PERFORMANCE REPORTING OPTION (PRO) 500
PREINSTALLATION INFORMATION
CALL MANAGEMENT SYSTEM (CMS)

CONTENTS PAGE

CONTENTS PAGE

Figures

Table

*Registered trademark of AT&T.

†Registered trademark of the Intelligent Systems Corporation.

1. GENERAL

1.01 This practice provides preinstallation information for equipment and features of the Performance Reporting Option (PRO) 500 used with a DIMENSION* 2000 PBX equipped with FP8, Issue 2. The PRO 500 utilizes a PDP† 11/70 minicomputer.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 All items required for the complete installation of the PRO 500 equipment should be available at the installation site to minimize time of the actual installation. The following checklist of typical requirements should be considered in installation planning:

- Approved PRO 500 installation location
- The PRO 500 floor plans which show the location of the minicomputer cabinets and all peripheral equipment
- Cabling distances
- Power source (customer provided)
- Grounding scheme
- Accurate recordkeeping
- Emergency power lighting source for attendants (customer provided and optional)
- Battery reserve system to provide uninterrupted power for the system (optional).

2. FLOOR PLAN

2.01 Floor plan sketches for the PRO 500 equipment room and the proposed customer arrangement should be prepared.

2.02 The PRO 500 equipment room floor plan should include the minicomputer cabinets, LA120 DECWRITER† printer terminal, TWE16 magnetic tape subsystem (located in a minicomputer cabinet), RWP06 disk pack drive subsystem, DATASPEED 40 printer (optional), required 202T and 212A data sets, and if possible the power receptacle locations. A typical equipment room floor plan is shown in Fig. 1.

2.03 The proposed customer arrangement floor plan should show the desired placement of the ADM-42 and INTECOLOR 8001 display terminals, printer(s), required data sets, and the associated customer-provided power outlets.

3. ENVIRONMENTAL REQUIREMENTS

A. Room Atmosphere

3.01 Extreme conditions of temperature and humidity may have damaging effects on PRO 500 equipment. Exposure to extreme temperature and humidity may degrade service, not only at time of exposure but also after a normal environment is restored. Environmental requirements must be achieved before installation begins. It is also recommended that a temperature sensing alarm (to indicate heating and/or air conditioning problems) be provided to ensure the equipment room temperature is maintained in the acceptable range. The customer is responsible for maintaining the following operating temperature and humidity ranges:

- Temperature range 18° to 24°C (65° to 75°F)
- Temperature change 2°C/hour (3.6°F/hour)
- Relative humidity of 20 to 55 percent.

3.02 Each of the following temperature and humidity characteristics are considered extreme for the PRO 500:

- Temperature range 15° to 32°C (59° to 90°F)
- Maximum temperature change 3°C/hour (5.4°F/hour)
- Relative humidity of 20 to 80 percent
- Maximum humidity change 2 percent/hour
- Maximum altitude 2.4 km (1.5 mi).

*Registered trademark of AT&T.

†Trademark of the Digital Equipment Corporation.

†Trademark of the Digital Equipment Corporation.

