

JOHN WAIHEE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
DIVISION OF LAND MANAGEMENT  
P.O. BOX 621  
HONOLULU, HAWAII 96809

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September 12, 1991

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WATER RESOURCES MANAGEMENT

Mr. Brian Choy, Director  
Office of Environmental  
Quality Control  
220 South King Street, 4th Floor  
Honolulu, Hawaii 96813

Dear Mr. Choy:

Subject: Environmental Assessment for GTE Hawaiian  
Telephone Company Installation of Telco Cabinets  
onto Existing Utility Poles Situated Off Round  
Top Drive, Honolulu, Hawaii TMK 2-6-19:3

As the approving agency and having ownership of the  
subject lands, enclose herewith are four copies and one  
original of the Environmental Assessment and Notice of Negative  
Declaration for GTE Hawaiian Telephone Company, Incorporated's  
Telco cabinet installation onto existing utility poles situated  
off Round Top Drive, Makiki, Honolulu, Hawaii.

GTE Hawaiian Telephone Company, Incorporated is requesting  
from the State permission to install Telco cabinets on existing  
utility poles to provide improvised service for the Honolulu  
Police and Fire Departments along with improving current  
telephone service for the upper Makiki Round Top residents.

It is Land Management's intention to submit the GTE  
Hawaiian Telephone Company's request at the Land Board meeting  
scheduled for October 11, 1991. We would appreciate your  
cooperation by publishing GTE Hawaiian Telephone Company's  
Environmental Assessment and Notice of Negative Declaration in  
the next O.E.Q.C. Bulletin.

160

Mr. Brian Choy, Director  
Page 2  
September 12, 1991

Should you have any questions, please contact Mr. Nicholas  
Vaccaro at 548-3262.

Very truly yours,



CECIL SANTOS  
Oahu District Land Agent

Enclosures 5

cc: Ms. S. Himeno  
T. C. Yim

1991-10-08-0A-FEA-

FILE COPY

ENVIRONMENTAL ASSESSMENT

AND

NOTICE OF NEGATIVE DECLARATION

FOR

GTE HAWAIIAN TELEPHONE COMPANY,  
INCORPORATED

TELCO CABINET INSTALLATION

MAKIKI ROUND TOP DRIVE

HONOLULU, HAWAII

PREPARED BY

ENVIRONMENTAL COMMUNICATIONS, INC.

AUGUST, 1991

**I SUMMARY**

**CHAPTER 343, HAWAII REVISED STATUTES (HRS)  
ENVIRONMENTAL ASSESSMENT**

**1. APPLICANT:**

**GTE HAWAIIAN TELEPHONE COMPANY, INCORPORATED**

**2. APPROVING AGENCY:**

**STATE DEPARTMENT OF LAND AND NATURAL RESOURCES  
P.O. BOX 621  
HONOLULU, HI 96809**

**3. AGENCIES CONSULTED:**

**STATE DEPARTMENT OF LAND AND NATURAL RESOURCES  
Division of Land Management  
Division of Forestry & Wildlife  
Division of Historic Preservation  
Division of State Parks & Outdoor Recreation**

**STATE DEPARTMENT OF HEALTH  
Environmental Health Administration,  
Environmental Planning Office**

## II GENERAL DESCRIPTION OF THE ACTION'S CHARACTERISTICS

### A. INTRODUCTION

The Hawaiian Telephone Company, Incorporated is requesting approval to design and install TELCO cabinets to be mounted on existing utility poles. This proposed installation would be done on State lands. The installation site is located on Tantalus Road, below the Puu Ualaka'a Wayside Park. (See Figure 1) The TELCO cabinets would be 44" wide, 22" deep, and 62" high and would provide improved service to the City Police and Fire Departments, respectively. All installation work will be done to applicable City & County Building Code standards, and maintenance will be by the applicant, Hawaiian Telephone Company. There will be no requirements for wastewater management, drinking water, or refuse disposal due to the installation of the TELCO cabinets. The installation would be completed in one phase and secured.

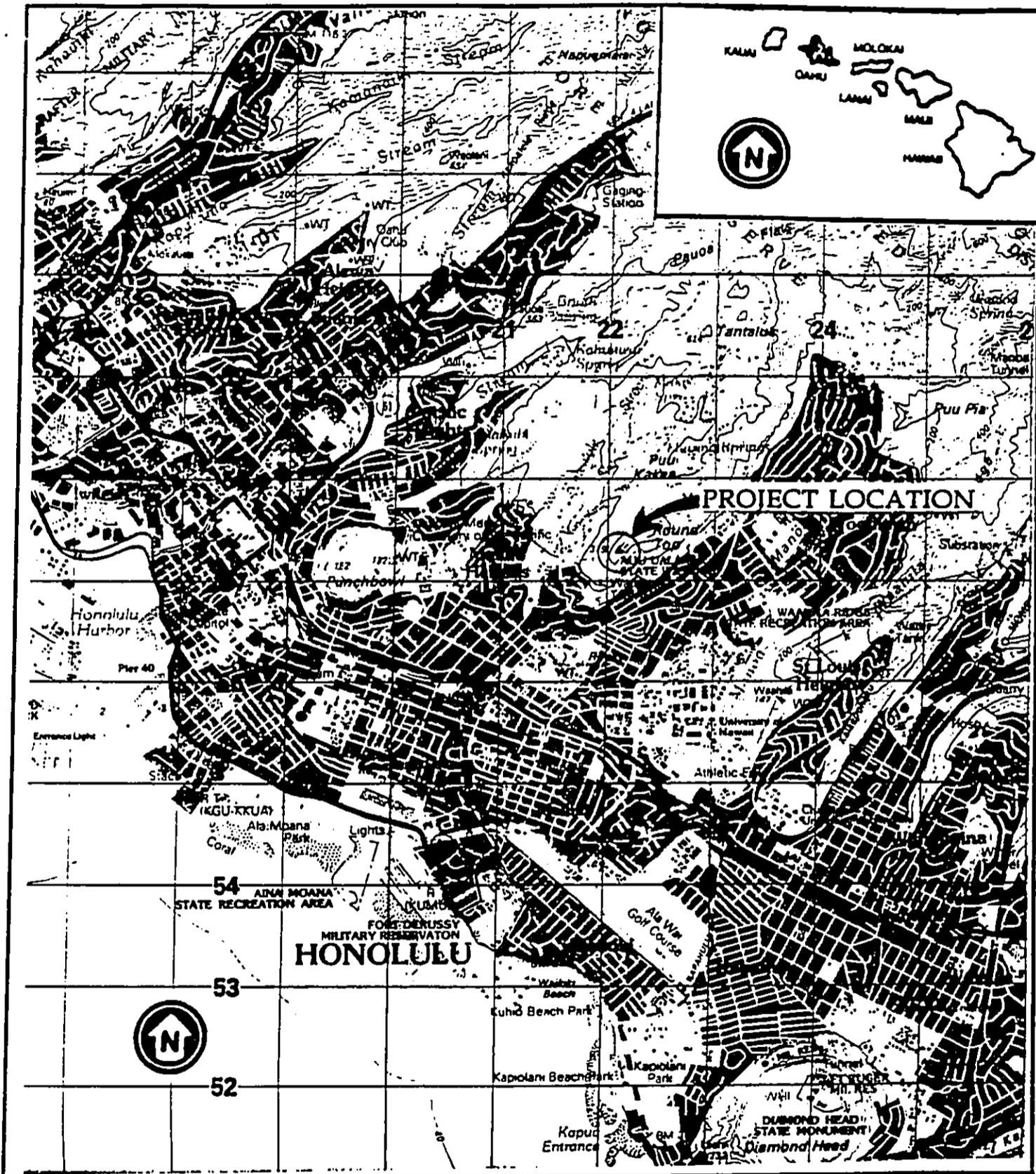
The planned installation is identified on Tax Map Key: 2-5-19: 03 and the State Land Use Boundary designation is Conservation; the City & County Development Plan Public Facility map designation is Preservation; and the County Zoning is P-1. (See Figures 2, 3).

The purpose of the planned installation is to provide improved service for the Honolulu Police and Fire departments, and also improve current telephone service for upper Makiki Round Top residents. At the present time, the service available is considered up to existing design capacity and this proposed project will increase service capacity.

### B. TECHNICAL CHARACTERISTICS

The Hawaiian Telephone Company provides tele-communications facilities and services to the State of Hawaii. These services are provided to both the private sector and governmental agencies in many forms. Administered by the Public Utilities Commission, the Telephone Company is mandated to maintain and keep abreast of the total community's needs.

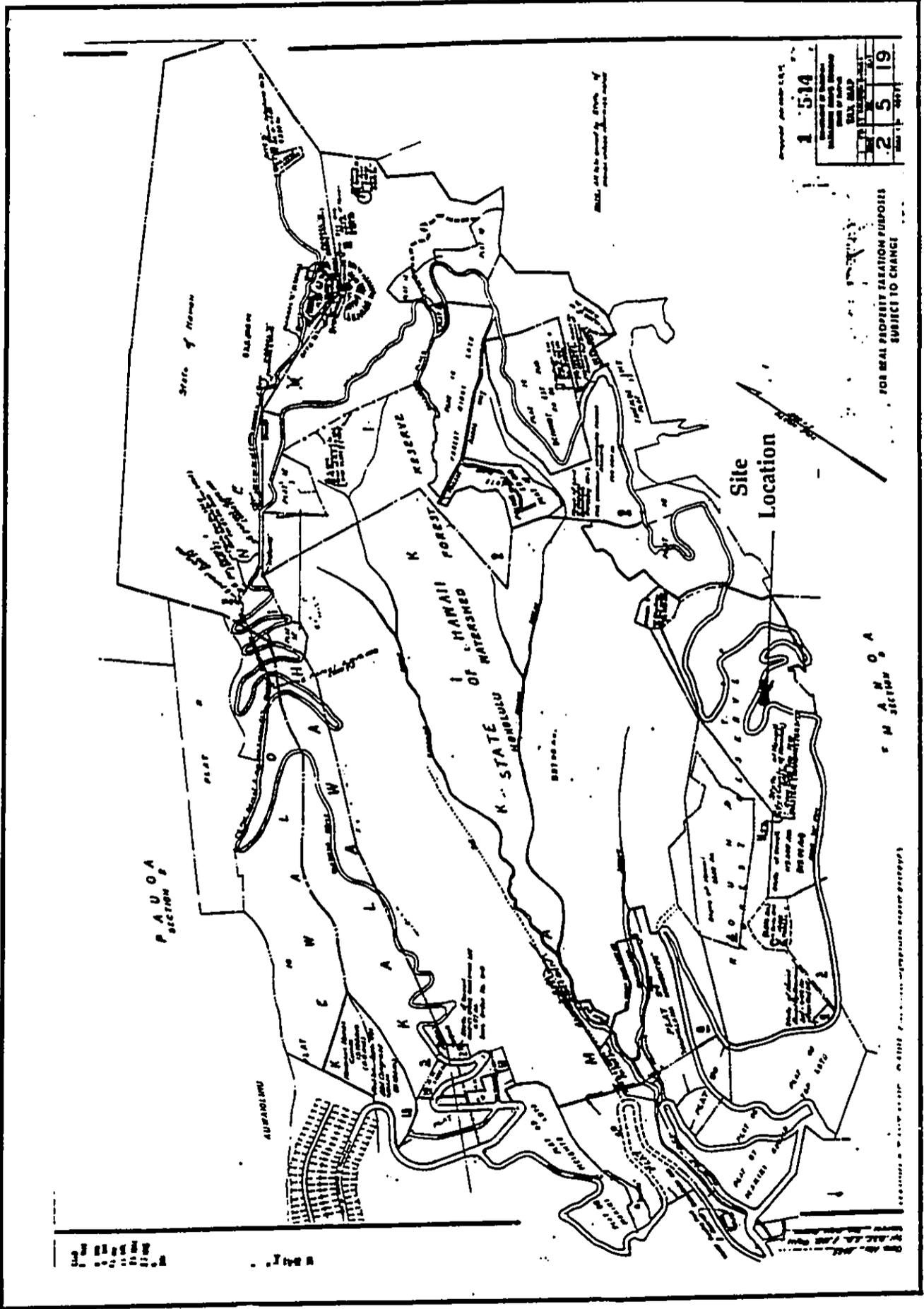
The TELCO cabinets will provide additional and more current state of the art telecommunication systems to the Police and Fire Departments, as well as increasing private subscriber's telephone line capacity to the residents of Makiki Round Top and Tantalus. The typical cabinet is 44" wide, 22" deep, and 62" high, and is built of heavy gauge steel. All site work will be done in accordance with applicable government building, and electrical codes/standards. No significant environmental impacts are anticipated from the design and construction of this TELCO cabinet.



GTE HAWAIIAN TELEPHONE COMPANY  
TELCO CABINET INSTALLATION  
MAKIKI ROUND TOP DRIVE  
Honolulu, Hawaii

LOCATION MAP

FIGURE 1

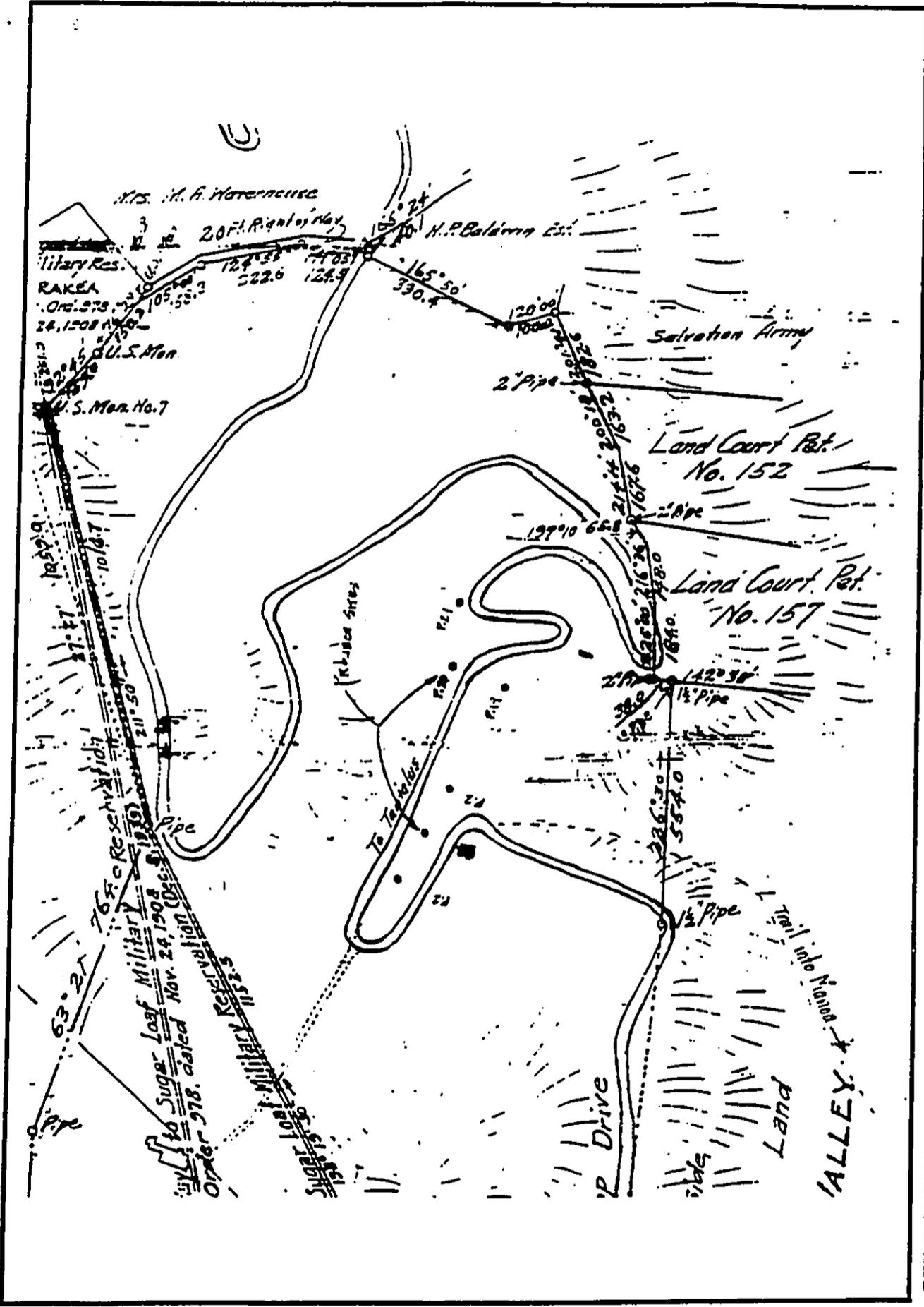


SITE LOCATION

GTE HAWAIIAN TELEPHONE COMPANY  
 TELCO CABINET INSTALLATION  
 MAKIKI ROUND TOP DRIVE  
 Honolulu, Hawaii

FIGURE 2

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Pole Location Map  
FIGURE 3

GTE HAWAIIAN TELEPHONE COMPANY  
TELCO CABINET INSTALLATION  
MAKIKI ROUND TOP DRIVE  
Honolulu, Hawaii

C. SOCIO-ECONOMIC CHARACTERISTICS

As previously stated, the purpose for this installation is to improve current telecommunication capacity for the Honolulu Police and Fire departments, as well as the private residents living above the Makiki Round Top and Tantalus areas.

