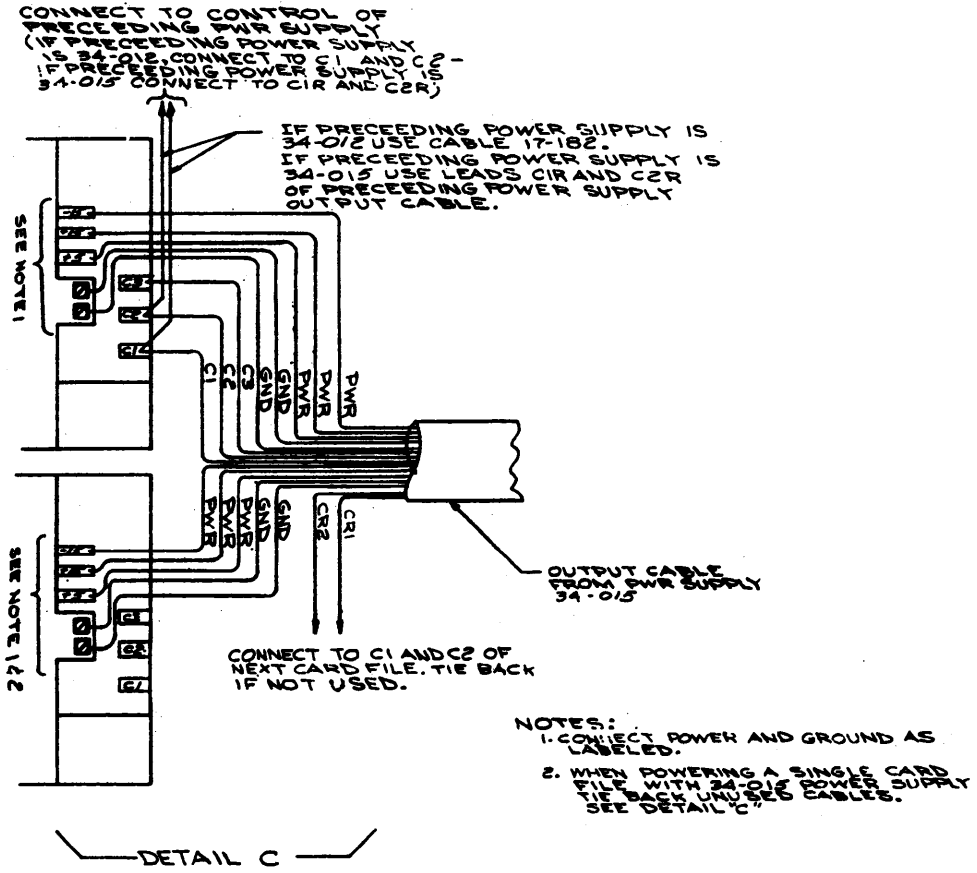
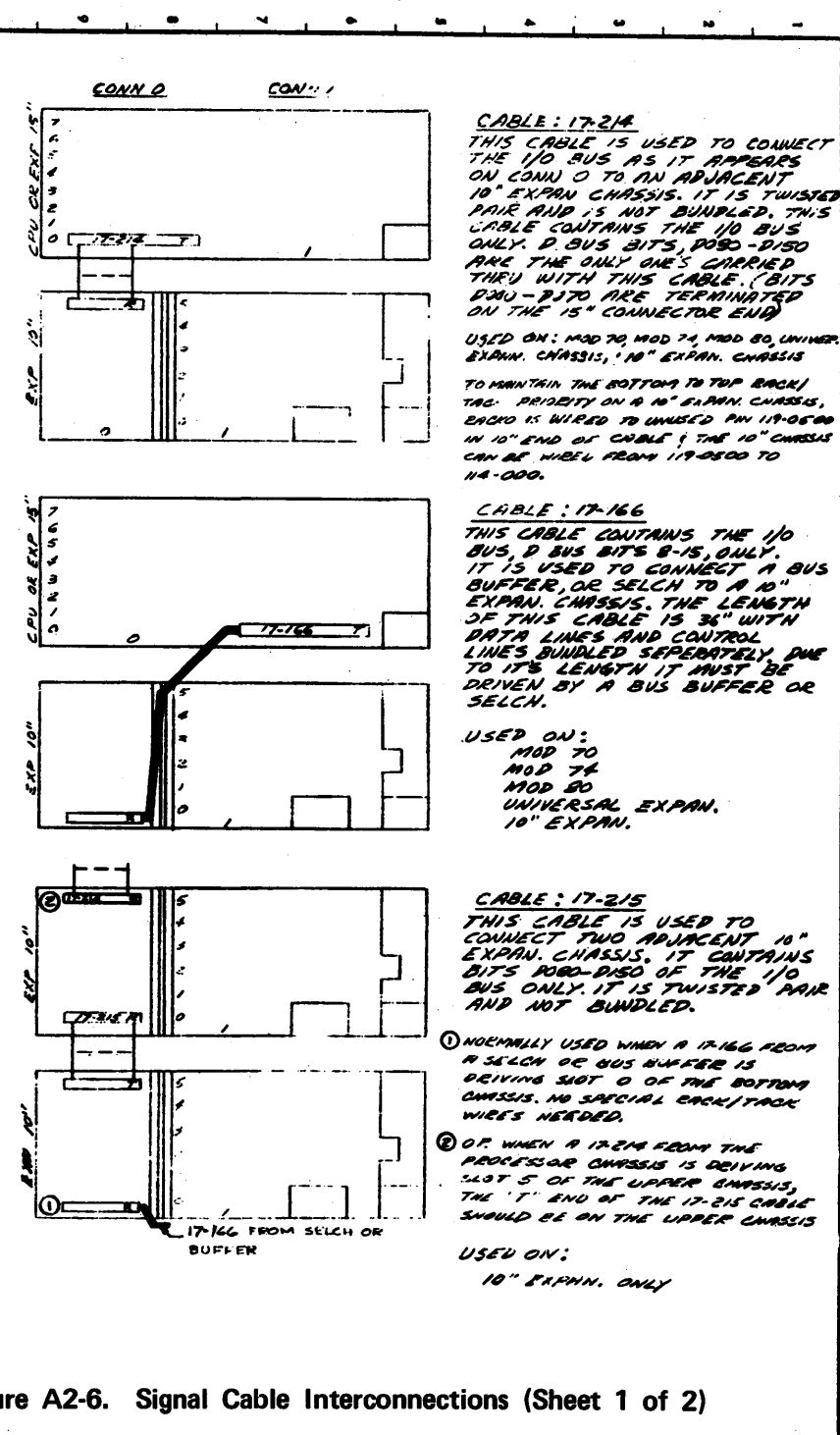