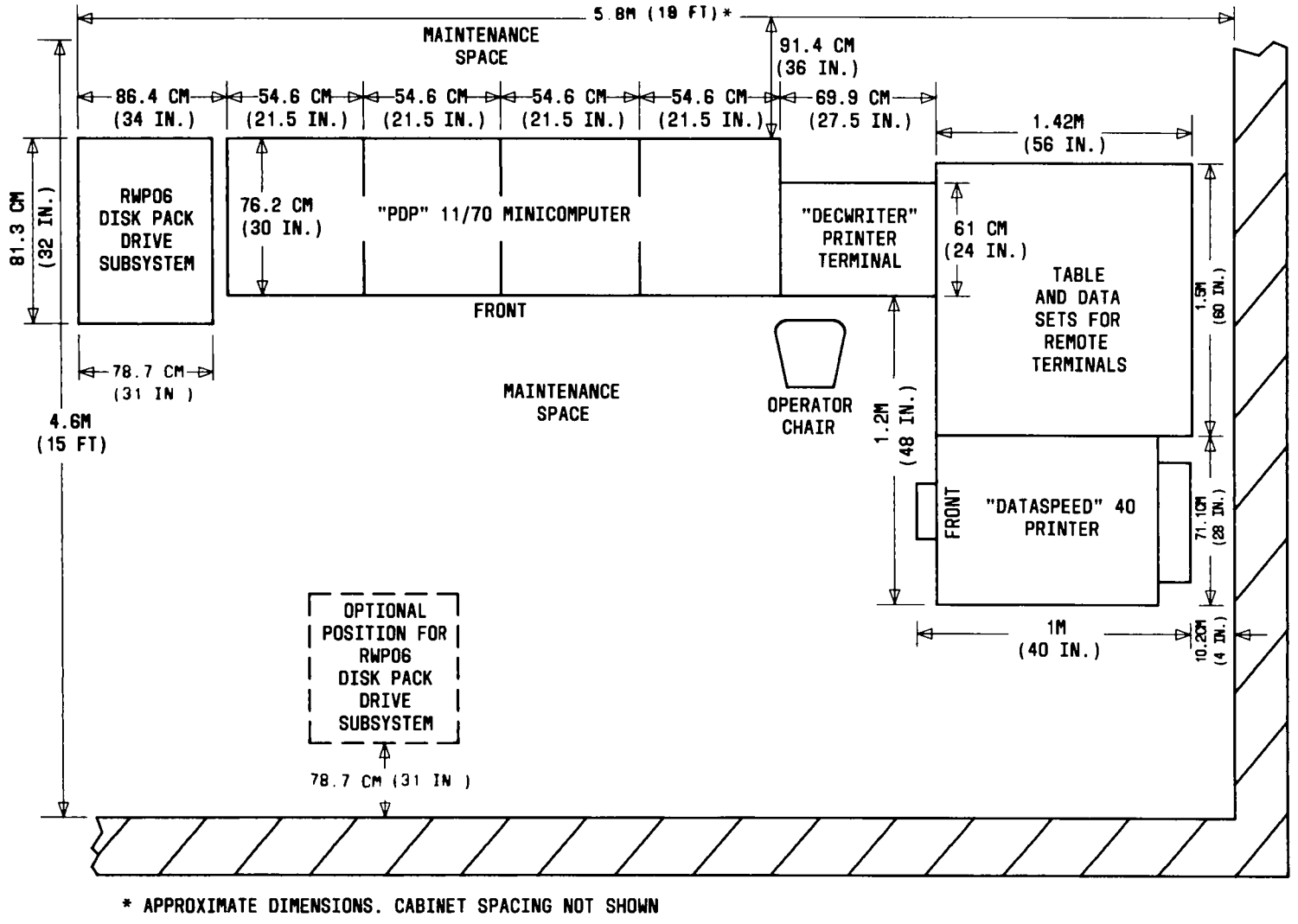


Fig. 1—Typical PRO 500 Equipment Room Floor Plan

3.03 The distance between the floor and the ceiling should be a minimum of 24m (8 ft). The walls and ceilings should not be made of fiberglass, soft wood fiber, straw fiber, cork, or expanded polyethylene (painted) since this type of material may flake.

3.04 To limit static electricity, it is recommended that floor resistance be more than 250,000 ohms and less than 1 million megohms [measured by two electrodes placed 91.5 cm (3 ft) apart anywhere on the floor].

3.05 The PRO 500 room air conditioner must be capable of handling 7500 kg cal/hr (30,000 BTU/hr). The ADM-42 display terminal dissipates 55 kg cal/hr (220 BTU/hr), the INTECOLOR 8001 display terminal dissipates 215 kg cal/hr (850 BTU/hr), and the DATASPEED 40 printer dissipates 198 cal/hr (785 BTU/hr).

3.06 In severely contaminated industrial environments, other PRO 500 equipment may be affected. Gold fingers and connector interfaces could chemically deteriorate through the corrosive effects of gases on particle surfaces. High concentrations of corrosive gases such as sulfur or chlorine should not be used near the PRO 500 installation.

B. Transportation

Handling in Transit

3.07 The maximum environmental specifications for equipment packed for shipment are as follows:

- Temperature range −40° to 66°C (−44° to 151°F)
- Humidity 0 to 95 percent noncondensing
- Altitude to 9 km (5.6 mi).

3.08 The preferred modes of transportation are in order of preference; ie, truck, rail, and air. Air freight transportation is known to subject equipment to severe handling shocks. Rail transportation is less severe, but railroad car coupling shocks can cause severe stress on the equipment. If air freight transportation is used, a plane with a cargo area big enough to ship the system upright must be used.

Handling on Site

3.09 A forklift and dolly are acceptable means of handling the crated equipment on customer premises. The pallet portion of the crate has been designed for these methods of handling. Care should be taken to avoid dropping the cabinet (either crated or uncrated).

The minicomputer will be unpacked and installed by the vendor. Any handling by personnel other than the vendor will void the warranty and service contract.

C. Floor Loading

3.10 The PRO 500 configuration weighs approximately 1530 kg (3400 lb) and represents a floor loading of approximately 732 kg/m² (150 lb/ft²). Although raised flooring is not essential, it is recommended. The use of carpet is not recommended.

D. Electrical Interference

In order to prevent the introduction of noise into the system, dedicated power lines to the system should be used. Separate branch circuits are sufficient to serve this purpose. The feeders should not be used to power other equipment.

3.11 Electromagnetic fields may cause noise to be introduced into the PRO 500. Care should be taken to avoid placing the system close to powerful radio or television transmitters or other possible radio frequency interference sources. Generally, AM stations interfere worse than FM stations (such as television). A building may provide a shielding effect, reducing the interfering capability of the radiating station. Field strength can be measured using a standard field strength meter, such as the electric field sensor Model EFS-1 (manufactured by the Instruments for Industry, Inc) or Model WX31D (manufactured by the RCA Corporation). If the field strength from a broadcast station cannot be measured, it can be estimated by dividing the square root of the emitted power (kW) by the distance from the antenna (km). This approximation yields field strength in volts per meter. If the field strength is to be greater than 0.5 V/m, corrective action may be necessary. Other sources of possible interference are industrial RF heating equipment and welders.