D. ENVIRONMENTAL CHARACTERISTICS

There will be minimal, if any, environmental impacts resulting from this proposed project.

E. FUNDING AND PHASING

All improvement costs will be borne by the applicant, Hawaiian Telephone Company. Estimated costs are \$30,000.

### III. THE AFFECTED ENVIRONMENT

#### A. GEOGRAPHIC CHARACTERISTICS

The proposed site is located on Round Top Drive, below the State Puu Ualaka'a Wayside Park. The Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii, prepared by the U.S. Department of Agriculture, Soil Conservation Service in August, 1972 describes the soils as follows: "*Tantalus Series: this series consists of well-drained soils on the uplands on the island of Oahu. These soils were developed in volcanic ash and material weathered from cinders. They are moderately sloping to very steep. Elevations range from 100' to 2,200'. Annual rainfall amounts to 50-150" and is well distributed throughout the year. These soils are used for homesites, water supply, and recreation. Natural vegetation consists of ferns, Formosan koa, koa haole, kukui, and eucalyptus. Official designation is TAF: Tantalus silty loam, 40-70% slope.*" (See Figure 4)

#### B. HYDROLOGICAL CHARACTERISTICS

There is no onsite flooding at the project site and no major excavation work will be necessary to affect existing drainage patterns. The project site is presently natural slope drained.

According to the FIRM Flood Insurance Rate Map, Panel 120 of 135, Community Panel Number 150001 0120 C, Revised 9-4-87, the project site is located in zone X. Zone X is classified as "Areas determined to be outside 500 year flood plain."

#### C. BIOLOGICAL CHARACTERISTICS

The subject parcel is located in the Round Top Forest Preserve and is part of the State of Hawaii Honolulu Watershed Forest Reserve. As such, the site is adjacent to areas where the likelihood of indigenous flora and fauna can be located readily. Also, the undeveloped Conservation land use practices, lend themselves to the maintenance of established plant and animal species most likely found on endangered and protected lists. The limited size of these improvements are not expected to have any significant impact on the flora and fauna of the Forest Reserve. The installed TELCO cabinets will be unmanned and operated without human involvement.



D. SERVICE FACILITIES AND PUBLIC UTILITIES

This project will require only electrical power and this will be obtained from existing power lines. There will be no sewer, water, or other utilities needed.

E. ARCHAEOLOGICAL SITES

There has been no onsite inspection conducted for archaeological sites. Literature search revealed that on this parcel, there has been alteration with the construction of Round Top Drive and other installation of utilities, etc. In the event that during the installation phase, sites are uncovered, the applicant will instruct the contractor to halt work and advise the Historic Preservation Division (587-0045) immediately.

F. AESTHETICS AND VISUAL CHARACTERISTICS

The TELCO cabinet is diminutive in size and is not considered a structure. Overall physical dimensions are 62" high, 44" wide, and 22" deep. It will be painted in greenish-olive drab weather resistant paint, and will be secured to the existing utility pole within the Utilities right-of-way. There will be a minimum of visual impact from the Round Top Drive view perspective.

#### IV. SUMMARY OF MAJOR IMPACTS AND MITIGATION MEASURES

The proposed action is not expected to have any significant environmental impacts. The site is undeveloped and the alteration to the terrain has been strictly improvements for the Round Top Drive roadway and the ancillary utilities. The relatively minor nature of the proposed TELCO cabinet installation is due entirely to the sizing of the proposed improvement.

Any impacts resulting from the subject action will be temporary in nature and construction related. These construction impacts will be minor and should not have any long term effect on the site or adjacent properties. Adherence to applicable State Department of Health rules and regulations on Air and Noise Quality will be observed under the contractor's conditions of construction. Appropriate noise abatement measures will be taken and dust control measures will also be employed if appropriate. It is very likely that the bulk of the site improvement will be done by portable machinery rather than heavy construction equipment.

V. **ALTERNATIVES CONSIDERED**

A. **ALTERNATIVE LOCATIONS**

Efforts were made to consolidate the TELCO cabinets in the existing Master Transmitter Site, located below the proposed site, but the applicant was advised by the City Building Department that there was no space available. This was due to future planned uses of the existing space for other expansion of services being provided at the Master Transmitter Site.

B. **DO-NOTHING ALTERNATIVE**

The "Do-Nothing" alternative was not a viable one in view of the increased demand for expanded services, particularly from the Police and Fire departments. It is also designed to increase service capacity for the private residential subscribers on Round Top Drive.

**VI. DETERMINATION, FINDINGS AND REASONS SUPPORTING DETERMINATION**

After completing an assessment of the potential environmental effects the proposed project and consulting with other governmental agencies, it has been determined that an Environmental Impact Statement (EIS) is not required. Therefore, this document constitutes a Notice of Negative Declaration.

1. The proposed action consists entirely of the design and installation of TELCO cabinets, to be mounted on to existing telephone poles.
2. There will be no permanent degradation of existing ambient air and noise levels. During construction operations, air quality and noise levels are expected to be affected, but these will be minor and temporary in magnitude and duration.
3. There are no known endangered species of animal or plants within the project site.
4. There are no natural, historic or archaeological sites within the project limits.
5. There are no secondary adverse effects on future development, population and public facilities.

This project will have negative environmental impacts and will be of benefit to the City & County Police and Fire Departments by providing increased capacity for their telecommunication needs. Any adverse impacts have been determined to be insignificant and the applicant will comply with all applicable statutes, ordinances, and rules and regulations of the Federal, State, and City governments.

**VII. LIST OF PREPARERS**

**GTE HAWAIIAN TELEPHONE COMPANY  
OSP ENGINEERING IV**

**ENVIRONMENTAL COMMUNICATIONS, INC.**

# Exhibit A

Northern Telecom Limited 1987  
Digital Multiplex System  
DMS-1 URBAN\*  
112 Line Remote Terminal Cabinet  
Description, Installation, and Maintenance

DOCUMENT CAPTURED AS RECEIVED



PRACTICE 640-2151-201  
Issued: 88 02 20  
Standard

DIGITAL MULTIPLEX SYSTEM

DMS-1 URBAN\*

112 LINE REMOTE TERMINAL CABINET  
DESCRIPTION, INSTALLATION, AND  
MAINTENANCE

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Contents Continued

*155 LMS TRAIL 10/22/84*

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PRACTICE 640-2151-201

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\* DMS-1 Urban is a trademark of Northern Telecom

## 1. DESCRIPTION

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### GENERAL

1.01 The 112 Line Remote Terminal Cabinet provides mechanical protection and a controlled environment for Remote Terminal (RT) equipment. In addition to providing protection and terminations for up to 112 Voice Frequency (VF) pairs, 2 DS1 lines and four maintenance pairs, the cabinet features separate compartments for backup battery power reserves and crossconnect facilities. The 112 Line RT Cabinet can be mounted on a pole or on a concrete pad.

### PHYSICAL DESCRIPTION

1.02 The RT cabinet is 44 in. (1120 mm) wide, 62 in. (1575 mm) high, and 22 in. (559 mm) deep. The weight of an empty cabinet is about 500 lbs (230 kg). A fully equipped cabinet, including electronics and four sets of batteries, weighs about 1100 lbs (500 kg).

1.03 The housing is constructed primarily of welded, 12 gauge, SAE 1008, cold-rolled steel. The cabinet doors are made from 14 gauge steel, while special parts, such as the bay frame, use thicker materials. The outer shell of the cabinet is galvanized to provide corrosion resistance.

1.04 The cabinet consists of four parts (see Figs. 1-1 through 1-4):

- (a) **Base:** used for anchoring the cabinet; for housing the batteries, the optional emergency connector, the air intake and filter system; for mounting heating elements; and to provide cable entrances.
- (b) **Electronics Compartment:** houses the DMS-1 Urban equipment, the rectifier, the ac and dc control units and the environmental control systems.
- (c) **Crossconnect Compartment:** contains the Service Protection Center (SPC) and the crossconnect facility; houses a heater and the air intake fans.
- (d) **Roof:** accomodates the damper and air exhaust system.

1.05 The exterior walls, ceiling, and floor of the cabinet, which are constructed of 12 gauge steel, are insulated for protection against cold weather and sun load. A 14 gauge divider wall, also insulated on each side for improved thermal resistance, separates the cabinet into two compartments. Two recesses located at the bottom of the cabinet exterior are provided for lifting the cabinet with slings.

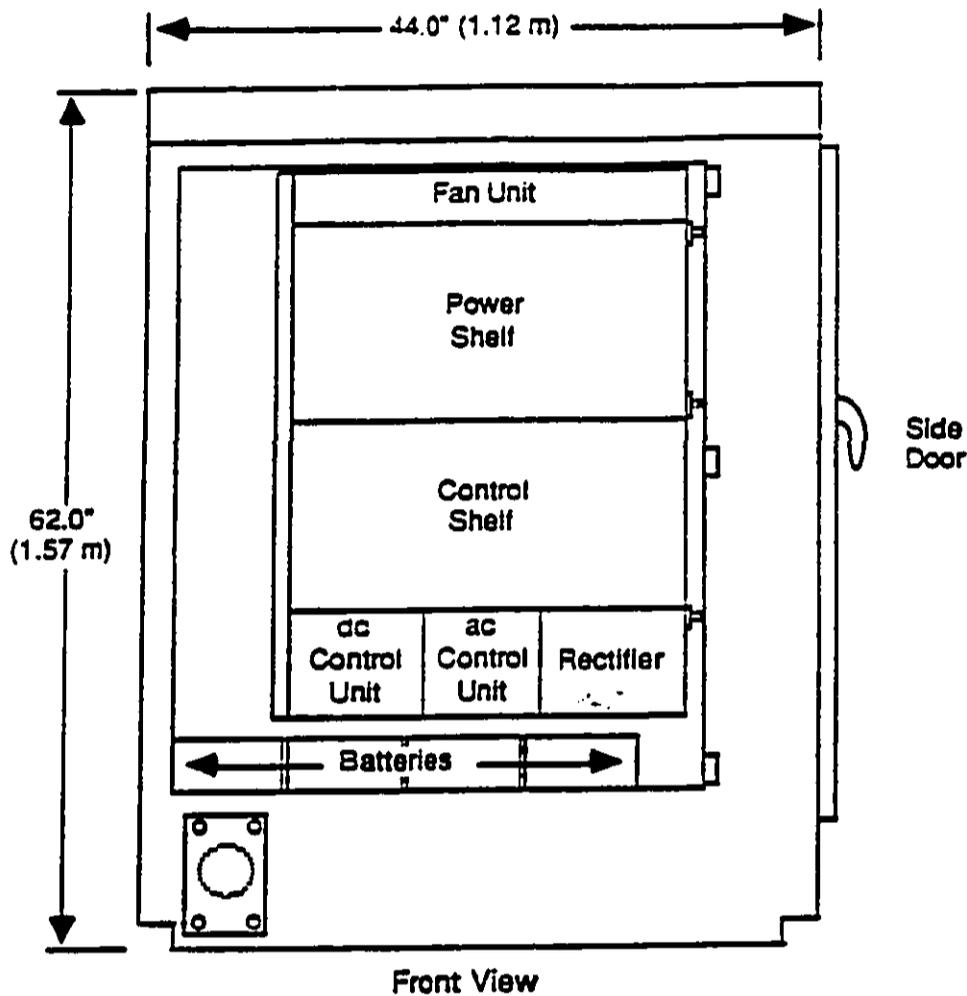


Fig. 1-1  
Electronics Compartment - Front Door Removed

1.06 The insulated doors are made from 14 gauge steel. A protection cover is fitted onto the inside of each door to protect the insulation from damage. Each door is hinged with concealed lock pins. A three-point latching mechanism, operated by a quarter-turn handle with a padlocking facility, is used to lock the door. For security purposes, the door latching bar is applied against the door alarm. The door switch plunger may be pulled out to delete the open door alarm when the cabinet doors are opened during maintenance. Each door features a self-locking wind relief mechanism, which is located at the bottom edge of the door.

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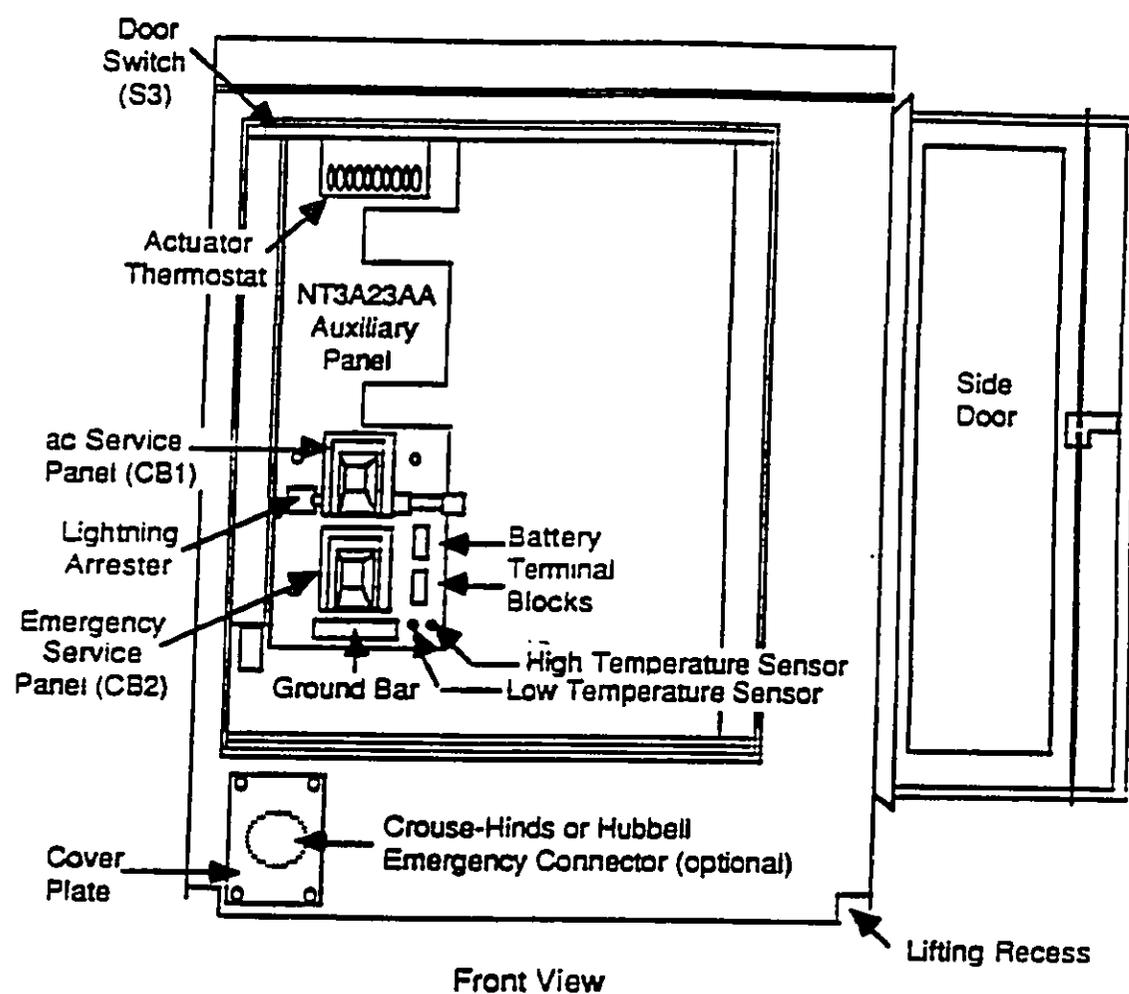


Fig. 1-2  
Inner Rear Wall Of Cabinet - Front Door And Swing Frame Removed

1.07 A hinged bay frame houses the DMS-1 Urban RT equipment and the rectifier (see Fig. 1-1). The frame is secured in position with locking latches at the upper part of the frame. A shipping strap is provided to secure the frame during transportation of the cabinet.