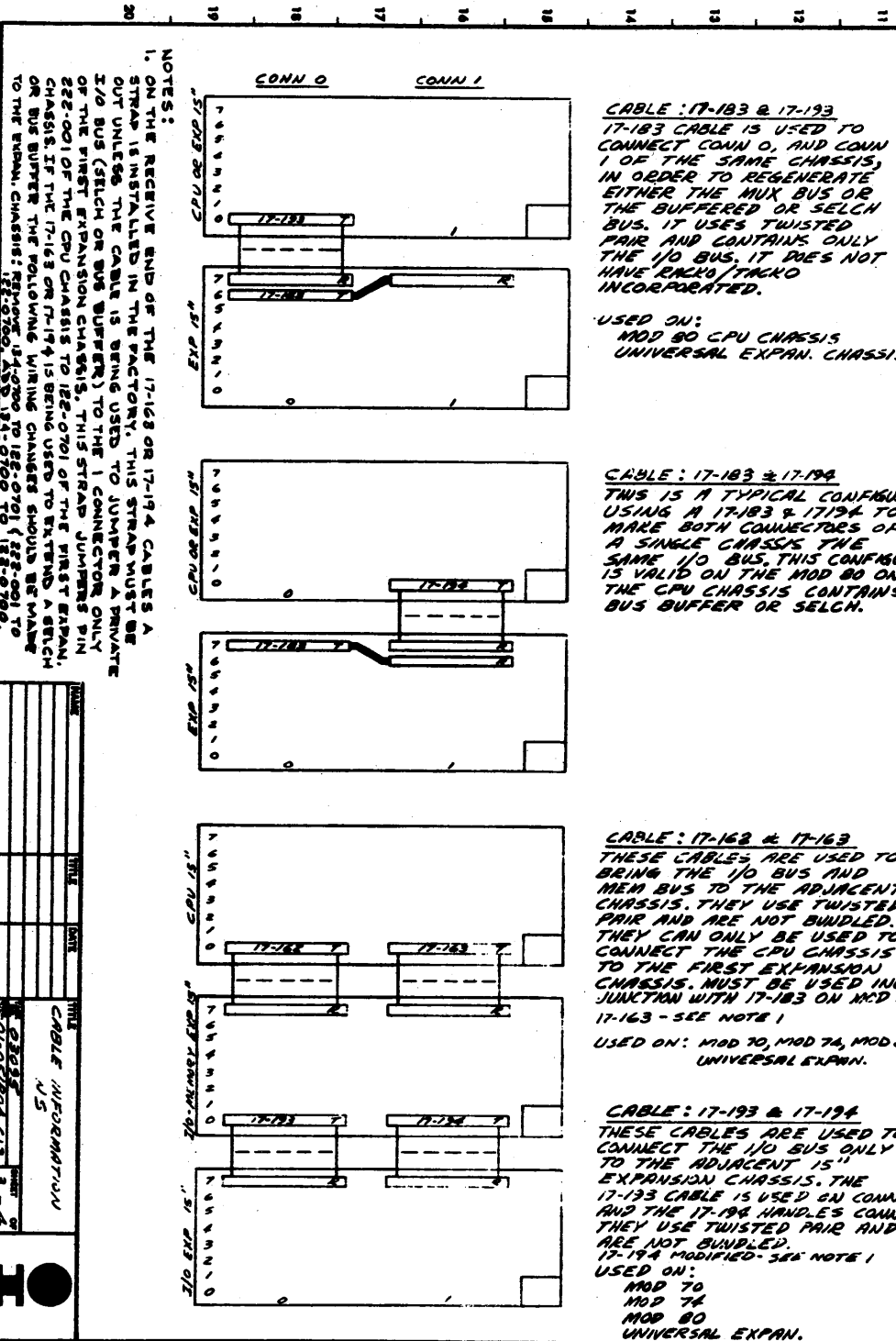