E. Lighting

3.12 Lighting for the PRO 500 shall be as specified below.

- In the equipment room area, the illumination should measure near 650 lumens/m² (60 footcandles) at 76 cm (30 in.) above the floor. Dimmer switches should not be used.
- In the terminal area, illumination should measure near 430 lumens/m² (40 footcandles) at 76 cm (30 in.) above the floor.
- The light intensity level for maintenance should be at least 1350 lumens/m² (125 footcandles) in an area where maintenance is being performed.

F. General Fire Protection

3.13 The following items should be considered for basic fire protection:

- Where telephone equipment rooms are required, they shall be totally enclosed with walls, doors, floors, and ceilings which have a minimum of 1 hour fire-resistive construction.
- Equipment and terminal rooms must not contain combustible furniture, packing materials, cardboard cartons, paper, etc.
- Combustibles necessary for the work operation in an equipment area must be stored in metal containers when not in use.
- Smoking must not be permitted in the equipment area.
- Fire detection devices should automatically shut down ventilation and/or air-conditioning equipment and provide an audible alarm.
- Power and communication cables should be separated to reduce the combustibility continuity in each grouping.
- Cable racks must be enclosed with noncombustible materials when they are routed through nonequipment areas.
- Flammable liquids must be limited in quantity and handled, dispensed, and stored per local procedures.
- HALON* 1301 gaseous fire extinguishing systems are acceptable.

*Registered trademark of the Systron-Donner Corporation.

4. POWER AND GROUNDING

A. Power Requirements

4.01 Arrangements should be made to provide the installation and wiring of an approved load center equipped with thermal magnetic circuit breakers, wall-mounted receptacles, and a wall ground bar.

4.02 The PRO 500 equipment power and connector requirements are listed in Table A. All receptacles must be unswitched and separately fused. The input voltage may vary from 105 to 129 Vac and the frequency from 59.5 to 60.5 Hz.

If brownout conditions are anticipated which will cause the input voltage and/or current to be less than required, an alternate power source or power reserve should be provided.

4.03 System performance may be adversely affected by various power line aberrations, such as voltage sags, surges, impulses, and frequency deviations. In general power conditioning equipment can be purchased which will render the commercial service acceptable for the PRO 500, but the type of power conditioner cannot be selected without a detailed knowledge of the commercial power characteristics at the site in question. It is recommended that power be monitored to determine its characteristics. Once the power's characteristics are known, the required equipment can be determined and an economic comparison can be made between the cost of power conditioning and the impact of commercial power on the operation of the minicomputer.

B. Grounding Requirements

4.04 A No. 4 AWG [5.9 mm (0.23 in.)] ground cable [equipped with a QA4C-B solderless lug (manufactured by the Burndy Corporation) or equivalent] should be provided. This ground cable should be run from a suitable low-impedance ground (normally from the point electrical service enters the building) to the ground stud provided in the central processing unit (CPU) cabinet. This ground cable will be provided, installed, and connected by computer maintenance personnel.

4.05 Conduit or other metallic enclosures shall not be used to replace the ground wire.

TABLE A

EQUIPMENT POWER REQUIREMENTS

DEVICE	POWER-WATTS (115 Vac, 60 Hz)	RECEPTACLE (NOTE)	CIRCUIT (AMPERES)
PDP 11/70 Minicomputer H960-CA (Cabinet 0)	1610, phase to neutral, 3-phase wye	IG2810 (NEMA-IGL21-30R)	30
H960-DA (Cabinet 2) (with tape unit)	1150, single-phase	IG2610* (NEMA-IGL5-30R)	30
H960-DA (Cabinet 3)	1150, single-phase	IG2610* (NEMA-IGL5-30R)	30
MK11-C Memory in H960-DA (Cabinet 1)	1150, single-phase	IG2610* (NEMA IGL5-30R)	30
RWP06 Disk Pack Drive Subsystem	1460, 3-phase wye	IG2510* (NEMA-IGL21-20R)	20
LA120 DECWRITER Printer Terminal†	440, single-phase	IG5262* (NEMA IG5-15R)	15
DATASPEED 40 Printer‡	230, single-phase	IG5262* (NEMA-IG5-15R)	15
ADM-42 Display Terminal‡	65, single-phase	IG5262* (NEMA-IG5-15R)	15
INTECOLOR 8001 Display Terminal‡	250, single-phase	IG5262* (NEMA-IG5-15R)	15
202T Data Set‡	7	IG5262* (NEMA-IG5-15R)	15
212A Data Set	9	IG5262* (NEMA-IG5-15R)	15
Equipment Room Utility Outlet	—	IG5262* (NEMA-IG5-15R)	15

Note: Or equivalent isolated ground receptacles, customer provided.

* Manufactured by Harvey Hubbell, Inc.

† The printer terminal may be wired from the H960-CA cabinet.

‡ One NEMA-IG5-15R receptacle, or equivalent, required per display terminal, printer, and 202T data set.