1.08 The rear wall of the electronics compartment houses the ac and emergency service panels, the ground bar, the battery terminal blocks, and the high and low temperature thermostats (see Fig. 1-2).

1.09 The 112 Line Cabinet is offered with two mounting options: an anchoring plate assembly, and a pole-mounting assembly. The optional anchoring plate kit consists of a 12 gauge galvanized anchoring plate and template assembly, with anchoring bolts and two temporary support angles.

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PRACTICE 640-2151-201

1.10 The optional pole-mount assembly kit consists of a pole-mounting brace assembly and a mounted platform assembly, which features a 1/4 in. (6.4 mm) thick steel plate. Threaded rod fasteners are also included in the pole-mount kit.

ENVIRONMENTAL CONTROL

1.11 Temperature control is achieved by the use of cooling fans, a ventilation damper system, heaters and insulation. Six fans are installed in a separate shelf at the top of the cabinet to maintain continuous air circulation. Two thermostatically controlled fans, mounted on the divider wall, bring the outside air through the crossconnect compartment into the electronics compartment. These fans are equipped with a gravity flap that seals the fan opening in the divider wall when the fans are not in operation.

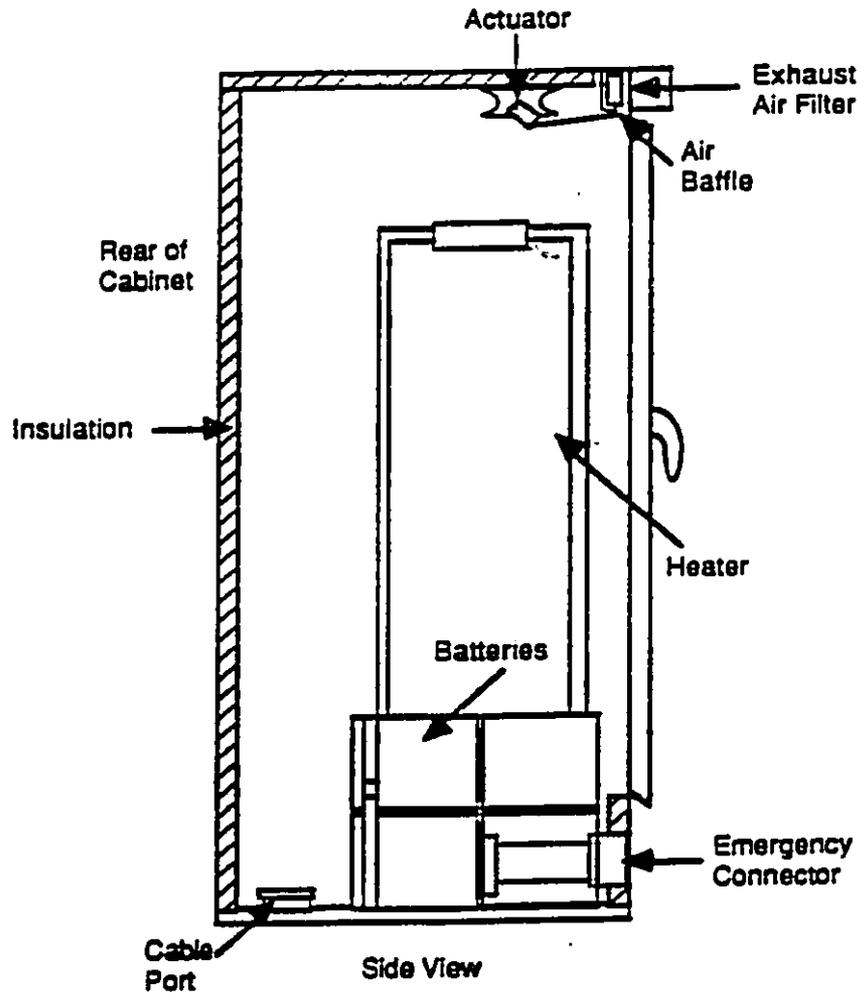


Fig. 1-3  
Section View

1.12 Air filters, made from open-cell foam, are located at the air intake and exhaust ports in the roof, and in the crossconnect compartment just below the compartment door. These filters prevent particles, precipitation and vermin from entering the cabinet. Closed neoprene gaskets around the inner perimeter of each door and in the roof area seal the cabinet from rain and snow.

1.13 The ceiling features a thermostatically controlled damper system (see Fig. 1-3). The actuator motor of the ventilation system is controlled by the actuator thermostat to operate the diverting damper as follows: when the temperature inside the cabinet rises above 30° C (86° F), the damper opens to allow air outside the cabinet to enter; the actuator thermostat simultaneously turns on the two intake fans, and air is directed down the back of the bay frame to the battery area, and up through the electronic equipment. The air is exhausted at the top of the cabinet by the exhaust fans. At cabinet temperatures below 30° C (86° F), the damper closes, the intake fans are shut off, and the air inside the cabinet is recirculated.

1.14 Two flat heating elements (located on the inside of the left wall and under the battery tray) in the electronics compartment provide uniform heat within the cabinet. The wall mounted element provides 250 W at 120 Vac, and the unit under the battery tray provides 135 W. A 135 W element (located on the divider wall) heats the crossconnect compartment.

1.15 The cabinet is insulated inside with 1 in. (25.4 mm) thick insulation boards. The divider wall is insulated with 1/2 in. (12.8 mm) thick insulation board on both sides. This insulation provides protection from the cold and from sun load. Humidity control is achieved by mixing incoming air with some of the warmer air in the cabinet.

#### ELECTRICAL SYSTEM

1.16 The 112 Line Cabinet electrical system consists of the ac and emergency service panels, the ac and dc control units, the rectifier, and the batteries. The cabinet requires a standard 30 A, single-phase, three-wire 230 Vac commercial supply. A battery reserve of up to 100 ampere-hours (AH) provides eight hours of backup power at external temperatures as low as - 40° C (- 40° F). When equipped with an optional emergency connector, ac power can be supplied by an emergency generator during extended power outages.

1.17 The ac service panel is equipped with a 30 A double-pole breaker and a lightning arrester. This panel allows for direct connection of the ac power supply to the equipment. A second 30 A double-pole breaker is provided for connecting optional emergency connectors.

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1.18 The ac control unit accommodates the transfer switch, the rectifier, the heaters, the service receptacles, and the environmental thermostats. The transfer switch allows switchover from the commercial ac supply to an emergency source, and vice-versa. One of the two 15 A breakers (single-pole) feeds power to the rectifier receptacle; the other feeds the service receptacle. The 7 A single-pole breaker, which is controlled by the heater thermostat, feeds power to the heater receptacle. The ac control unit is also equipped with a terminal block for connections to the ac and emergency service panels.

1.19 The dc control unit consists of four battery connectors, the fan unit connector, the fan fuse (2 A) the actuator fuse (0.75 A) and connector, the rectifier bypass breaker (30 A) and the rectifier junction connector. The bypass breaker is normally locked in the OFF position. The junction connector and the bypass breaker are used for powering equipment directly from the batteries during the replacement of the rectifier (to minimize service interruptions). The dc control unit is equipped with a terminal block for connections to the Power Shelf.

1.20 All alarms are terminated on the Power Shelf. The cabinet alarm system has six alarms: low/high temperature, door open, fan/actuator fuse and rectifier bypass breaker operation, low battery voltage, ac fail and rectifier fail. See Fig. 3-1 for the cabinet alarm pin-outs and assignments.

1.21 The cabinet ground bar is connected to a customer-provided ground rod, in accordance with local utility codes. Ground wires from the bay frame, the SPC, the ac supply and the outside plant cables are terminated at the ground bar. The recommended ground to earth resistance is 25  $\Omega$  (maximum).

1.22 Five thermostats are located in the cabinet. These control the low and high temperature alarms, the ventilation damper system (actuator thermostat), and the heaters.

1.23 The cabinet is equipped with one NPS 50148, - 48 V/25 A switching mode rectifier, which charges the batteries, and powers the RT equipment, the fans and the actuator. Voltage is nominally adjusted to deliver - 56 V. The low voltage disconnect is set at - 43 V.

1.24 The batteries are sealed lead-acid types (25 AH, 12 V) with a nominal life of five years. The battery space at the bottom of the cabinet accommodates up to four sets of batteries (four batteries per set) to provide a maximum of 100 AH at - 48 Vdc.

**CABLING INTERFACE**

**1.25** 112 Line RT Cabinet installation kits are designed for optimum cable placement: outside plant and power cables may enter the 112 Line Cabinet by way of customer-provided conduits through the cabinet floor or through two cable ports at the top of the cabinet. All cable entry points are capped.

**1.26** A removeable connector plate, which is fastened to the base of the cabinet with 7/16 in. (10 mm) hex nuts, provides access to the optional emergency connector. The two options available are the Crouse-Hinds and the Hubbell 30 A, three-wire, four pole male connectors. When field installed, the outlet box is bolted to the wall plate (see Fig. 1-2).

**1.27** Outside plant cable protection and termination is provided on the Service Protection Center (SPC), which is located on the divider wall in the crossconnect compartment (see Fig. 1-4). The SPC is divided into two sections, the protection field and the termination field.

**1.28** The protection field consists of one 100-pair block and one 15-pair block for 112 VF lines, and one 12-pair block for 2 DS1 lines and four maintenance pairs.

**1.29** The HF receive and transmit pairs are contained in two separate shielded cables along with the miscellaneous pairs. A third unshielded cable is used for the maintenance pairs. Cables are wire-wrapped at the power shelf, and are connectorized at the SPC end.

**1.30** Outside plant cable protection consists of both VF and DS1 line protection. Two-element gas tube protector modules are recommended for primary voltage protection of VF and HF pairs.

PRACTICE 640-2151-201

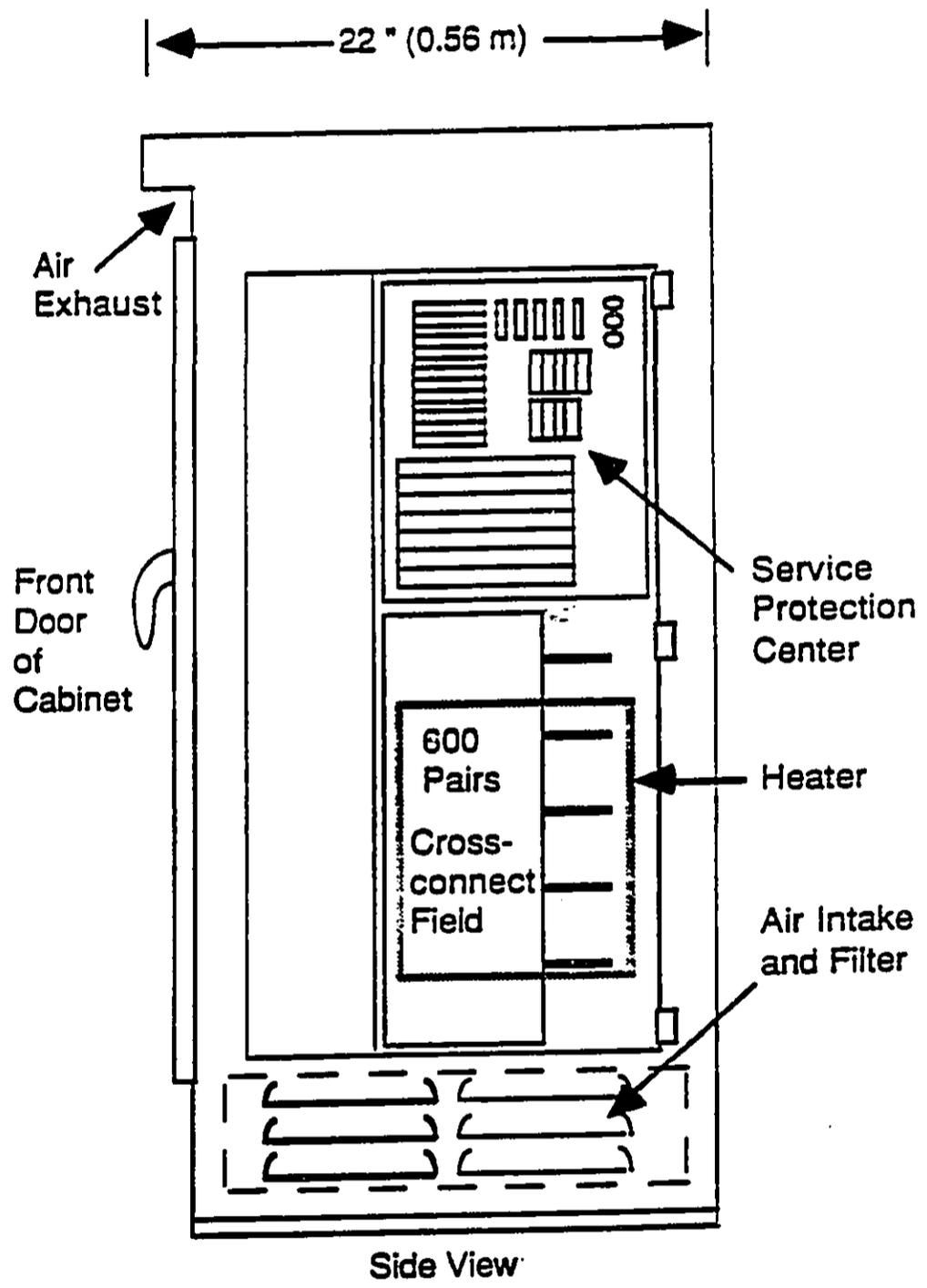


Fig. 1-4  
Crossconnect Compartment - Side Door Removed

PRACTICE 640-2151-201

## 2. INSTALLATION PROCEDURES

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### PREREQUISITES FOR INSTALLATION

2.01 The 112 Line RT Cabinet may be installed in any suitable location, either on a concrete pad, or mounted on a pole. The choice of site, and compliance with local regulations are the responsibility of the operating company. The provisioning of commercial power and outside plant cables are also the responsibility of the operating company, including compliance with the applicable electrical codes for the site.