Figure A2-5. DC Power Interconnections (Sheet 2 of 2)



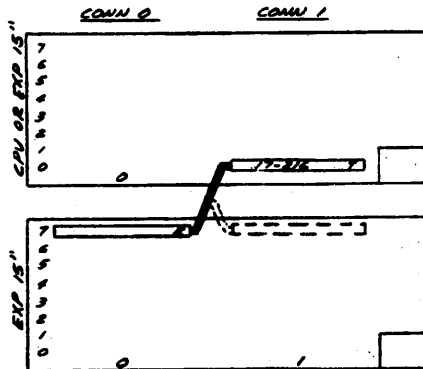
APPENDIX 2 (Continued)

Figure A2-6. Signal Cable Interconnections (Sheet 1 of 2)

DATE	TIME	REVISION	DESCRIPTION
		1	ORIGINAL
		2	REVISION
		3	REVISION
		4	REVISION
		5	REVISION

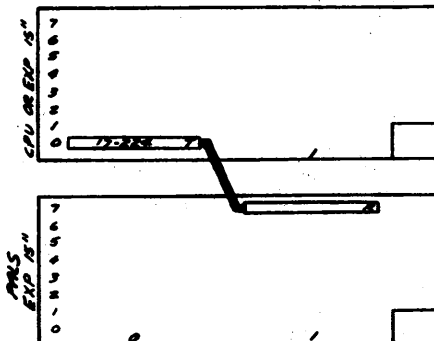
CABLE INFORMATION
 N 5
 01-051001 012 3 - 4





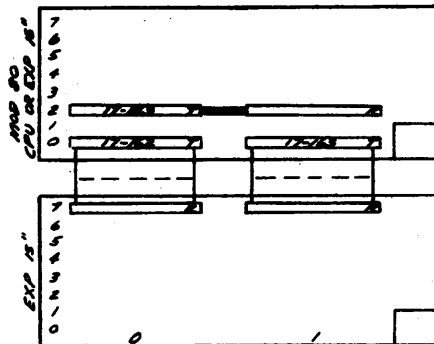
CABLE: 17-216
 THIS CABLE IS USED TO CONNECT THE I/O BUS ONLY FROM A 15" CHASSIS TO A 15" CHASSIS. IT MUST BE DRIVEN BY A SELCH OR BUS BUFFER. THIS CABLE IS 36" LONG AND USES TWISTED PAIR WITH THE DATA LINES AND THE CONTROL LINES BUNDLED SEPARATELY. IT CAN BE CONNECTED TO THE 0 OR 1 SIDE ON THE SECOND CHASSIS.

USED ON:
 MOD 70
 MOD 74
 MOD 80
 15" EXPAN.



CABLE: 17-224
 THIS CABLE IS THE SAME AS THE 17-183 EXCEPT FOR THE ADDITION OF RACK/TACKO. ITS PRIMARY USE IS WITH THE PALS CHASSIS. IT CONTAINS THE I/O BUS COMPLETE WITH RACK/O/TACKO ONLY.

USED ON:
 MOD 70
 MOD 74
 MOD 80
 PALS EXPAN. CHASSIS



CABLE: 17-162, 17-163, 17-183
 THIS EXAMPLE SHOWS THE TYPICAL CONFIGURATION OF THE MOD 80. THE 17-183 CABLE IS INSTALLED ON SLOT 2 CONN 0 TO CONN 1 IN THE STANDARD CPU CHASSIS. IF A SELECTOR CHANNEL OR BUS BUFFER IS INSTALLED IN THE CPU CHASSIS THE 17-183 CABLE MUST BE REMOVED.