C. Static Electricity

4.06 Due to static electricity problems between the LA120 DECWRITER printer terminal and the minicomputer, an H7005 filter should be used.

5. CABLE CONNECTIONS

A. Data Channel Connections

5.01 The PRO 500 and the DIMENSION PBX are connected through the peripheral interface circuit (PIC). When the cable distance between the minicomputer and PIC is less than 22.9m (75 ft), an M25A cord (or equivalent) can be used. For cable distances greater than 22.9 (75 ft), two asynchronous line drivers (ALDs) must be used. (See Fig. 2.) The maximum cable distance from the minicomputer to the ALD is 4.6m (15 ft). The maximum cable distance from the ALD to the PIC is 4.6m (15 ft).

B. DATASPEED 40 Printer Connections

5.02 Printers operating at distances less than 91.4m (300 ft) from the minicomputer are considered local printers, while printers operating at distances greater than 91.4m (300 ft) are considered remote printers.

5.03 For local printer operation, the M12R null modem is located near the minicomputer and connects to various cables/cords which run to the printer. (See Fig. 3.) The M12R null modem is not required for remote printer operation.

5.04 Remote printer operation requires the use of two 202T data sets, one at the minicomputer and the other near the printer. A 2-wire private line network is locally engineered between the 202T data sets. (See Fig. 3.) The M25A cord must be modified before connecting to the 202T data set located at the minicomputer.

C. Display Terminal Connections

5.05 Display terminals operating at distances less than 304.8m (1000 ft) from the minicomputer are considered local display terminals, while display terminals operating at distances greater than 304.8m (1000 ft) are considered remote display terminals.

ADM-42 Display Terminal

5.06 For local ADM-42 display terminal operation, the M12R null modem is located near the minicomputer and connects to various cables/cords which run to the display terminal. (See Fig. 4.) The M12R null modem is not required for remote ADM-42 display terminal operation. The M25E cord must be modified before connecting to the A25B cord.

5.07 Remote ADM-42 display terminal operation requires the use of two 202T data sets, one at the minicomputer and the other near the display terminal. A 4-wire private line network is locally engineered between the 202T data sets. (See Fig. 4.)

INTECOLOR 8001 Display Terminal

5.08 For local color display terminal operation, the M12R null modem is located near the display terminal and connects to various cables/cords which come from the minicomputer. (See Fig. 5.) The M12R null modem is not required for remote color display terminal operation.

5.09 Remote color display terminal operation requires the use of two 202T data sets, one at the minicomputer and the other near the display terminal. A 4-wire private line network is locally engineered between the 202T data sets. (See Fig. 5.)

D. Data Set Connections

202T Data Sets

5.10 The 202T data sets are used for remote display terminal and printer operation. The maximum allowable cable distance between the minicomputer and display terminal and/or printer and each associated 202T data set is 15.2m (50 ft). Cable distances greater than 15.2m (50 ft) may degrade service. When planning cable distances for the 202T data sets, approximately 2m (6 ft) of cable length should be allowed for each set to provide cable runs inside the minicomputer. (See Fig. 3, 4, and 5.)

212A Data Set

5.11 The 212A data set is used for the dial-up maintenance line. The maximum allowable cable distance between the minicomputer and the 2565HKM telephone set and associated 212A data set is 15.2m (50 ft). Cable distances greater than 15.2m (50 ft) may degrade service. When planning cable distances for the data set, approximately 2m (6 ft) of cable length should be allowed for each set to provide cable runs inside the minicomputer. The 2565HKM

telephone set is connected between the 212A data set and the maintenance center through the PBX cross-connect field and the Central Office (CO). (See Fig. 6.)

6. REFERENCES

6.01 The following J-drawings are associated with the PRO 500 and may be referred to for additional information:

DRAWING	TITLE
J59212A-1	PBX Systems — 11A Customer Information System — ACD-ESS Management Information System (AEMIS) — Minicomputer Equipment Specification
J59212AA-1	PBX Systems — 11A Customer Information System — ACD-ESS Management Information System (AEMIS) — Terminal Equipment Specification
J59212AB-1	PBX Systems — 11A Customer Information System — ACD-ESS Management Information System (AEMIS) — Data Set Equipment Specification
J59212G-1	PBX Systems — 11A Customer Information System — ACD-ESS Management Information System (AEMIS) — Software Equipment Specification

6.02 The following SD and associated CD is applicable to the PRO 500 and may be referred to when required:

DRAWING	TITLE
SD-66953-01	PBX Systems — Customer Information — AEMIS — System Circuit

6.03 The following sections should be referred to for additional information:

SECTION	TITLE
554-010-143	Performance Reporting Option (PRO) 500 — Descriptive Information — Call Management System (CMS)
554-010-144	Performance Reporting Option (PRO) 500 — Identification Information — Call Management System (CMS)

6.04 The following Task Oriented Practice (TOP) provides additional information on the PRO 500:

TOP	TITLE
554-010-146	Performance Reporting Option (PRO) 500 — Call Management System (CMS) — Installation, Test, and Maintenance