2.02 Cable conduit and port openings should be sealed by the operating company to prevent water from entering the cabinet. When the cabinet is pad-mounted, the pad must be located above local flood plains, and a plugging compound should be applied on and around all conduit openings as per local practice. When the cabinet is pole-mounted, sealing tape should be applied around the cable port at the bottom of the cabinet. Hardware is provided with the pole-mount installation kit for sealing the grommet around the cable at the bottom of the cabinet.

2.03 The installation procedures in this section assume the following:

- (a) The RT Cabinet to be equipped is available and ready on site for installation of the DMS-1 Urban system and associated hardware facilities.
- (b) All hardware and materials are available, and have been checked for completeness and readiness for the installation.
- (c) All the required drawings, local installation instructions, job specifications and other documentation are available and ready for use.

### PROCEDURES

2.04 The following installation procedures are provided in this section:

*Note:* Chart 2-1 is for pad-mounted installations only. Chart 2-2 is for pole-mounted installations only. All other procedures apply to both kinds of installations, and should be followed in the sequence presented.

- (a) Prepare The Cabinet Mounting Pad - Chart 2-1
- (b) Install The Pole-Mount Kit - Chart 2-2
- (c) Install The Cabinet - Chart 2-3
- (d) Install Cabinet Entrance Cables (Outside Plant) - Chart 2-4

PRACTICE 640-2151-201

- (e) Connect Commercial Power For The Cabinet - Chart 2-5
  - (f) Connect The VF Cable Pairs To BIX Connectors - Chart 2-6
  - (g) Connect The VF Cable Pairs To 710 Connectors - Chart 2-7
  - (h) Connect the VF Cable Pairs To 3M Connectors - Chart 2-8
  - (i) Terminate The DS1 And Maintenance Pairs - Chart 2-9
  - (j) Install Batteries In The Cabinet - Chart 2-10
  - (k) Power And Test The Rectifier - Chart 2-11
  - (l) Install DMS-1 Urban RT Circuit Packs - Chart 2-12
- 2.05 To replace a rectifier in the RT cabinet, follow Chart 3-1 in this practice.

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**Chart 2-1  
PREPARE THE CABINET MOUNTING PAD**

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*Note:*

- 1) Construction of the pad, and the lateral spacing of the cabinet mounting studs and cable conduits are facilitated by use of the anchor assembly. Refer to 363-2051-150 for ordering information.
- 2) The NT4A19 CM pad-mount kit must be installed above local flooding levels.

**TOOLS REQUIRED:**

- Hammer
- Spirit Level

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**STEP PROCEDURE**

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*Note:* Refer to Figs. 2-1 through 2-3 for dimensions and layout.

- 1 (a) **Excavated Pad Application.** For excavated pads, locate and excavate a hole for the pad and cable conduits. The recommended pad dimensions in heavy front areas are 46 in. (168 mm) long by 24 in. (610 mm) wide by 60 in. (1525 mm) deep. When the excavation is specified by local construction codes, the minimum depth recommended is 12 in. (305 mm).  
  
(b) **Floating Pad Application.** The floating pad arrangement is suitable where the conditions listed below apply, however, final design responsibility rests with the operating company, particularly regarding local codes and requirements.
  - 1) Soil conditions must be such that the weight of the cabinet and concrete pad can be supported.
  - 2) The pad should be used in areas free of heaving due to frost.
  - 3) The pad should be re-inforced with steel rods to prevent cracking and loss of retention for the anchor bolts.The recommended size of the floating pad is 10 in. (254 mm) thick with a front and rear overhang (distance from the cabinet wall to the edge of the pad) of 10 in. (254 mm). The side overhang should be 2 in. (508 mm) minimum.
- 2 Place the form and level in as required by the site plans.
- 3 Assemble the anchor assembly.

The assembly consists of a 12-gauge galvanized steel plate, four 1/2 in. (13 mm) anchoring bolts, two temporary angle supports, and plastic caps to protect the bolts. Install the angle supports on top of the anchor plate using the anchoring bolts (see Fig. 2-3)

Chart Continued

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PRACTICE 640-2151-201

Chart 2-1 Continued  
PREPARE THE CABINET MOUNTING PAD

---

STEP PROCEDURE

---

- 4 Level the top of the form, then place the anchor plate assembly on top of the form and secure it in place by nailing the angles to the form. Use the plastic caps provided to protect the anchor bolt threads. Ensure that the front of the anchor assembly is placed to coincide with the front door side of the cabinet (see Fig. 2-1).
  - 5 Position the cable ducts through the conduit template openings at the rear center of the anchor assembly. The 1.5 in. (38 mm) hole is provided for the ground wire conduit, while the 2.5 in. (64 mm) hole is used for the ac supply conduit. The two 4.5 in. (115 mm) openings are for outside plant conduits, and the remaining hole (3.8 in. (97 mm)) is spare. Conduits should extend 1 to 2 in. (24 to 51 mm) above the anchor assembly and should be plugged to prevent concrete from entering the conduit.
  - 6 Pour the pad concrete through the large openings at each end of the anchor assembly. The mix should be 25 MPa of type 10 Portland cement, 6 to 7 percent air entrainment with a maximum coarse aggregate (stone) size of 3/4 in. (20 mm) and 50 to 100 mm slump. For floating pads, the following constraints also apply:
    - solid conditions should be able to support the weight of the cabinet and pad
    - the area must be free of heaving due to frost
    - steel re-inforcement should be provided to prevent cracking of the pad and subsequent loss of the anchors.
  - 7 Before the concrete sets, check the leveling with a spirit level. Once the concrete begins to set, wash off the residue from the top of the anchor plate.
- 

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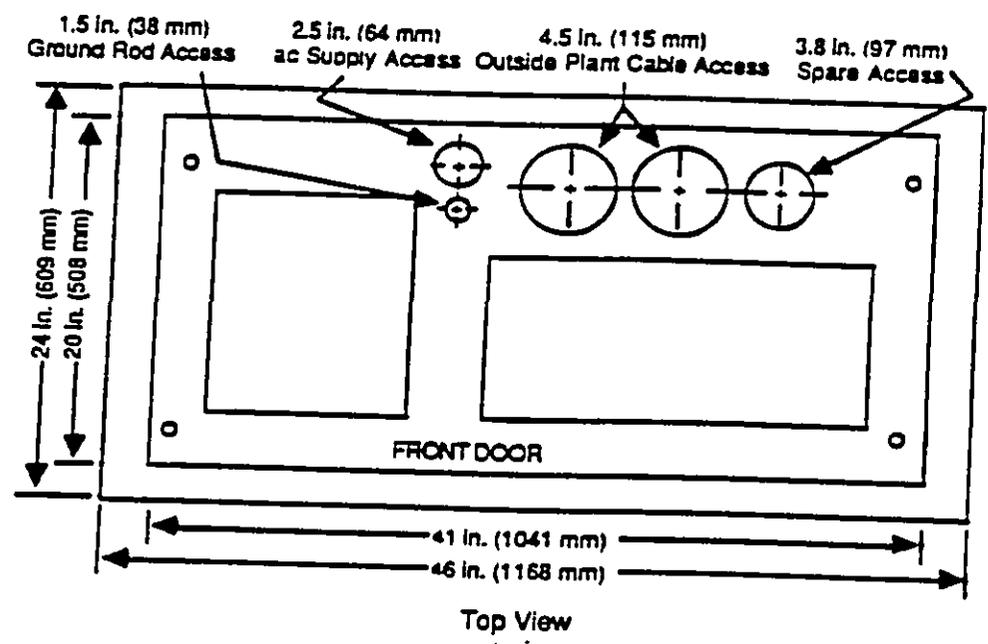


Fig. 2-1  
Typical Pad Dimensions And Anchor Assembly

640-2151-200  
Fig. 2-2  
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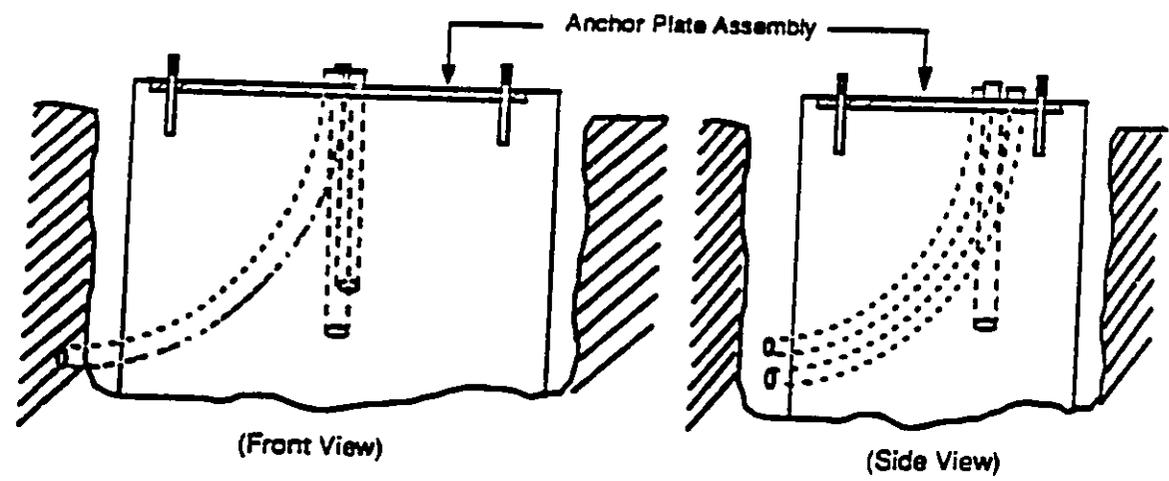


Fig. 2-2  
Typical Anchor Assembly Installation

PRACTICE 640-2151-201

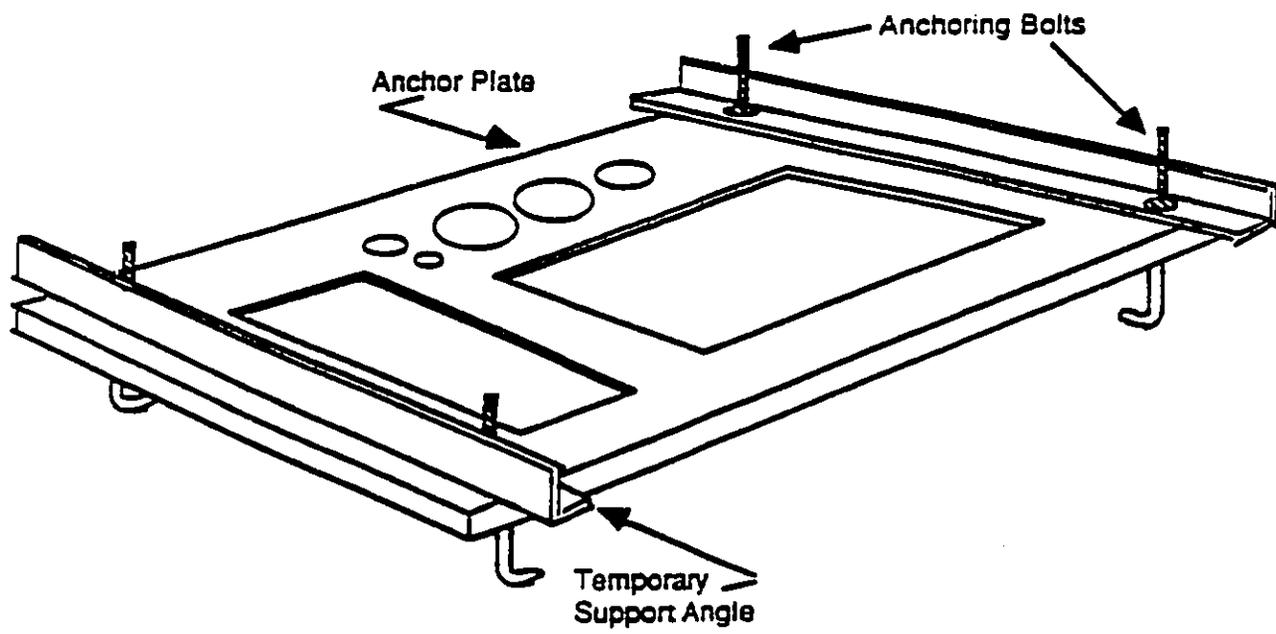


Fig. 2-3  
Typical Anchor Assembly

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**Chart 2-2**  
**INSTALL THE POLE-MOUNT KIT**

**Note:**

- 1) The NT4A19CN pole-mount kit (see Fig. 2-5) must be installed above local flooding levels and away from road hazards on Class 4 or larger poles.
- 2) The pole site should have stable soil conditions to circumvent gradual leaning of the pole. Follow local outside plant practices for permissible pole placement.
- 3) Fig. 2-4 illustrates a pole-mounted 112 Line Cabinet, and Fig. 2-5 shows a top view of the pole-mount kit assembly, excluding the top brace assembly.

**TOOLS REQUIRED:**

- Spirit Level
- Heavy Duty Drill, 1-1/8 in. (28.6 mm) Drill Bit
- Hammer
- Three Wrenches, 2 x 14 in. (356 mm) adjustable, and 3/8 in. (9.5 mm)
- Measuring Tape
- Socket Wrench Set, 5/8 in. (15 mm)

**STEP PROCEDURE**

- 1 Starting from a height of approximately 16 in. (406 mm) from the ground, use the 1-1/8 in. (28.6 mm) drill bit to drill a hole through the pole at a right angle to the front face of the cabinet.
- 2 Position the pole-mount assembly in front of the first hole, and using the 1 in. (25.4 mm) diameter threaded rod, nuts, washers, and lock washer, fasten the assembly to the pole as shown in Fig. 2-6. Leave the extra length of the rod projecting towards the front of the assembly.
- 3 Install a lag bolt through the bottom rear of the assembly and into the pole to keep the assembly from moving (see Fig. 2-8).
- 4 Fasten the side braces onto the back of the assembly (see Fig. 2-7) using the 3/8 in. (9.5 mm) hex bolts and lock washers. Do not fasten the braces to the pole at this point.
- 5 Level the platform of the pole mount assembly by tightening the adjustment assemblies (see Fig. 2-8).