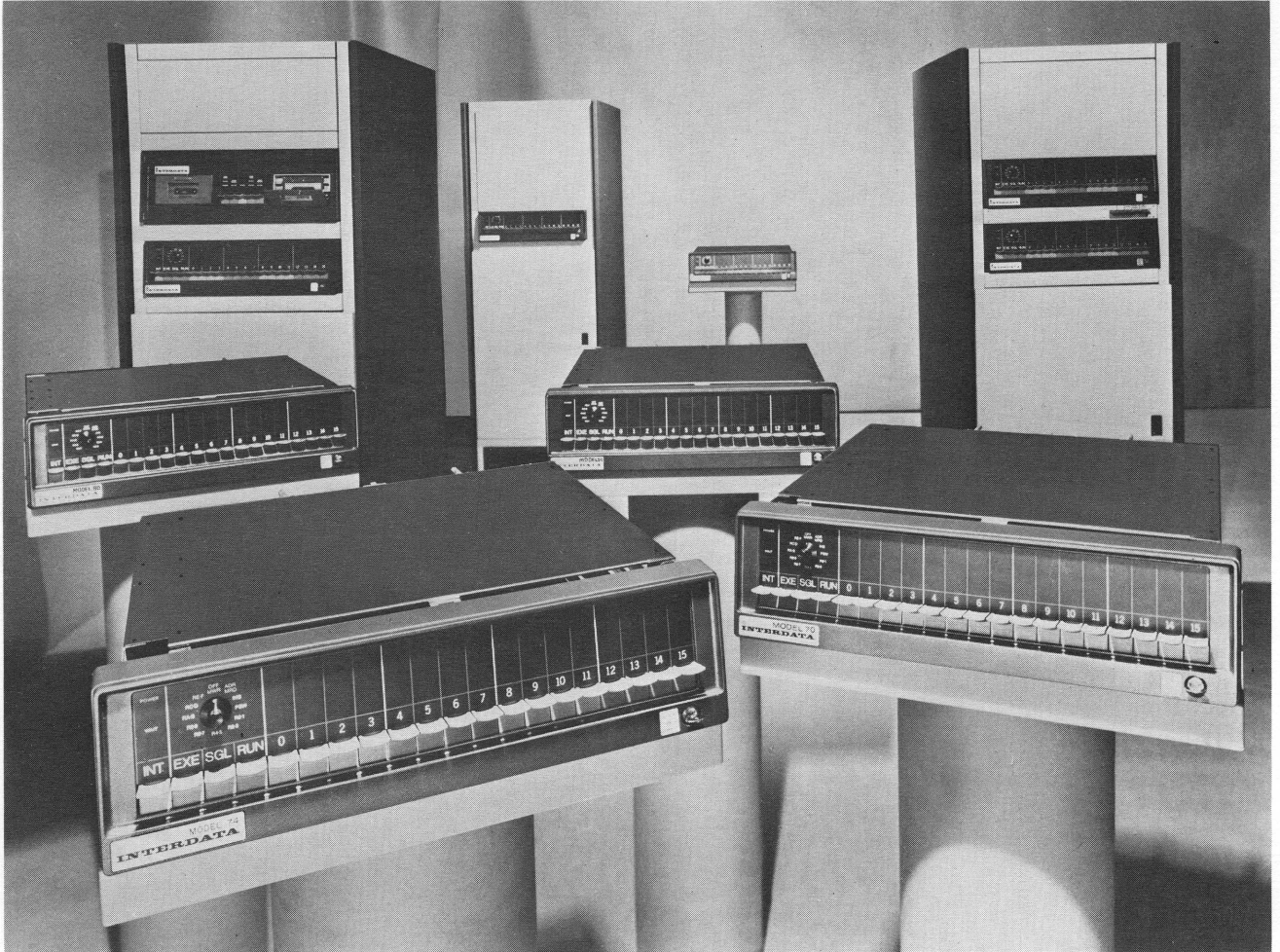
NO.	DATE	BY	REVISION

CABLE INFORMATION
 U.S. AIR FORCE
 WRIGHT-PATTERSON AFB
 OHIO 45433-6199

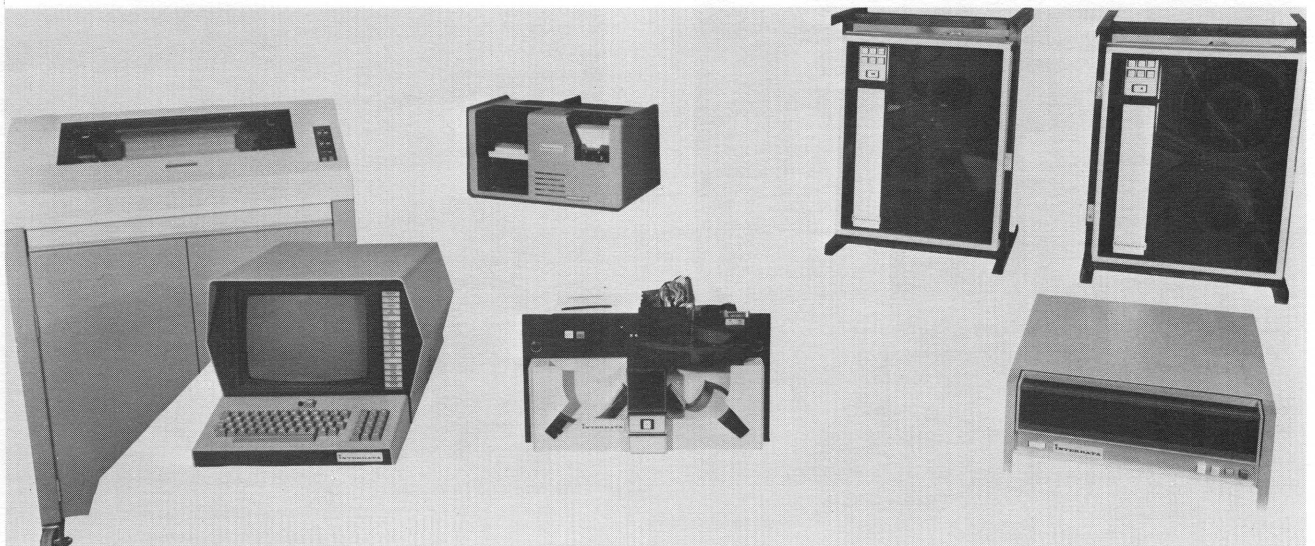


Figure A2-6. Signal Cable Interconnections (Sheet 2 of 2)