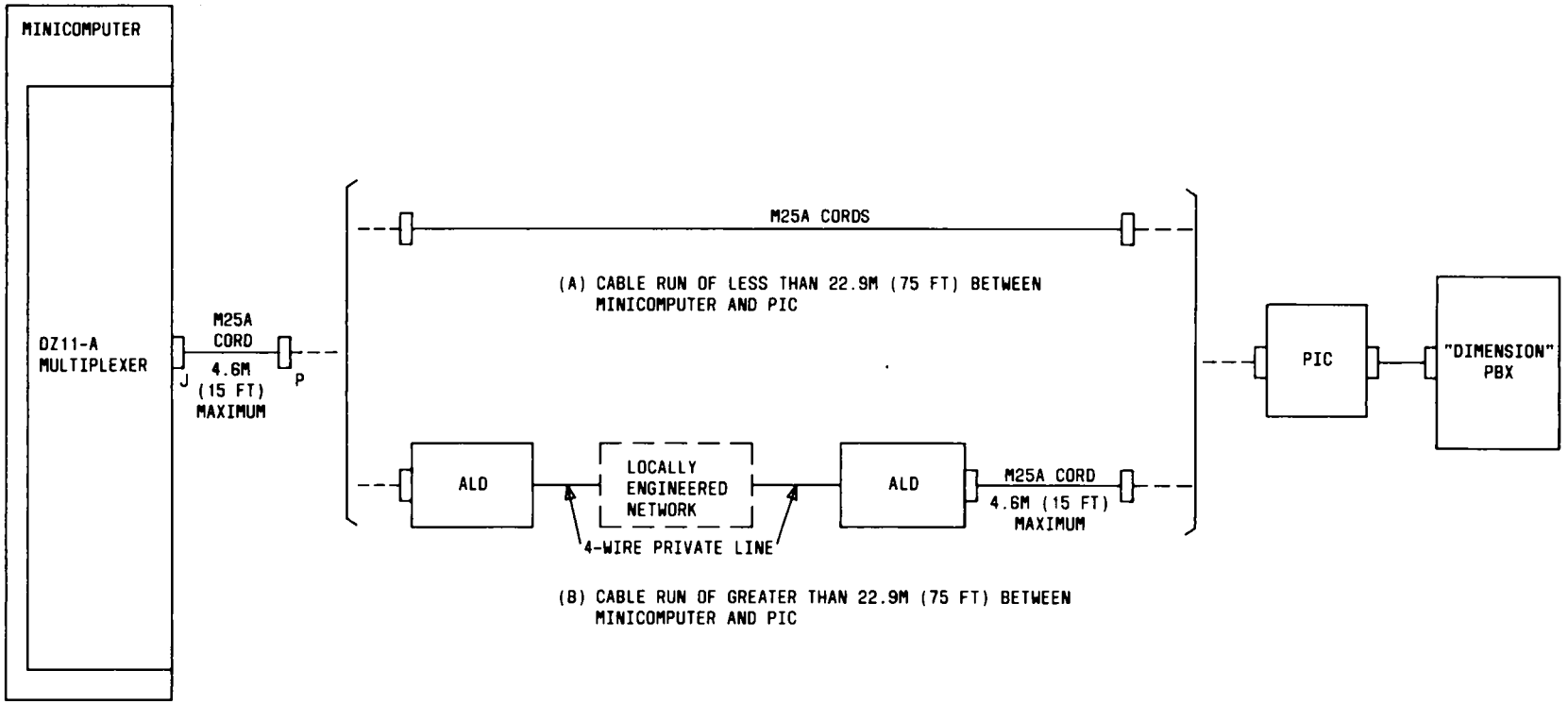
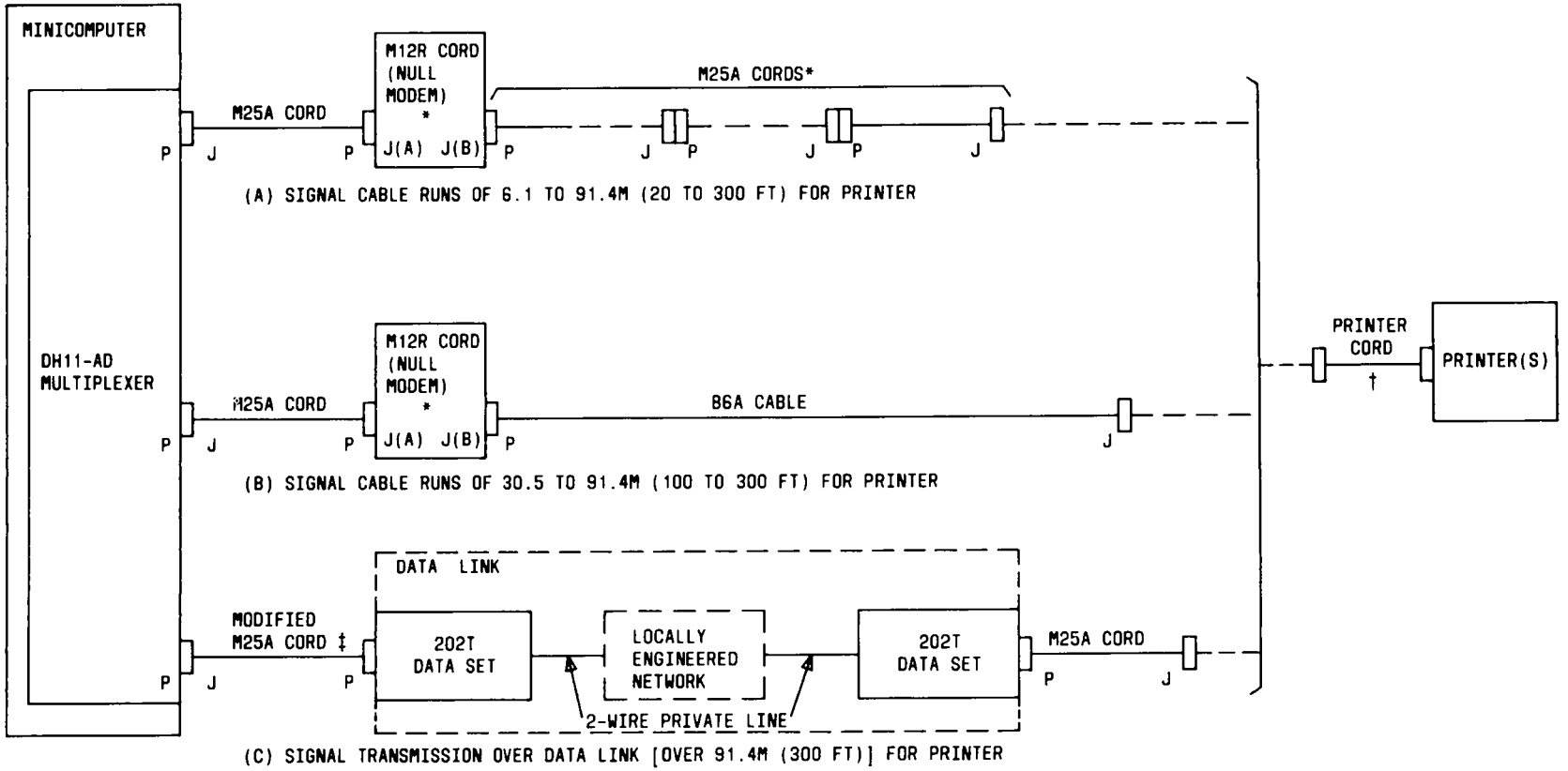