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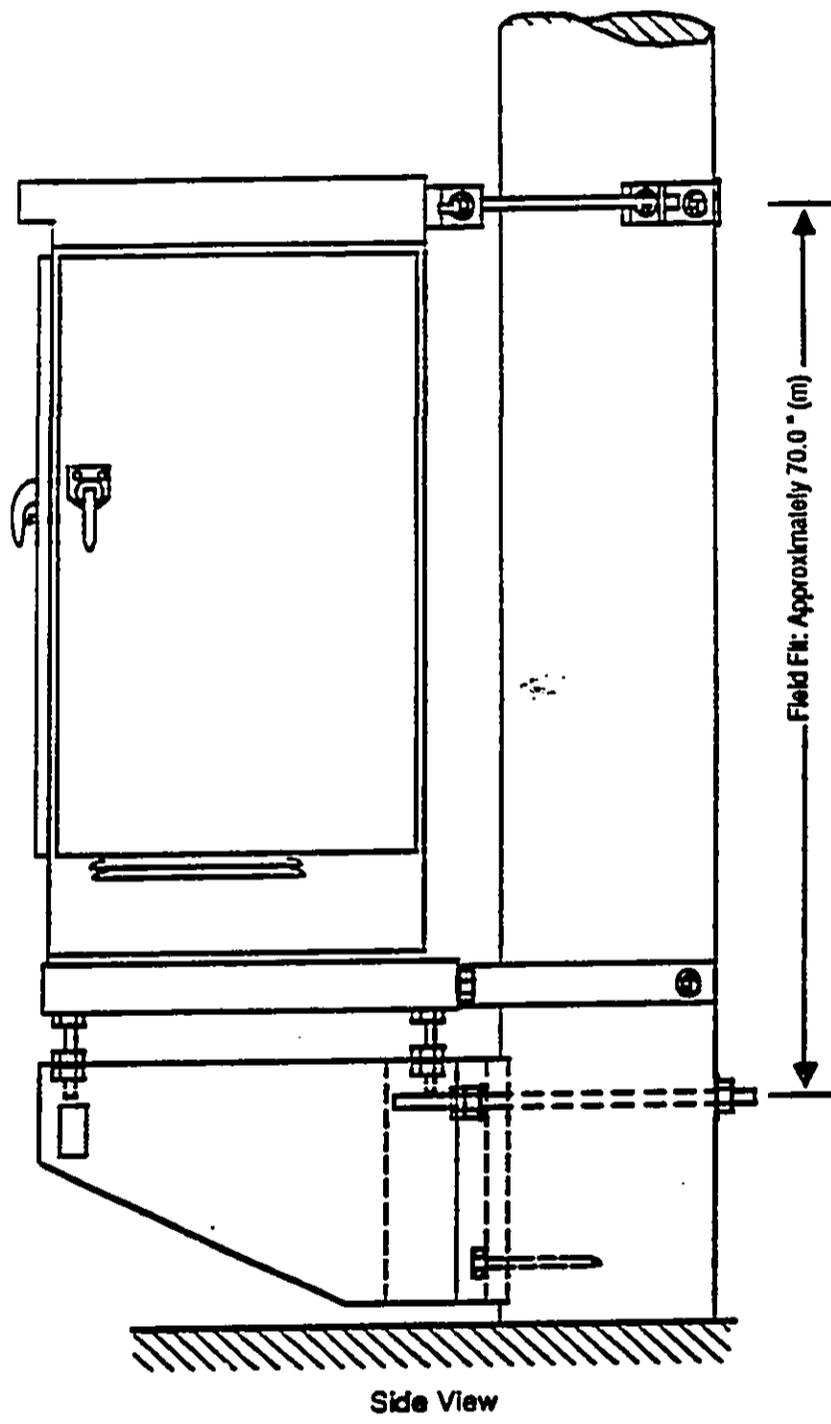


Fig. 2-4  
Pole-Mounted NT4A21AA 112 Line Cabinet

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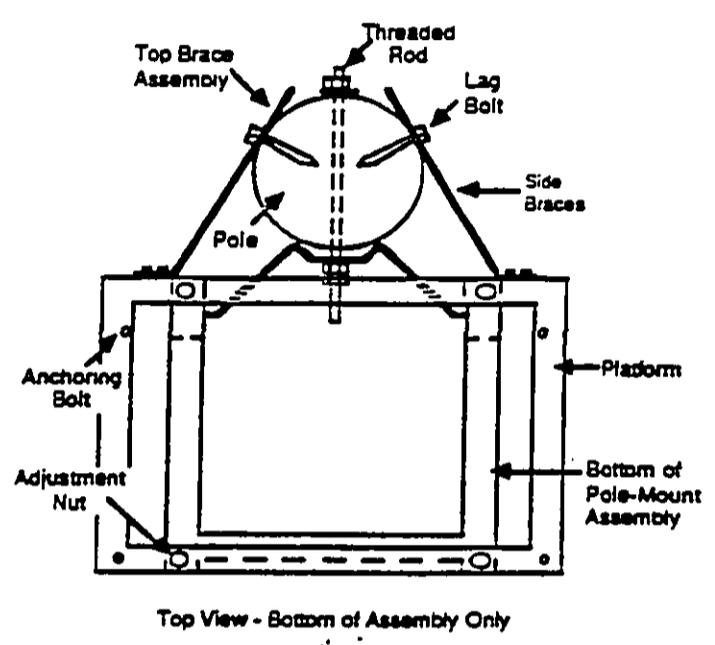


Fig. 2-5  
NT4A19CN Pole-Mount Kit Assembly

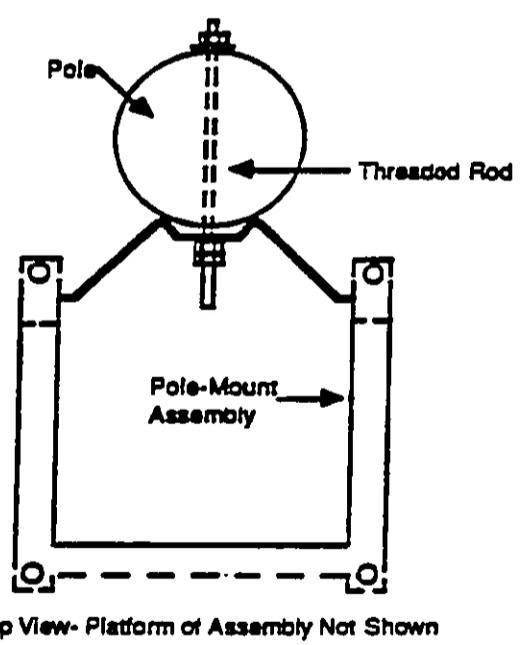


Fig. 2-6  
Attach The Bottom Of The Pole-Mount Assembly To The Pole

PRACTICE 640-2151-201

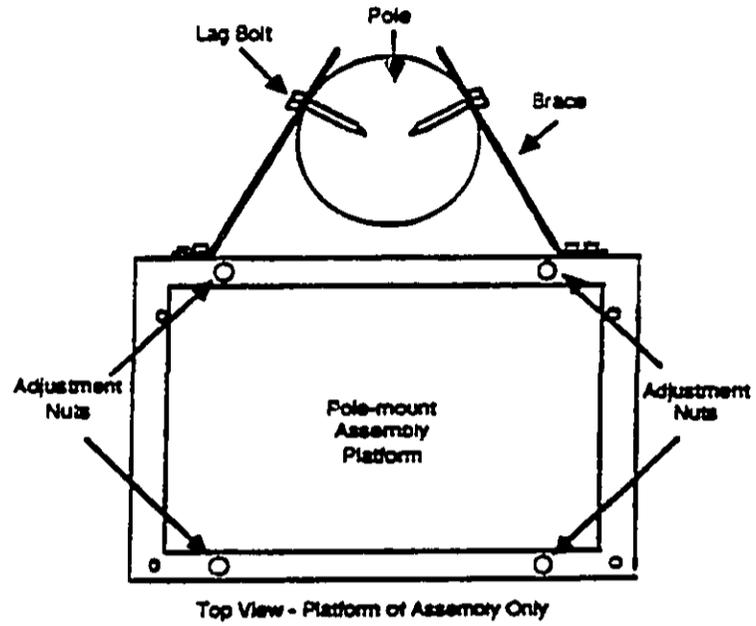


Fig. 2-7  
Attach The Side Braces To The Platform

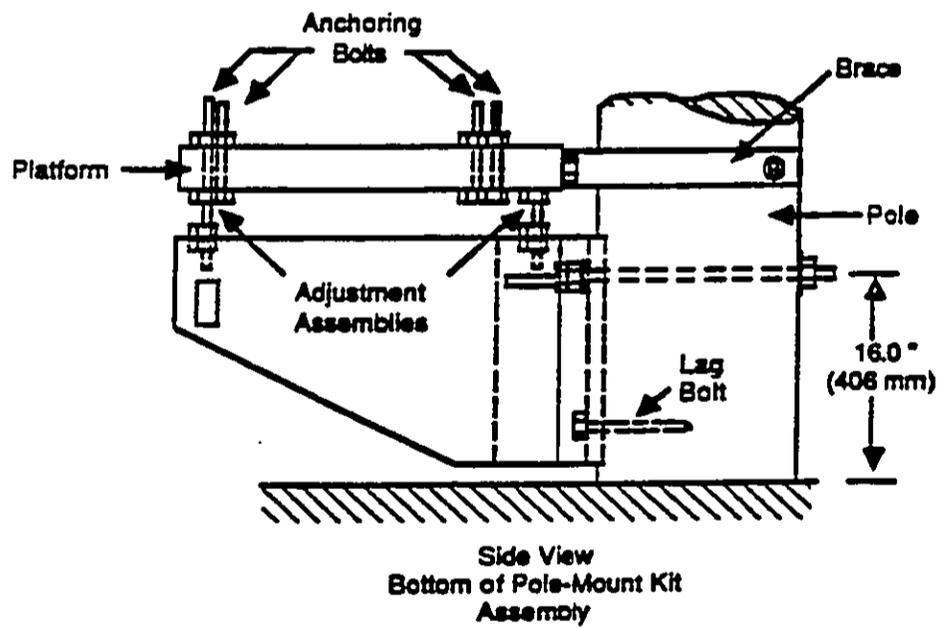


Fig. 2-8  
Level The Platform

Chart 2-3  
INSTALL THE CABINET

---

PRECAUTIONS:

- 1) No circuit packs are to be installed until the cabinet has been firmly secured to its mounting pad, as described in this procedure.
- 2) When the cabinet is not secured on its mounting pad, its stability is greatly reduced. Before opening either of the doors, ensure that the other one is locked. Never open both doors at the same time when the cabinet is not firmly secured to its mounting pad.

**WARNING:** *An unmounted cabinet will become unbalanced and can tip over when the swing frame assembly is opened, or when both doors are opened at once.*

TOOLS REQUIRED:

- Hammer
- Pinch bar, 30 in. (750 mm)
- Tin snips
- Socket wrench set, 5/8 in. (15 mm) square drive
- Screwdriver, 3/8 in. (11 mm)
- Lifting slings
- Heavy duty straps, or ropes, as required

---

STEP PROCEDURE

---

Install The Cabinet

**Caution:** *The shipping bracket holds the bay frame in place. To prevent unbalance of the cabinet, do not remove the shipping bracket until the cabinet is properly secured in position.*

- 1 (a) For a pad-mount installation: cut the conduits which are protruding from the pad so that they are flush with the top surface of the pad.

Remove the plastic caps, nuts, washers and support angles from the anchoring bolts on the mounting pad. Clear the pad of any debris, and ensure that the pad is level.

(b) For a pole-mount installation: remove the nuts and washers from the anchoring bolts on the platform.

- 2 Carefully remove all crating material.

Chart Continued

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PRACTICE 640-2151-201

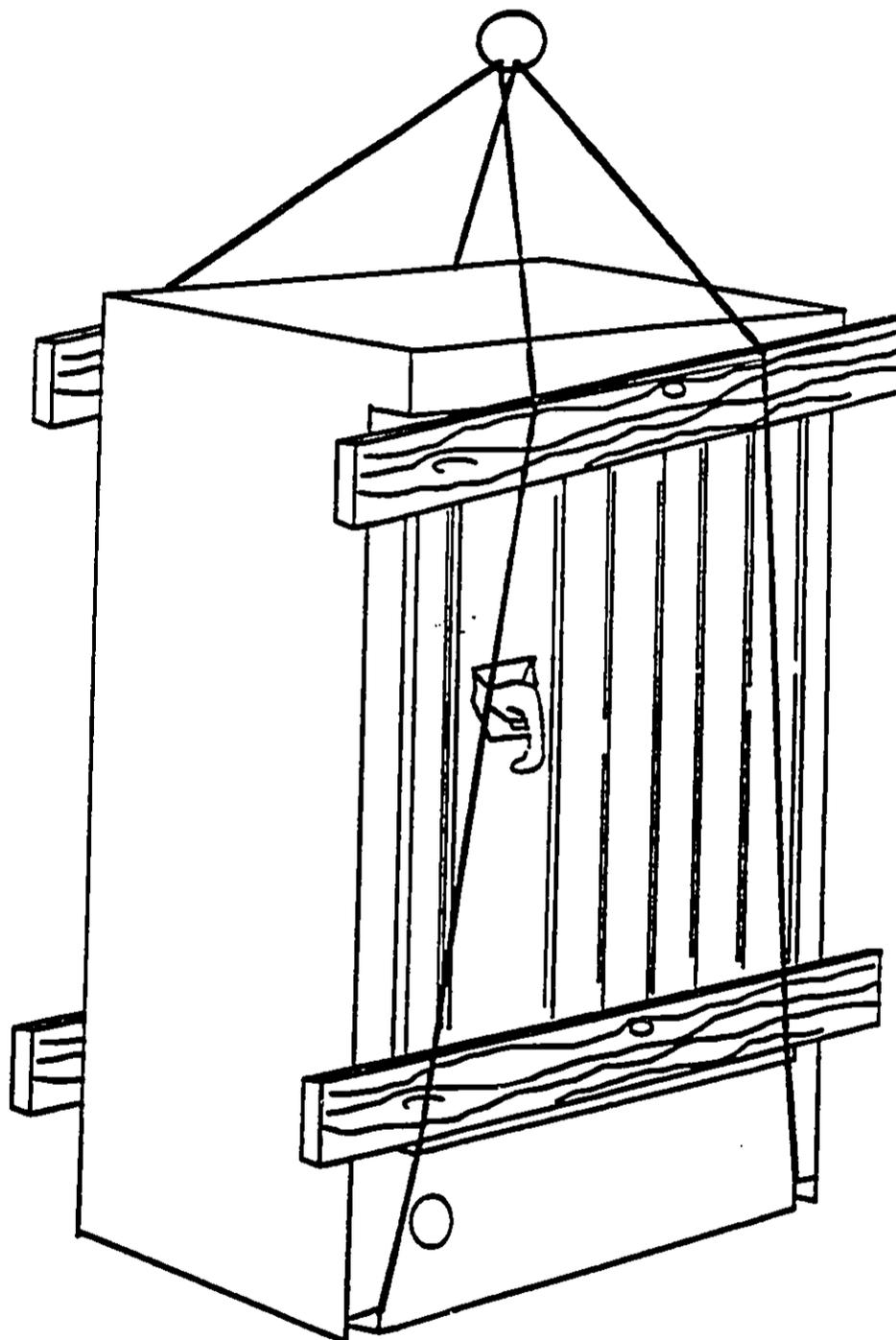
Chart 2-3 Continued  
INSTALL THE CABINET

---

STEP PROCEDURE

---

- 3 Use the packing material from the crate to protect the cabinet's painted finish.
  - 4 When using slings, secure the lifting cables to the recesses at the bottom of the cabinet (see Fig. 2-9). Attach a hoist to the center of the cable. Use rope lines around the bottom to guide the cabinet onto the pad or pole-mount platform.
  - 5 With the cabinet doors closed, lift the cabinet with the lifting slings, and lower the cabinet over the anchoring bolts.
  - 6 With the cabinet in place, open the side door and secure the first two anchor bolts using the nuts and washers provided.
  - 7 Open the front door and remove the frame shipping bracket from the cabinet interior.
  - 8 Open the equipment frame and attach it to the door using the securing bar mechanism (frame hook), which is located at the top of the door.
  - 9 Disconnect the ground wire that leads to the battery tray on the left-hand side, then remove the battery tray from the bottom of the cabinet.
  - 10 Install and tighten the nuts and washers on the remaining anchoring bolts.
  - 11 Place the battery tray back into the bottom of the cabinet, and reconnect the ground wire so that it leads to the battery tray on the left-hand side.
  - 12 For a pad-mount installation: seal around the conduit entrances and cables, using plug compound or equivalent.
  - 13 For a pole-mount installation: fasten the braces on the platform to the pole by installing one lag bolt through each brace (see Fig. 2-7) into the pole.
  - 14 Locate the top brace assembly and the associated threaded rods, washers, and lock washers. Attach one end of each of the threaded rods to the pole brace, then attach the assembly to the corresponding brackets at the top rear of the cabinet (see Fig. 2-10). Do not tighten the assembly at this point.
  - 15 If necessary, cut the threaded rods to permit installation of the lag bolts (see Fig. 2-10).
  - 16 Install a lag bolt through either side of the pole brace (see Fig. 2-10) to hold the assembly in position.
  - 17 Tighten the assembly a little at a time, alternating from side to side to ensure that tension is applied evenly across the back of the cabinet. Continue tightening the assembly until the cabinet is held securely in place.
-

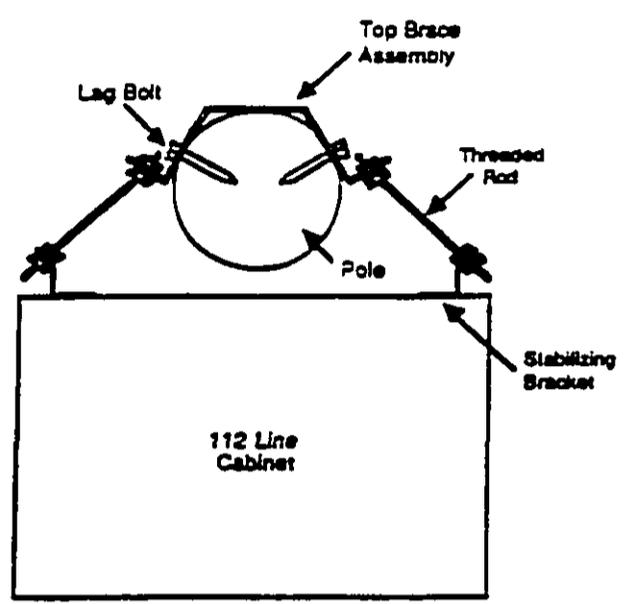


**Fig. 2-9**  
**Suggested Lifting Method For The DMS-1 Urban 112 Line RT Cabinet**

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Top View - Bottom of Pole-Mount Assembly Not Shown

Fig. 2-10  
Top Brace Assembly

Chart 2-4  
INSTALL CABINET ENTRANCE CABLES

*Note:* All cables enter through conduits at the rear of the cabinet base. The 1.5 in. (38 mm) hole is provided for the ground rod conduit; the 2.5 in. (64 mm) hole is used for the ac supply conduit; and the 4.5 in. (115 mm) holes are for the outside plant conduits. The remaining hole is spare.