APPENDIX 3
EQUIPMENT ILLUSTRATIONS



Processors

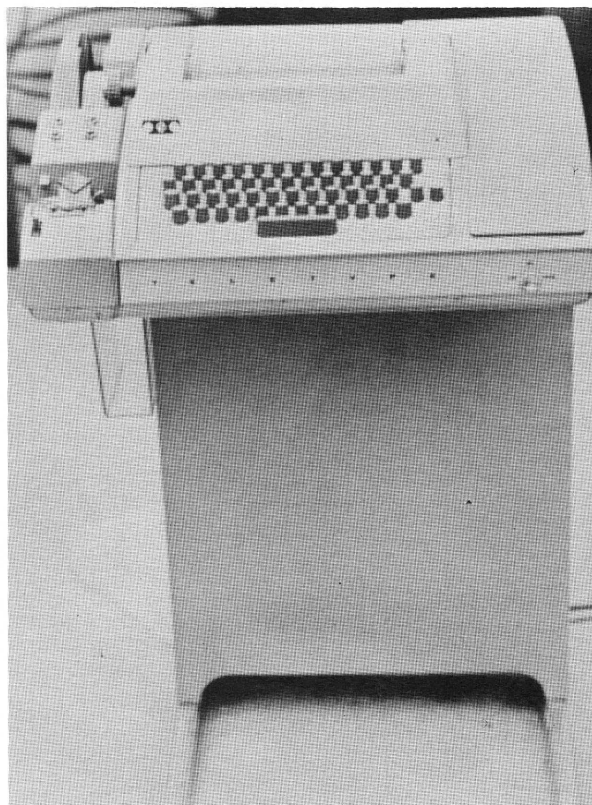


Peripherals

TERMINALS



ASR-35
Product No. M46-001



ASR-33
Product No. M46-000

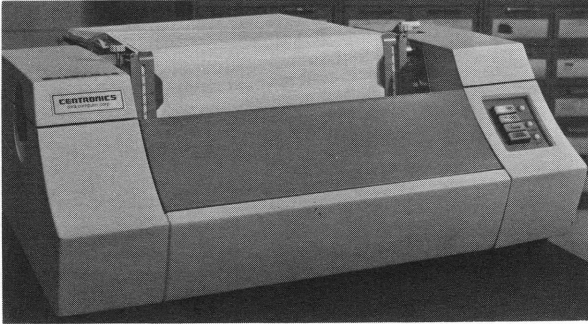


Graphic
Product No. M46-108

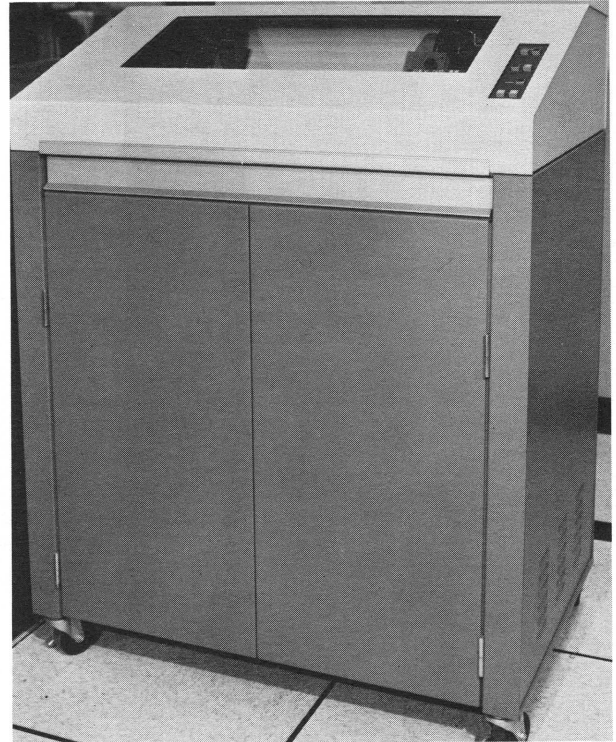


TEC
Product No. M46-102

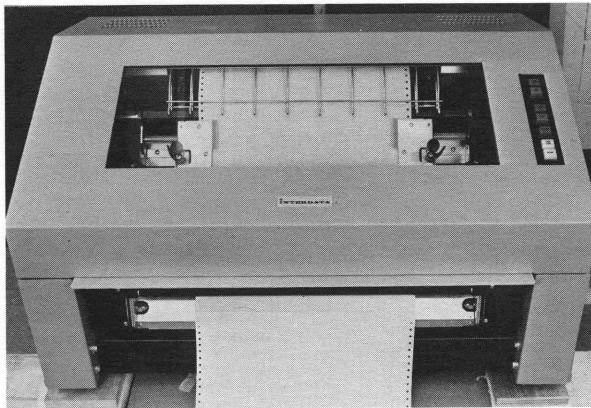
PRINTERS



60-200 LPM
Product No. M46-204

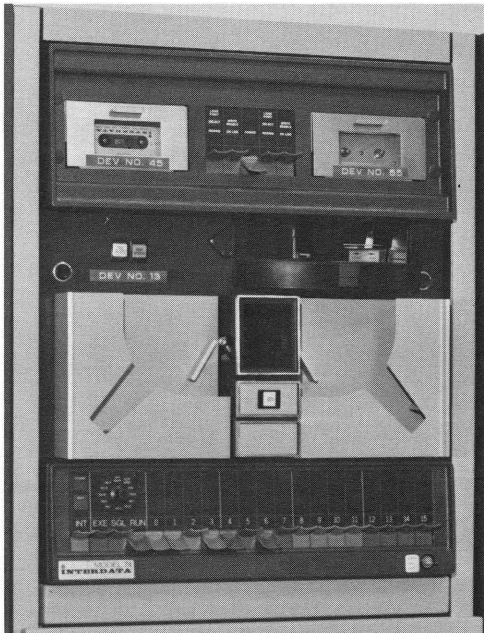


600 LPM
Product No. M46-209



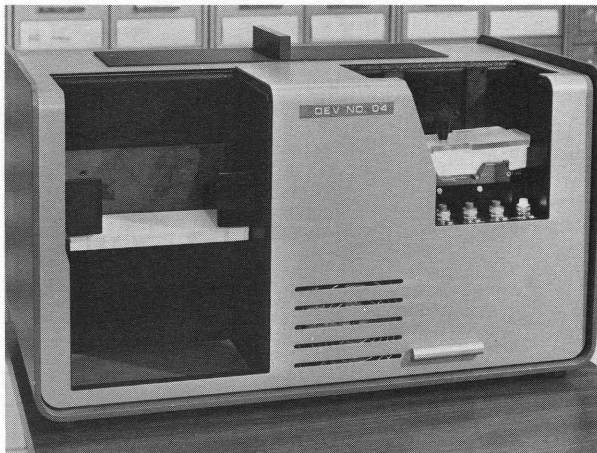
200 LPM
Product No. M46-207

READERS

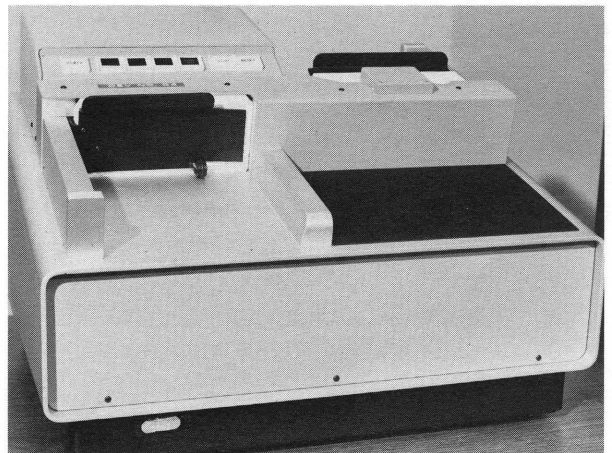


Cassette
Product No. M46-400

Combination Paper
Tape Reader Punch