Fig. 2—Typical Cable and Cord Options Available for PIC Connection to Minicomputer

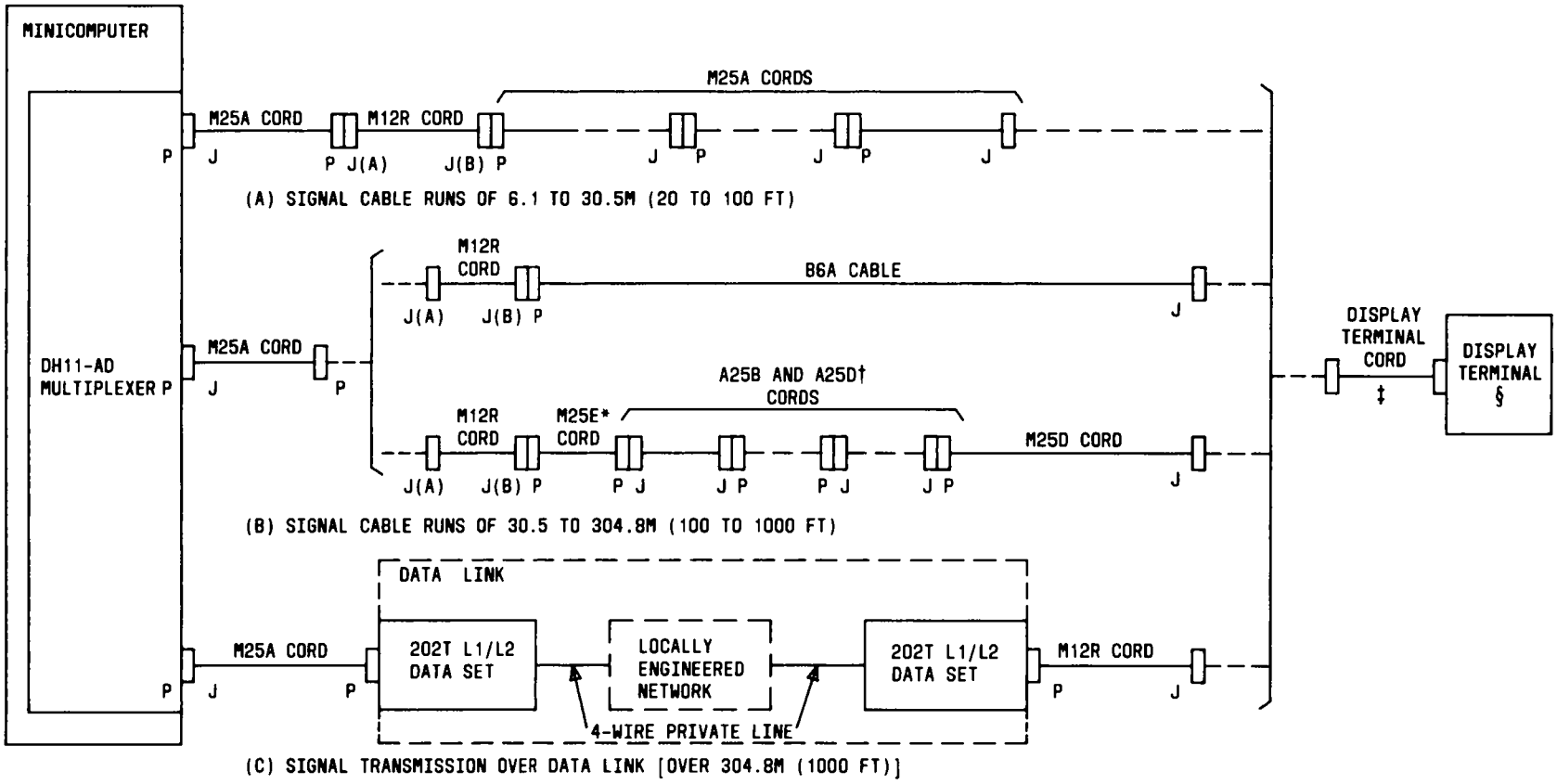


* NULL MODEM JACK A TOWARD COMPUTER MULTIPLEXER.