TOOLS REQUIRED:

- Socket Wrench Set, 5/8 in. (15 mm)
- Long Nose Pliers
- QCM2A Bond Clamp - one for each outside plant cable
- Heat Shrink Tubing and Sealing Tape (for pole-mount installations only)

STEP PROCEDURE

- 1 Remove the lower and middle cable trough covers, and the aluminum disks from only those cable ports to be used.
- 2 Pull the distribution cables into the cabinet, leaving a length of approximately 8 ft. (2.5 m) free for routing.
- 3 Remove the cable sheaths to within 3 in. (75 mm) of the cable entrances.
- 4 Route the cables at the bottom of the cabinet through the hole provided at the bottom of the divider wall, and up into the crossconnect compartment (see Fig. 2-11). Secure the cable with tie wraps.
- 5 Seal around the cables and the rubber boot (in the crossconnect compartment) using tie wraps. Plug compound (optional) may also be used.
- 6 Install QCM2A bond clamps on each outside cable, route the wires inside the rear cable trough, and connect the grounding wires from the clamps to positions G6 and G7 on the cabinet ground bar (see Fig. 2-12).

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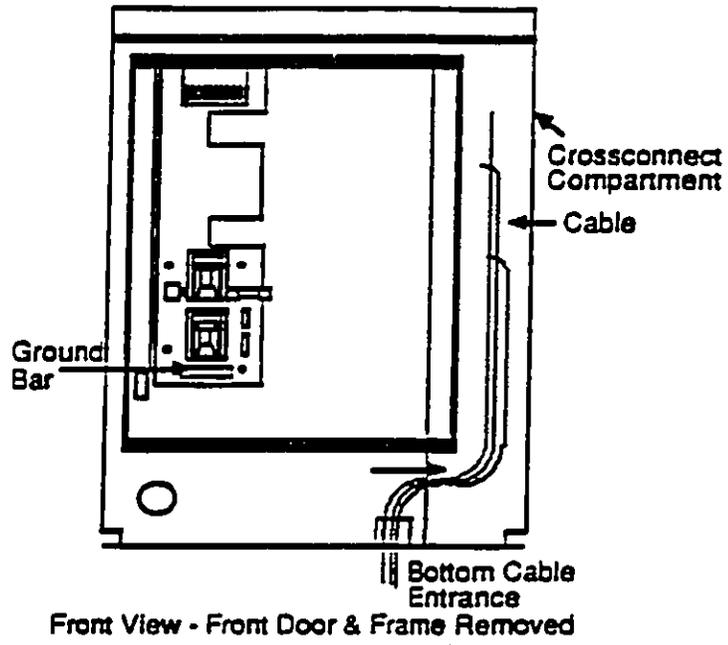


Fig. 2-11  
Cable Routing

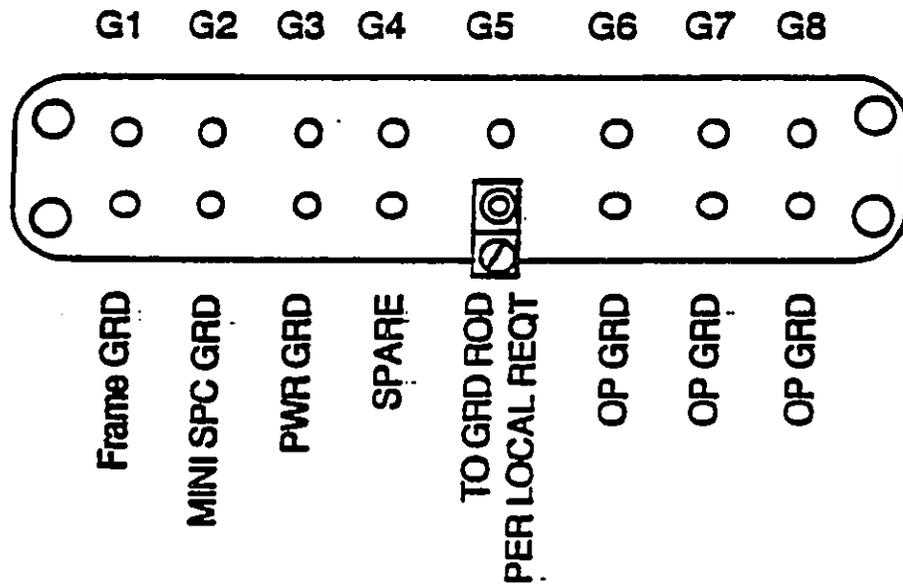


Fig. 2-12  
Ground Bar Connections

**Chart 2-5**  
**CONNECT COMMERCIAL POWER FOR THE CABINET**

---

**TOOLS REQUIRED:**

- Screwdriver, flat blade
  - Socket Wrench, 7/16 in. (11 mm)
  - Freon applicator
- 

**STEP PROCEDURE**

---

*Caution: The procedures listed in this chart should be done by a qualified electrician.*

- 1 Run a # 6 tinned copper wire from position G5 on the ground bar (Fig. 2-12) to the ground rod (in accordance with local codes).

*Note: The ground to earth resistance should be 25  $\Omega$  (maximum)*

- 2 Turn off the circuit breakers on the ac control unit, on the ac service panel (CB1) and on the emergency service panel (CB2).
- 3 Remove the cover from the ac service panel to expose the circuit breaker (see Fig. 2-13).
- 4 Terminate the ac power cable (# 6 gauge) on the ac service circuit breaker (CB1).

*Note: If the optional emergency generator is available, see Fig. 2-14 for wiring information.*

- 5 Switch on the circuit breakers and verify that power is active at the rectifier outlet, and at the service outlet (see Fig. 2-15).
- 6 Refer to Fig. 1-2 for the location of the temperature sensors, and spray the area around the low temperature sensor with freon.

*Note: The heater outlet is not activated at temperatures above 12° C (53.6° F).*

Verify that power is active at both heater outlets (see Fig. 2-15).

- 7 If emergency power is required, ensure that the emergency power is active.
-

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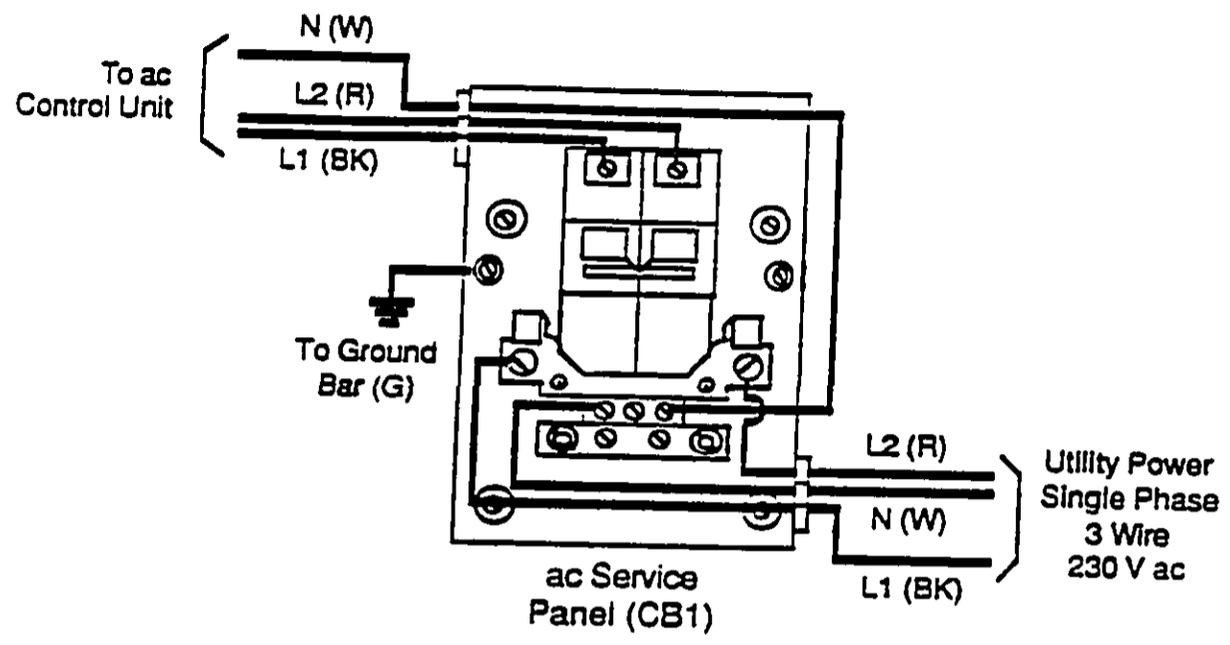


Fig. 2-13  
Ac Supply Wiring

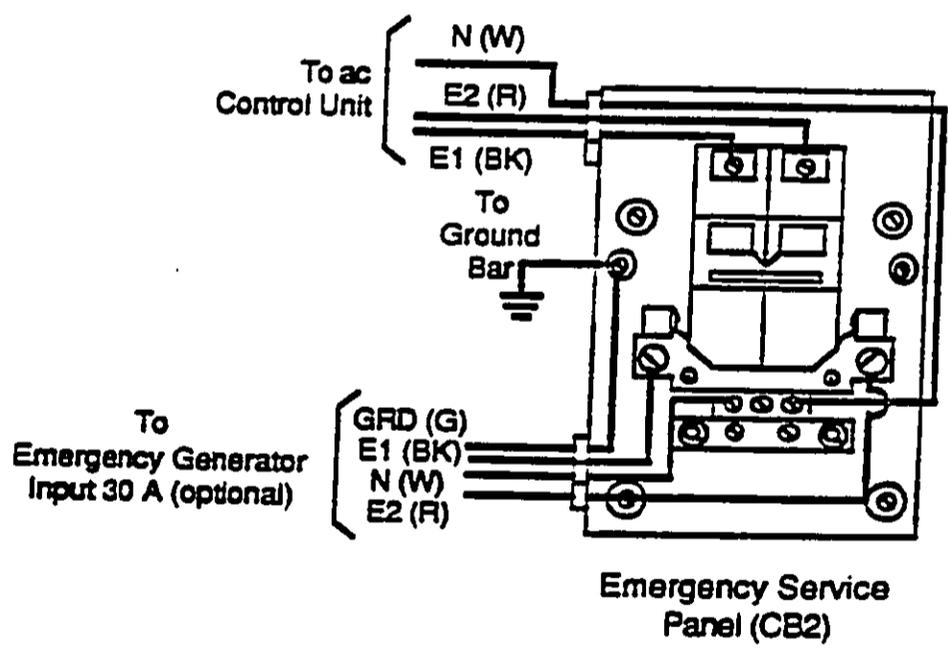


Fig. 2-14  
Wiring For Emergency Service Panel

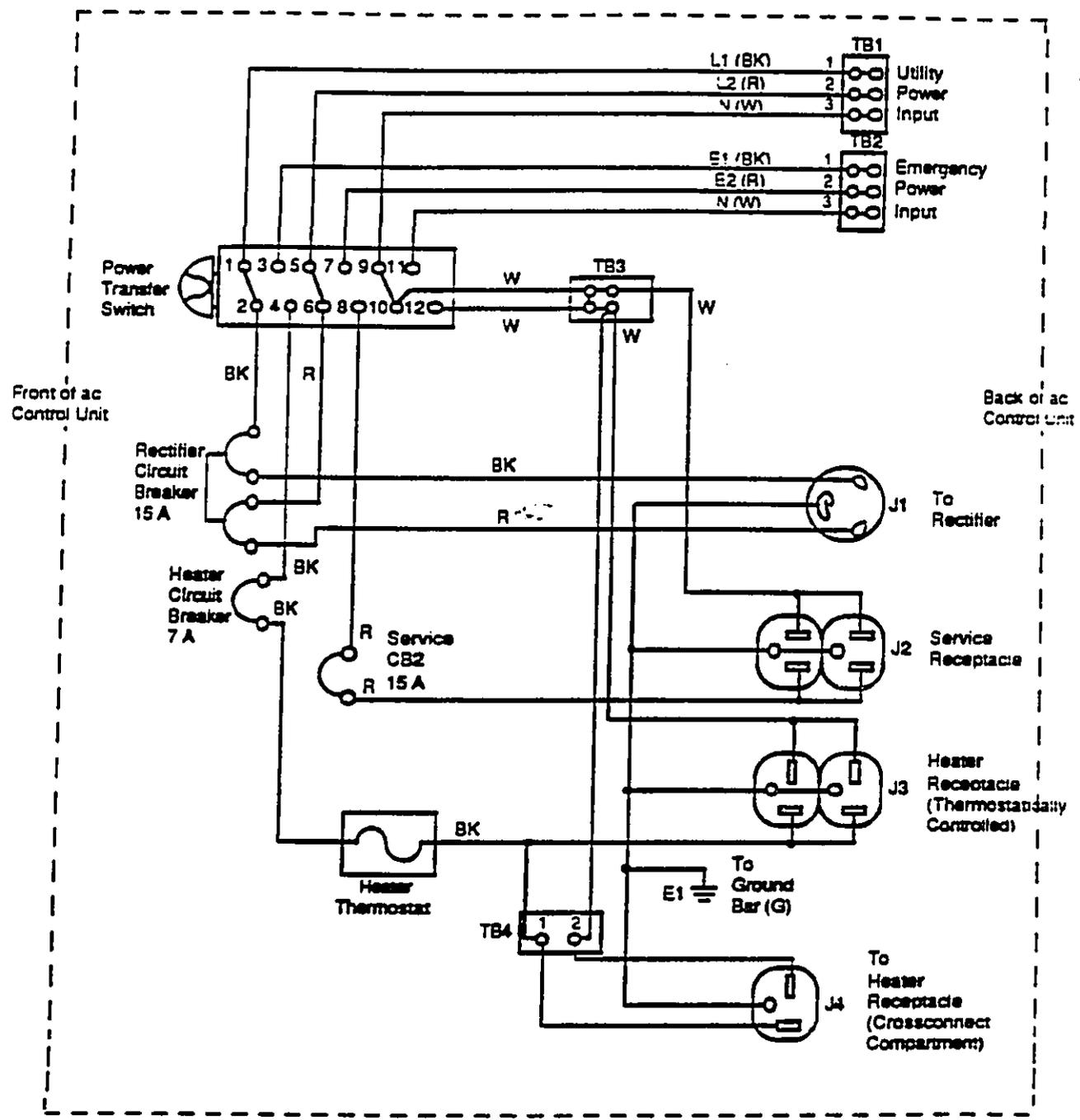


Fig. 2-15  
NT4A24AA Ac Control Unit Wiring

PRACTICE 640-2151-201

Chart 2-6  
CONNECT THE VF CABLE PAIRS TO BIX CONNECTORS

---

*Note:* For additional protection, the operating company may wish to install a fuse-link cable, as shown in Fig. 2-16.