Product No. M46-242

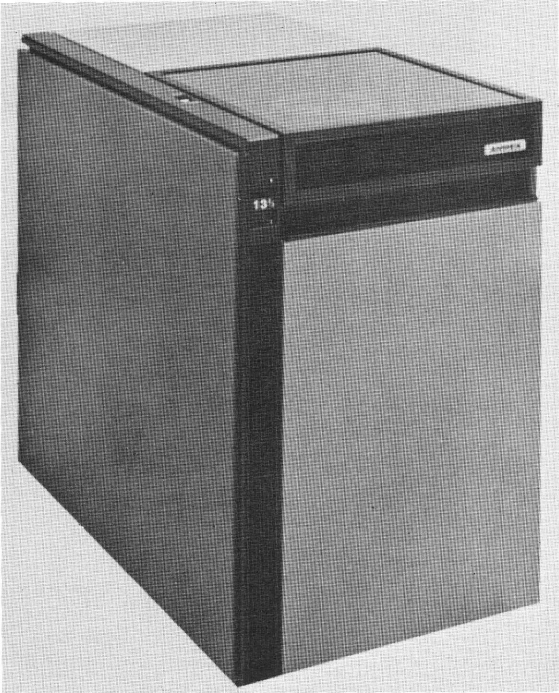


400 CPM
Product No. M46-230

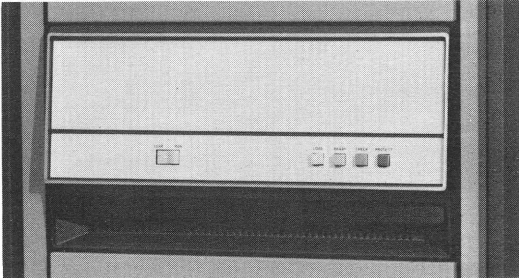


1000 CPM
Product No. M46-236

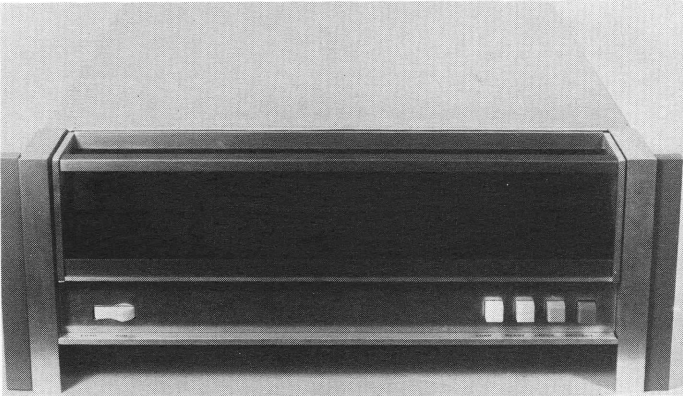
DISK AND TAPE



40 MB Disk
Product No. M46-429



10 MB Disk
Product No. M46-416

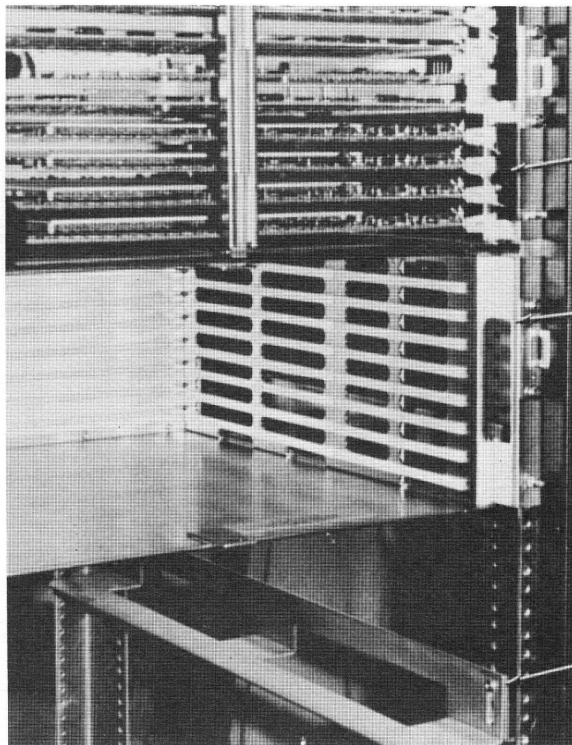


2.5 MB Disk
Product No. M46-410



Mag Tape Transport
Product No. M46-467

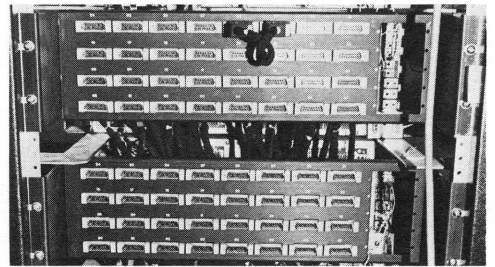
RACK INTERIORS



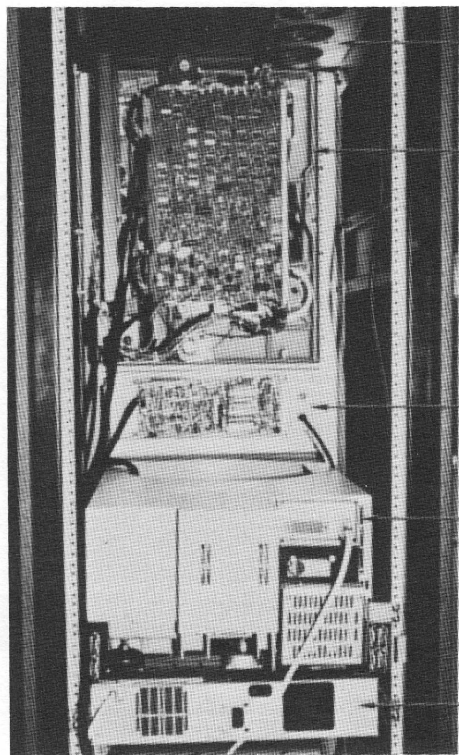
CPU Chassis

Expansion Chassis

Support Rails
Product No. M49-018



Communication
15 Pin Connector
Panels



Fans

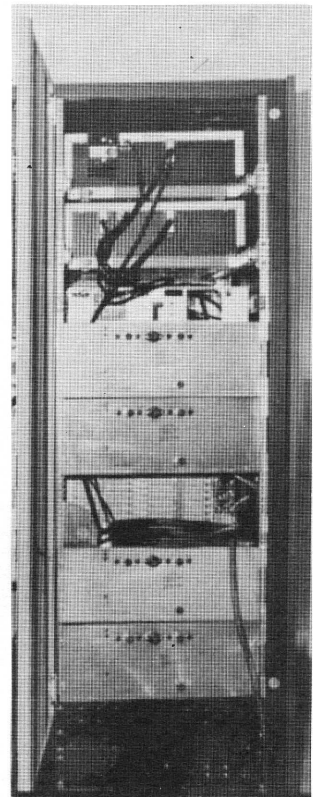