† M25B CORD MAY BE USED.

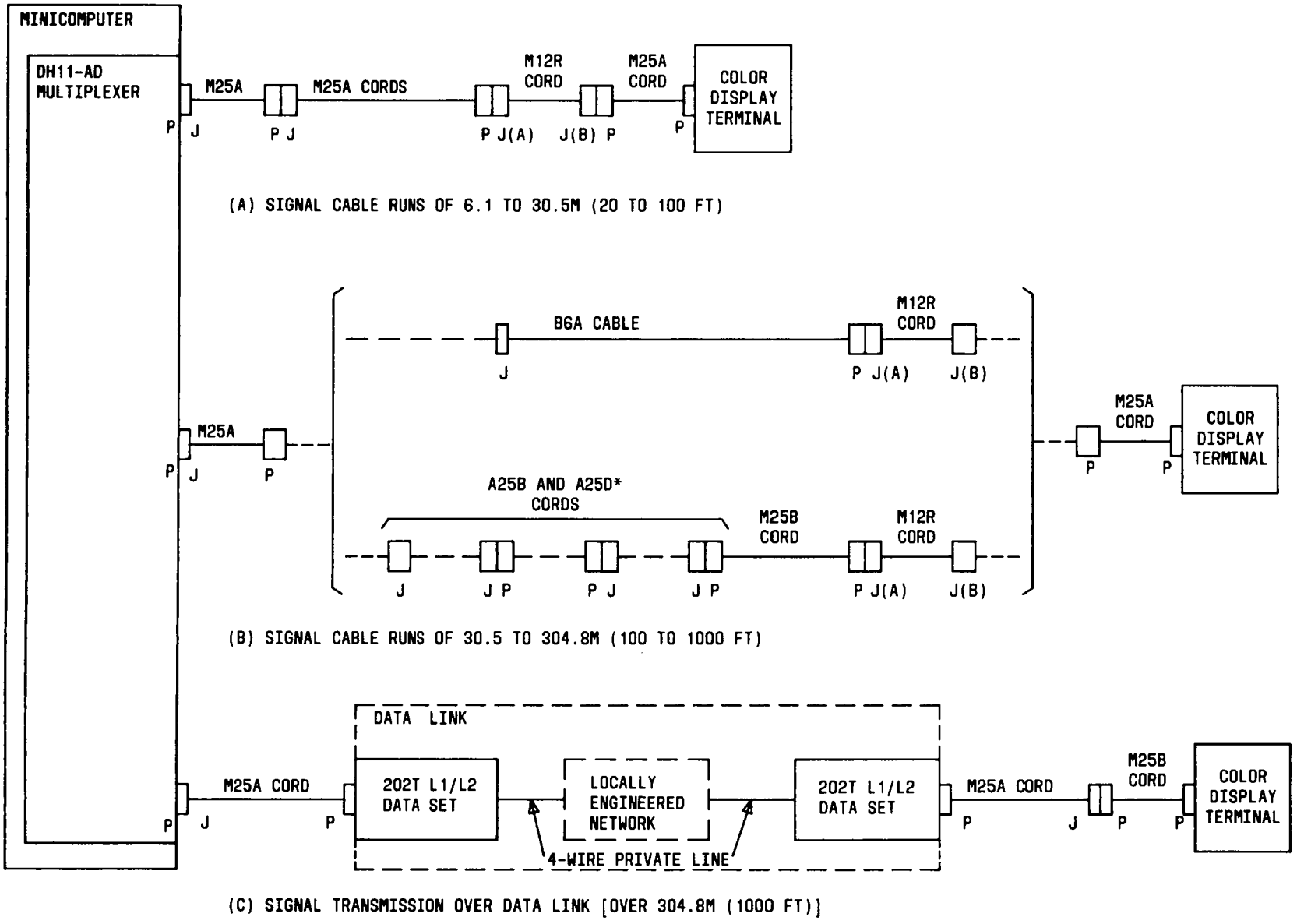
‡ MODIFIED BY DISCONNECTING LEAD FROM TERMINAL 8 AND CONNECTING TO TERMINAL 20 ON THE JACK (MALE) END.