TOOLS REQUIRED:

- QTBIX17A Connection Tool
- Wire Cutter
- Wire Stripper

---

STEP PROCEDURE

---

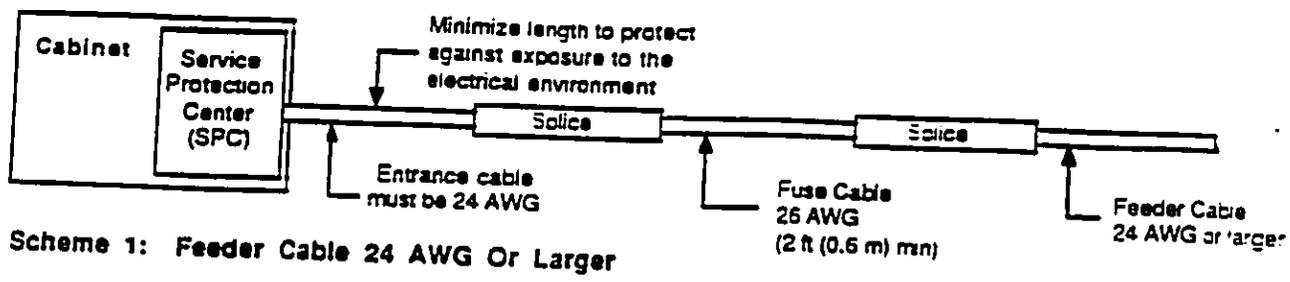
Terminating VF Pairs

*Note:* The normal procedure for terminating VF pairs on a BIX connector is to work from the top (connector 1, circuits 1 through 25) to the bottom (connector 5, circuits 101 through 125).

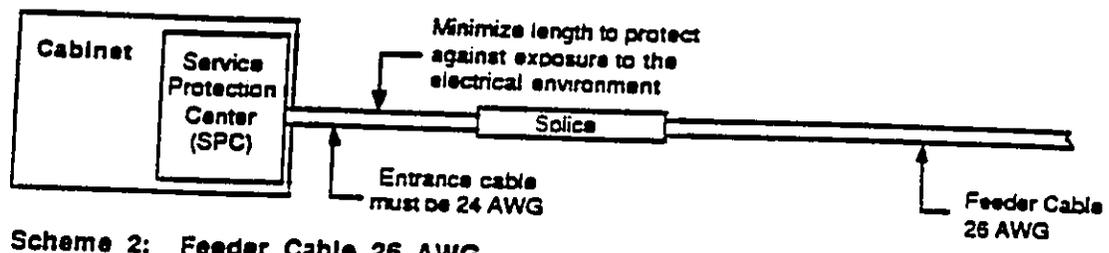
- 1 Divide the VF distribution cable into 25-pair binders, as shown in Table 2-A and Fig. 2-17.
- 2 Run each binder in its proper sequence (see Note above) and tie-wrap each binder on the wall panel to the right of the Service Protection Center (SPC). Tie down the unused pairs for future use.
- 3 Fan the cable pairs below each connector.

*Caution:* The QTBIX17A tool is used to connect each wire to the BIX connector and to trim off the excess. Ensure that the cutting edge is on the appropriate side. A button on the handle selects either the "Cut" or "No Cut" position.

- 4 Using a QTBIX17A tool (black blade down), terminate the cable pairs to each connector as detailed in Table 2-B.
-



Scheme 1: Feeder Cable 24 AWG Or Larger



Scheme 2: Feeder Cable 26 AWG

Fig. 2-16  
Fuse Cable

Table 2-A  
VF CABLE BINDER ASSIGNMENTS

Binder	Pair Count	Color of Bindings
1	1 through 25	White-Blue
2	26 through 50	White-Orange
3	51 through 75	White-Green
4	76 through 100	White-Brown
5	101 through 125	White-Slate

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Table 2-B  
VF CABLE BINDER PAIR ASSIGNMENTS

Pair No.	Tip	Ring	Pair No.	Tip	Ring
1	White	Blue	14	Black	Brown
2	White	Orange	15	Black	Slate
3	White	Green	16	Yellow	Blue
4	White	Brown	17	Yellow	Orange
5	White	Slate	18	Yellow	Green
6	Red	Blue	19	Yellow	Brown
7	Red	Orange	20	Yellow	Slate
8	Red	Green	21	Violet	Blue
9	Red	Brown	22	Violet	Orange
10	Red	Slate	23	Violet	Green
11	Black	Blue	24	Violet	Brown
12	Black	Orange	25	Violet	Slate
13	Black	Green			

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PRACTICE 640-2151-201

Chart 2-7  
CONNECT THE VF CABLE PAIRS TO 710 CONNECTORS

---

*Note:* For additional protection, the operating company may wish to install a fuse-link cable, as shown in Fig. 2-16.

TOOLS REQUIRED:

- 890A Connection Tool.
  - L Connector Compressor
  - Wire Cutter
  - Wire Stripper
- 

STEP PROCEDURE

---

*Note:* The normal procedure for terminating VF pairs on 710 connectors is to work from the top (connector 1, circuits 1 through 25) to the bottom (connector 5, circuits 101 through 125).

- 1 Remove each 710 connector from its position to allow access to the tie-wrapping points: pull on both side brackets while depressing the catches at the same time. Provide temporary support to the 710 cable assemblies as required.
  - 2 Divide the VF distribution cable into 25-pair binders, as shown in Table 2-A and Fig. 2-17.
  - 3 Run each binder in its proper sequence (see Note above) and tie-wrap each binder on the wall panel to the right of the Service Protection Center (SPC).
  - 4 Using tie-wraps, attach each binder to the corresponding 710 cable assembly near the bottom of the wall.
  - 5 Starting from the top, terminate each binder to the corresponding 710 connector, as detailed in Table 2-B. Ensure that sufficient length is provided to return the connector assemblies to their original positions.
  - 6 Return the 710 connector assemblies to their respective positions using the same side brackets as before.
  - 7 Arrange the cable loops in an orderly manner behind the connectors.
- 

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**Chart 2-8**  
**CONNECT THE VF CABLE PAIRS TO 3M CONNECTORS**

---

*Note:* For additional protection, the operating company may wish to install a fuse-link cable, as shown in Fig. 2-16.

**TOOLS REQUIRED:**

- 40ZOM Splicing rig
  - Wire cutter/stripper
- 

**STEP PROCEDURE**

---

*Note:* The normal procedure for terminating VF pairs on 3M connectors is to work from the top (connector 1, circuits 1 through 25) to the bottom (connector 5, circuits 101 through 125).

- 1 Remove each 3M connector from its position to allow access to the tie-wrapping points. Provide temporary support to the 3M cable assemblies as required.
  - 2 Divide the VF distribution cable into 25-pair binders, as shown in Table 2-A and Fig. 2-17.
  - 3 Run each binder in its proper sequence (see Note above) and tie-wrap each binder on the wall panel to the right of and below the Service Protection Center (SPC).
  - 4 Using tie-wraps, attach each binder to the corresponding 3M cable assembly near the bottom of the wall.
  - 5 Starting from the top, terminate each binder to the corresponding 3M connector, as detailed in Table 2-B. Ensure that sufficient length is provided to return the connector assemblies to their original positions.
  - 6 Return the 3M connector assemblies to their respective positions.
  - 7 Arrange the cable loops in an orderly manner behind the connectors.
-

## PRACTICE 640-2151-201

Chart 2-9  
TERMINATE THE DS1 AND MAINTENANCE PAIRS

*Note:* The DS1 and maintenance pairs include the following:

- 2 PCM Transmit Pairs
- 2 PCM Receive Pairs
- 2 Fault-locate Pairs
- 1 Order-wire Pair
- 1 (optional) Metallic Test Access (MTA) Pair

## STEP PROCEDURE

## Terminating DS1 and Maintenance Pairs

- 1 Identify the individual DS1 pairs in the entrance cable.
- 2 DS1, maintenance, and other miscellaneous pairs should be terminated on connectors 5 and 6. Follow the same basic procedure as that for the VF-pair terminations (Chart 2-6). See Fig. 2-18 for DS1 and maintenance pair assignments.

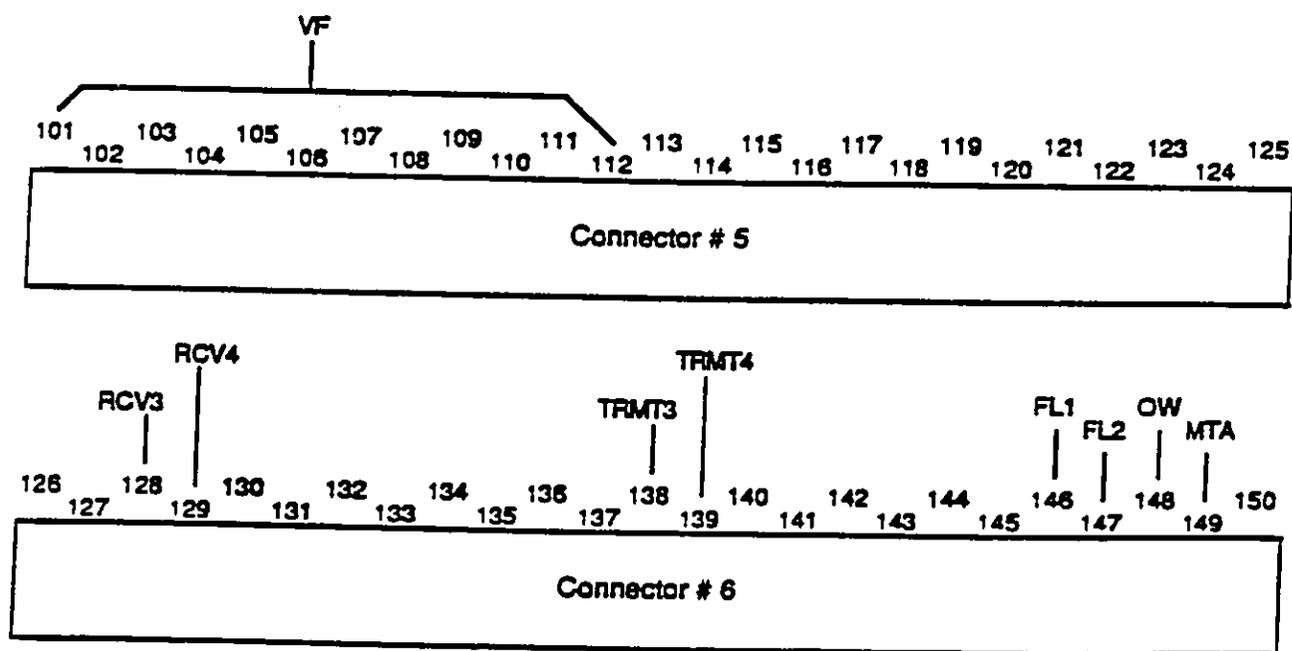


Fig. 2-18  
DS1, Maintenance and Miscellaneous Pair Assignments

**Chart 2-10  
INSTALL BATTERIES IN THE CABINET****Note:**

- 1) Use this procedure to install sealed lead-acid batteries in the cabinet either.
  - during initial installation of the cabinet, or
  - to add battery sets to a cabinet.
- 2) Before removing batteries, always disconnect the battery cable from the NT4A25AA dc control unit, which is located on the rear wall of the cabinet, behind the equipment frame.
- 3) The rectifier can be used in battery-less operation.
- 4) Battery packs may not be replaced on an individual basis. When one or more battery packs in the same set fail, replace ALL packs in that set.

**TOOLS REQUIRED:**

- Voltmeter

**STEP PROCEDURE**

**Note:** Repeat Steps 1 and 2 for each battery pack before continuing with Step 3.

- 1 Measure the voltage between the terminals of the battery pack.

**Requirement:** Voltage readings must be more than 11 Vdc on each battery pack.

Replace any battery pack which does not meet the requirement.

- 2 Install the battery sets (four battery packs per set) in the location corresponding to the battery set numbers shown in Fig. 2-19. Battery sets 1 and 2 are placed at the bottom of the cabinet; sets 3 and 4 are mounted above sets 1 and 2.

**Caution:** To avoid current inrush from one battery set, always turn the rectifier on before connecting the first (or removing the last) dc supply cable assembly to the dc unit.

- 3 Connect the battery set installed in Step 2 to the connectorized cable assembly. Each cable assembly is numbered from 1 to 4. See Fig. 2-20 for terminal block connections.

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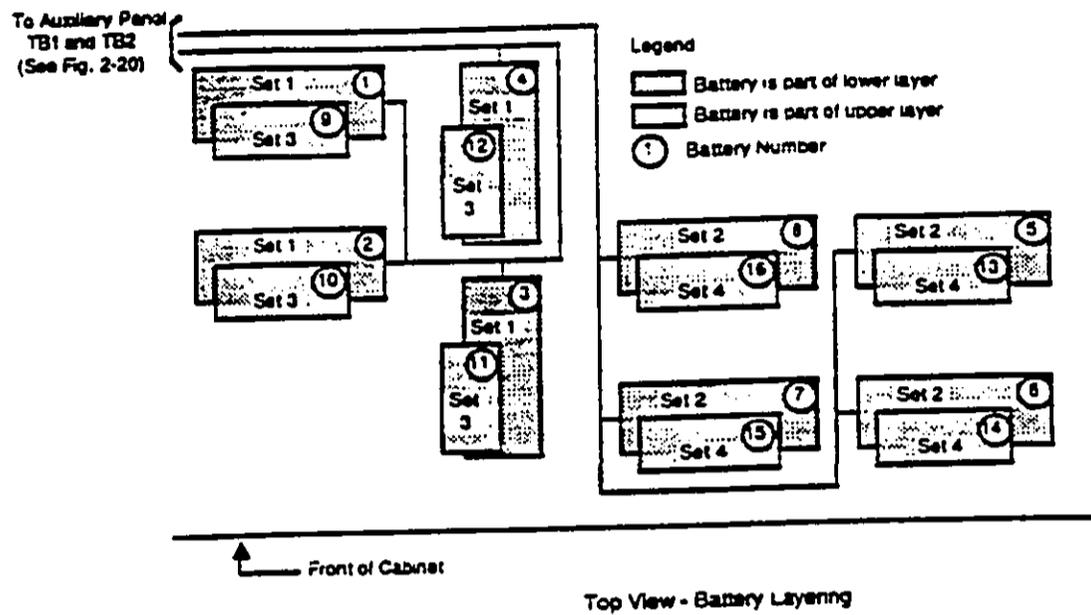


Fig. 2-19  
Battery Layout

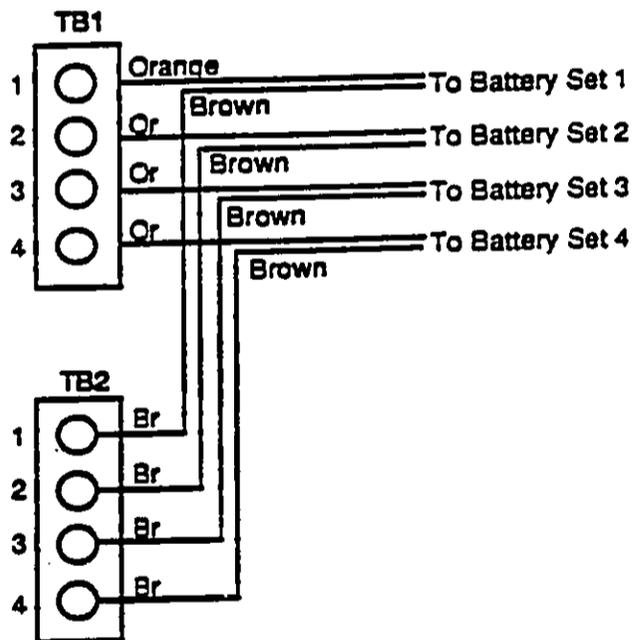


Fig. 2-20  
NT4A23AA Auxiliary Panel

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Chart 2-11  
POWER AND TEST THE RECTIFIER

STEP PROCEDURE

- 1 Check the ac service receptacle to ensure that 230 Vac is being supplied to the cabinet.
- 2 Switch the ac circuit breaker (CBI) on the ac service panel into the ON position.
- 3 Switch the RECTIFIER circuit breaker on the ac control unit into the ON position.
- 4 Measure the voltage across the dc output terminals of the rectifier (+ and - on TB3, Fig. 2-21), and adjust the voltage adjust (VOLT ADJ) control clockwise to obtain a reading of - 56 Vdc  $\pm$  0.1 V.
- 5 Switch the RECTIFIER circuit breaker on the ac control unit into the OFF position.