Mag Tape

Paper Tape
Reader/Punch

10 MB Disk

Disk Power
Supply

Peripheral Cabinet
Configuration
Rear View



Cabinet Configuration
Rear View

APPENDIX 4

REFERENCE MATERIAL

FIRE SAFETY NFPA Standards

National Fire Protection Association
60 Batterymarch Street
Boston, Massachusetts 02110

NFPA No. 75 Environmental Conditioning ASHRAE Handbook

American Society of Heating, Refrigeration
and Air Conditioning
New York, New York

Site Construction Plant Engineering Handbook by William Staniar

McGraw-Hill
New York, New York

COMPUTER ROOM ENVIRONMENTAL EQUIPMENT SUPPLIERS

AC Manufacturing Co., Cherry Hill, New Jersey

Airflow Co., Gaithersburg, Maryland

Blazer Corp., East Rutherford, New Jersey

Contempo Engineering Co., Los Angeles, California

Liebert Corp., Columbus, Ohio

Liskey Aluminum, Inc., Baltimore, Maryland

NL Floating Floors, Inc., Toledo, Ohio

Pomona Air, Inc., Pomona, California

Weber Technical Products, Grand Rapids, Michigan

Westinghouse/Industrial AC Div., Staunton, Virginia

RAISED FLOORING MANUFACTURERS

Armstrong Cork Co.--Datatile TM

Envoy Chemical Co.--Neramar-LFT

General Electric Co.--Perma-Kleen R

Johns-Manville--Ovrium

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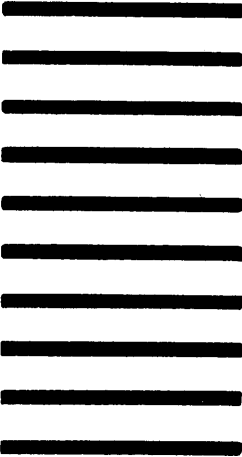
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