Fig. 3—Typical Cable and Cord Options Available for Printer Connection to Minicomputer



* M25E CORD MUST BE MODIFIED.
† USE A25D CORD IF MORE THAN ONE A25B CORD IS USED.
‡ M25B CORD MAY BE USED.
§ "INTECOLOR" 8001 DISPLAY TERMINAL IS NOT INCLUDED.

Fig. 4—Typical Cable and Cord Options Available for ADM-42 Display Terminal Connection to Minicomputer



* USE A25D CORD IF MORE THAN ONE A25B CORD IS USED.
† M25E CORD MUST BE MODIFIED.

Fig. 5—Typical Cable and Cord Options Available for Color Display Terminal Connection to Minicomputer

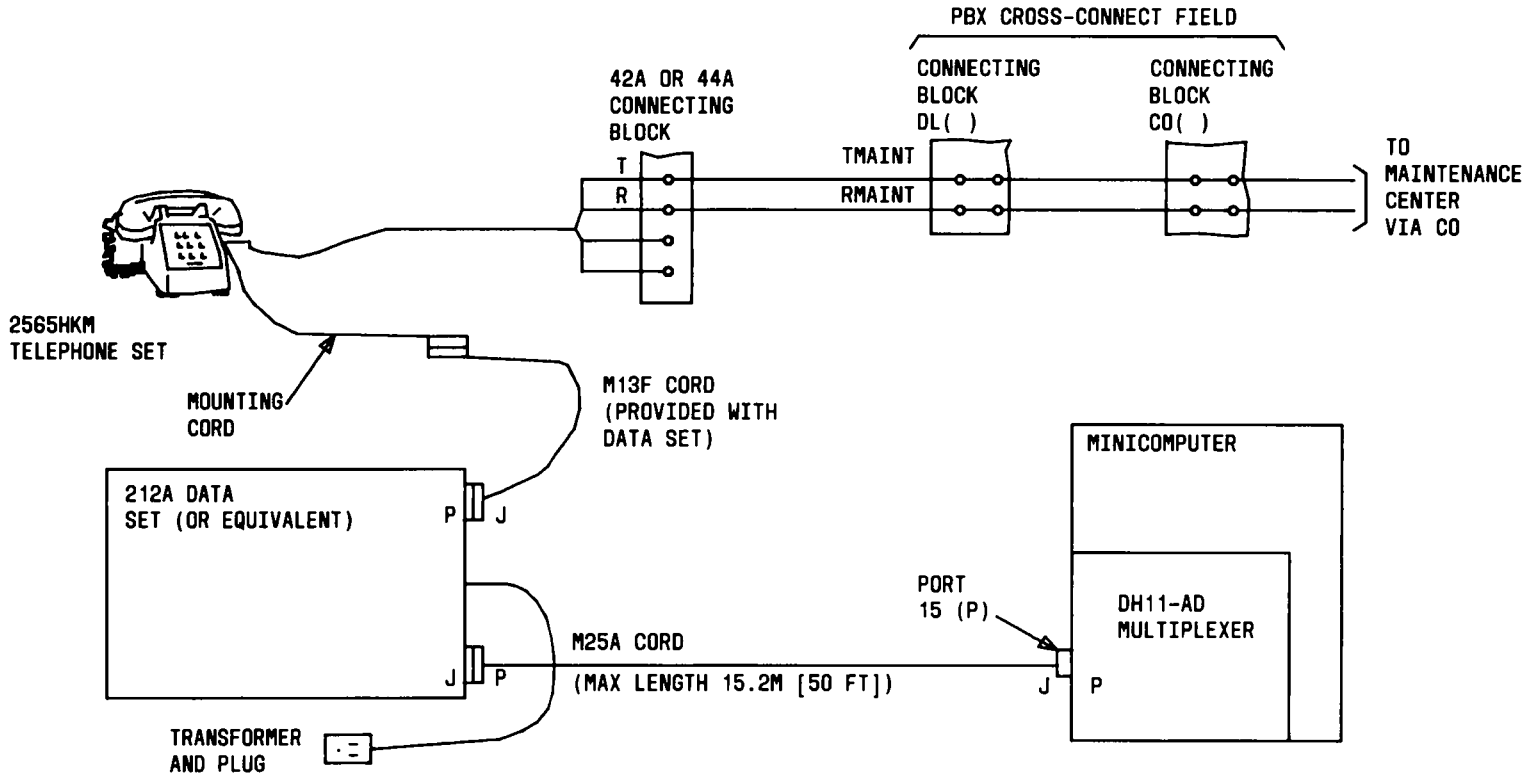


Fig. 6—Typical 212A Data Set Maintenance Line Connection to Minicomputer