Requirement: More than 52 V (battery voltage) can be measured across the terminals of TB3.

- 6 Switch the RECTIFIER circuit breaker on the ac control unit into the ON position. The DMS-1 Urban system is now ready to be powered from the rectifier.

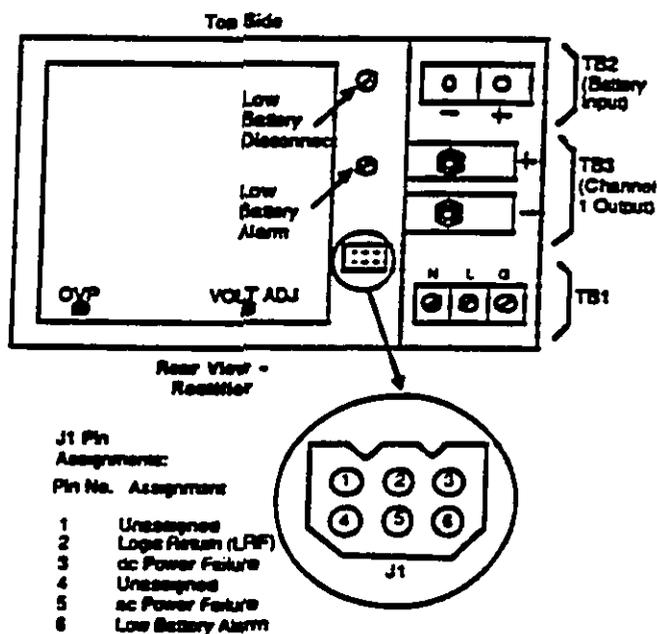


Fig. 2-21  
NPS 50148 - 48 V/25 A Switching Mode Rectifier

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Chart 2-12  
INSTALL DMS-1 URBAN RT CIRCUIT PACKS

---

*Caution:*

- 1) *Ensure that the actuator thermostat is set at 30° C (86° F) before installing circuit packs.*
  - 2) *Ensure that all fans in the NT4A26AA fan unit are working.*
  - 3) *Read the circuit pack storage and handling precautions in 363-2051-201, DP 2100.*
- 

**STEP PROCEDURE**

---

- 1 Install the RT circuit packs on the cabinet shelves by following the procedures from 363-2051-201 in the sequence listed below:
  - (a) Install or Replace Talk Battery Filters - DP 2101.
  - (b) Install or Replace The Power Converters - DP 2102.
  - (c) Install or Replace the Common Circuit Packs - DP 2103.
  - (d) Install or Replace the Ring Generator - DP 2104.
  - (e) Install or Replace the DMS-1 Urban Line Card and Line Card Carrier Circuit Packs - DP 2105.

*Note:* As described in DP 2103 and DP 2105, cabinet ambient temperature stabilization is required before common equipment and line card carriers are installed.

- 2 Once The RT circuit packs are installed, test the system operation by following the procedures in 363-2051-202.
-

### 3. CABINET MAINTENANCE

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3.01 All maintenance operations on the cabinet are performed by the operating company's maintenance crews, or by contractor personnel.

3.02 Whenever maintenance or other work is to be done, it is recommended that a tent, or a similar cover, be used if the cabinet is to be opened for an extended period, particularly during bad weather.

3.03 Table 3-A outlines which cabinet parts require regular maintenance, and when these operations should be performed. Fig. 3-1 shows the cabinet alarm pin-outs and assignments.

3.04 To replace the rectifier, refer to Chart 3-1.

3.05 See 363-2051-150 to order spare parts for the cabinet.

Table 3-A  
RECOMMENDED MAINTENANCE FOR THE 112 LINE RT CABINET

Item	Operation	Recommended Interval
Air Filters & Fans	<p>Air filters are located below the side door and behind the air baffle at the top of the cabinet.</p> <p><b>Caution:</b> Before accessing the exhaust filters, lower the temperature of the actuator thermostat as far as possible (this action ensures that the baffle is fully open). Remove the actuator fuse (F2) to prevent accidental closing of the baffle.</p> <p>The two options are:            (a) Clean the filters, and            (b) Replace the filters</p>	<p>(a) 6 months, or as required            (b) 2 years, or as required</p> <p><b>Recommendation:</b>            Inspect the filters 30 days after installation to determine the future inspection frequency required.</p>

Table Continued

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Table 3-A Continued  
 RECOMMENDED MAINTENANCE FOR THE 112 LINE RT CABINET

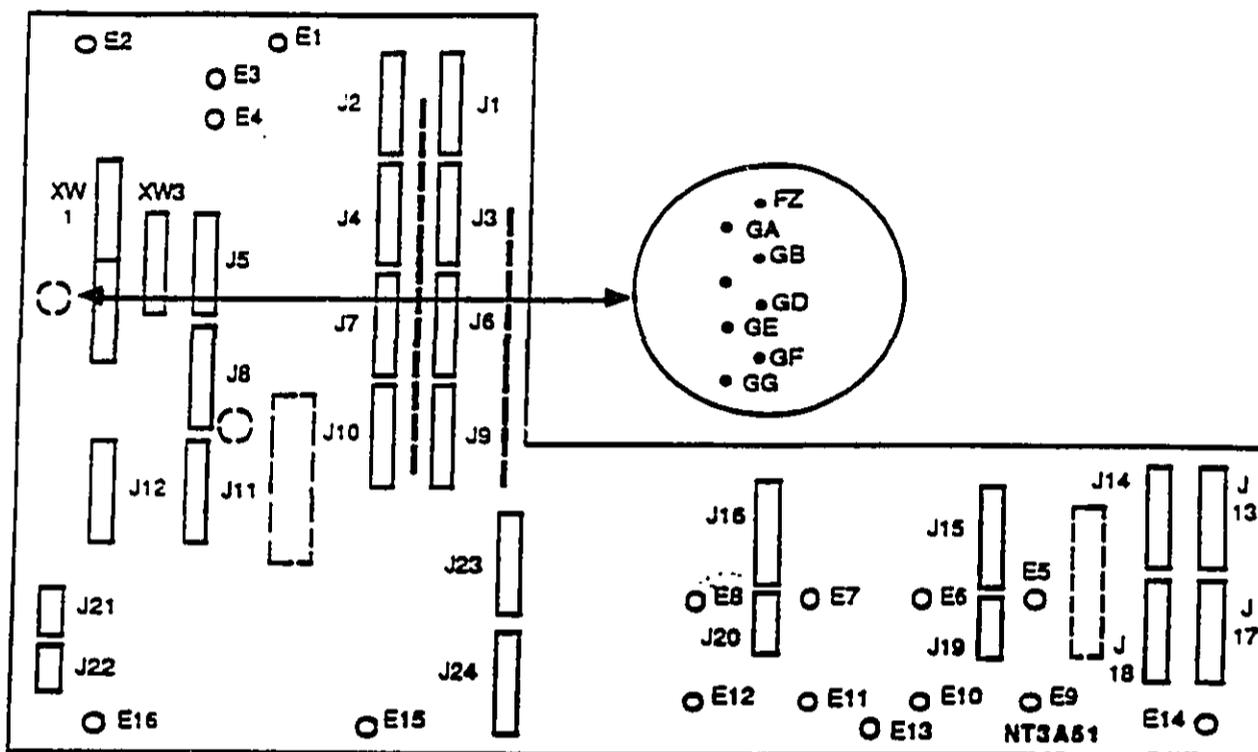
Item	Operation	Recommended Interval
	With the baffle in the opened position and the fan fuses installed.	12 months
	1) monitor the air flow from the intake fans. The air should pass freely from the bottom of the crossconnect compartment into the electronics compartments.	
	2) monitor the air flow from the exhaust fans. The air should be drawn from the top of the frame, and out through the top of the cabinet at the front.	
Heaters and Heater Thermostats	With heaters plugged into their proper receptacles.	12 months
	1) activate the heater thermostats with freon. One heater thermostat is located at the back of the dc control unit, while the other is located above the intake fans in the crossconnect compartment.	
	2) verify that the corresponding heaters are getting warm to the touch. One heater is located on the left-hand side wall; another is underneath the right-hand side of the battery tray; a third heater is located on the wall below the Service Protection Center (SPC).	
Door Alarms	1) Open the front door and verify that a door alarm is displayed on the Maintenance unit (the coded alarm is R1208).	Each visit to the cabinet
	3) Release the door switch and verify that the door alarm is displayed again.	
	4) Pull-out the door switch plunger and check that the alarm is cancelled.	
	5) Repeat Steps 1 through 4 for the side door.	
Batteries	Refer to 363-2051-503 for routine maintenance.	12 months

Table Continued

Page 3-2

Table 3-A Continued  
RECOMMENDED MAINTENANCE FOR THE 112 LINE RT CABINET

Item	Operation	Recommended Interval
Door Hinges	Lubricate.	As required
Paint Finish	Brush or spary with brown polyurethane paint: SICO 585-904, or ivory enamel SICO 586-110.	As required
System Ground	1) Check all system ground connections. 2) Measure the ground resistance according to local approved methods. The ground to earch resistance must be $\leq 25 \Omega$ .	As required by local instructions.
Damper Actuator	1) Set the temperature thermostat to ambient temperasture. 2) Verify that the damper opens to the maximum position. 3) Reset the thermostat to 30° C (86° F).	6 months
Low Temperature Alarm Sensor	The low temperature alarm is located at the lower right-hand corner of the auxiliary panel. 1) Activate the low temperature alarm by spraying the sensor with freon. 2) Verify that the coded alarm R1228 is displayed on the Maintenance unit.	12 months
High Temperature Alarm Sensor	The high temperature sensor is located on the lower right-hand corner of the auxiliary panel. 1) Activate the high temperature alarm by circulating the air (from a hot air gun, for example) in the immediate area of the sensor. 2) Verify that the coded alarm R1228 is displayed on the Maintenance unit.	12 months



**Cabinet Alarms**

Alarm	Pin No.	Return	Code	Definition
Major 1	GD	GA	R1208	Open Door
Major 2	FG	FZ	R1218	Low Voltage
Major 3	GE	GA	R1228	Low/High Temperature
Minor 1	GF	FZ	R1248	Rectifier Failure
Minor 2	FK	GA	R1258	Fan Fuse, Actuator Fuse, or Bypass Breaker Operation
Minor 3	GG	GA	R1268	Order Wire Alarm
Minor 5	GB	FZ	R1288	ac Power Failure

**Fig. 3-1**  
Cabinet Alarm Pin-outs - RT Power Shelf Backplane

**Chart 3-1  
REPLACE THE RECTIFIER****TOOLS REQUIRED:**

- Screwdriver, flat head
- Socket Wrenchs, 3/16 in. (4.8 mm) and 5/16 in. (7.9 mm)

**STEP PROCEDURE****Rectifier Disconnect Procedure**

*Note:* The 112 Line RT Cabinet is equipped with a rectifier bypass switch to connect batteries directly to the equipment. This breaker permits removal without affecting service.

- 1 On the dc control unit, remove the bypass breaker locking bar, then switch the rectifier bypass breaker into the ON position.
- 2 On the NT4A23AA auxiliary panel, switch the ac service breaker (CB1) into the OFF position.
- 3 Switch the RECTIFIER breaker on the ac control unit into the OFF position.

*Caution:* At the rectifier, use a voltmeter to ensure that no dc voltages are present at terminal blocks TB2 and TB3, and that no ac voltages are present at TB1. See Fig. 2-21 for rectifier connections.

*Note:* Be sure to identify and insulate all cable leads as the rectifier connections are removed in the following steps.

- 4 Remove the dc connections from the output terminals (+ and - on TB3).
- 5 Remove the battery connections from the battery terminals (+ and - on TB2).
- 6 Unplug the alarm leads from connector J1 on the rectifier.
- 7 Disconnect the ac supply leads from the ac input terminal (TB1).
- 8 Remove the retaining screws from the rectifier's front cover panel, and remove the rectifier from the frame by sliding the unit carefully towards the front door of the cabinet.

**Rectifier Turn-on and Test Procedure**

- 1 Ensure that Switch S1, located at the rear of the rectifier, is set to the 230 V position.

*Caution:* Do not apply 230 V ac with the rectifier set to 115 V ac. Set the selector switch S1 to 230 V ac before applying ac power.

Chart Continued

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Chart 3-1 Continued  
REPLACE THE RECTIFIER

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STEP PROCEDURE

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- 2 Mount the new rectifier and replace the retaining screws that were removed in Step 8.
- 3 Reconnect the ac supply leads on the ac input terminal (TB1).
- 4 Reconnect the dc leads on the output terminal block (+ and - on TB3).
- 5 Reconnect the battery leads on the battery terminal block (+ and - on TB2).
- 6 Plug-in the alarm leads on connector J1.
- 7 On the NT4A23AA auxiliary panel, switch the ac service breaker (CB1) into the ON position.
- 8 Turn the voltage-adjust (VOLT ADJ) control on the rectifier fully counter-clockwise.
- 9 Switch the RECTIFIER circuit breaker on the ac control unit into the ON position.
- 10 Measure the voltage across the dc output terminals (+ and - on TB3), and adjust the VOLT ADJ control clockwise to obtain a reading of - 56 V dc  $\pm$  0.1 V.
- 11 Switch the rectifier bypass breaker on the dc control unit into the ON position, thus reconnecting the load to the rectifier. Re-install the bypass breaker locking bar.
- 12 Switch the RECTIFIER circuit breaker on the ac control unit into the OFF position.

Requirement: The DMS-1 Urban system should receive power from the batteries.

- 13 Switch the RECTIFIER circuit breaker on the ac control unit into the ON position.

Requirement: The DMS-1 Urban system should receive power from the rectifier.

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