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Millennium Desk terminal:

Installing and repairing terminal hardware

Document number: P0883900 Document issue: 00.01

Document status: Standard Date: June 1998

This document covers all Millennium Desk sets

NORTEL

NORTHERN TELECOM

Millennium terminals installation, operation, and maintenance documentation modules

The table below shows all the customer-orderable books in the terminal installation, operation and maintenance suite. These books can be ordered separately as modules or in sets as documentation kits.

Title	Order code
All terminals	
Millennium terminals provisioning guide	A0685011
Millennium terminals: using the craft interface	P0883893
Millennium terminals: maintenance troubleshooting	P0883894
Millennium terminals pocket troubleshooting guide	P0883895
Multi-pay-based terminals	
Millennium Multi-pay-based terminals: installing terminal hardware	P0883896
Millennium Multi-pay-based terminals: replacing parts	P0883897
Card-based terminals	
Millennium Card-based terminals: installing terminal hardware	P0883898
Millennium Card-based terminals: replacing parts	P0883899
Desk terminals	
Millennium Desk terminals: installing and replacing hardware	P0883900
Also available:	
Accessory kit: binder, cover, and spine	A0737727
Complete assembly kit (one each of all modules)	A0737720
Multi-pay terminal documentation kit	A0737722
Card terminal documentation kit	A0737723
Desk terminal documentation kit	A0737725

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Publication history

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This is the standard release of the *Millennium Desk terminal: installing and repairing terminal hardware*, which contains the installation and maintenance procedures for Millennium Desk terminals.

This new format combines the installation and repair procedures from previous versions of the *Millennium Desk terminal installation, operation, and maintenance guides*.

Craft interface information and troubleshooting information are contained in these modules: *Millennium terminals: using the craft interface,* and *Millennium terminals: maintenance troubleshooting*, respectively.

March 1997

Standard MSR 1.9/2.0 release 01 of this document. This includes a smaller format, reversed polarity on the baseboard wiring, replacement of the wall jack with spade tip connections, improved ESD shielding on the datajack, new control board layout, Inferred Answer Supervision, and Smart Card Alert changes.

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Tables

1 Introduction

This document is intended for the craftsperson who installs Millennium Desk terminals on-site and connects them to the CO line and supplementary. It contains the information you need to install and maintain a Millennium Desk terminal from a hardware perspective.

Types of desk terminals

There are two models of desk terminal, the M1351, which has a mag-stripe card reader, and the M1361, which has a multi-card reader.

There are several versions of each one. They all have card readers and quick access keys, and they may be equipped with smart card alert and inferred answer supervision (IAS) modules.

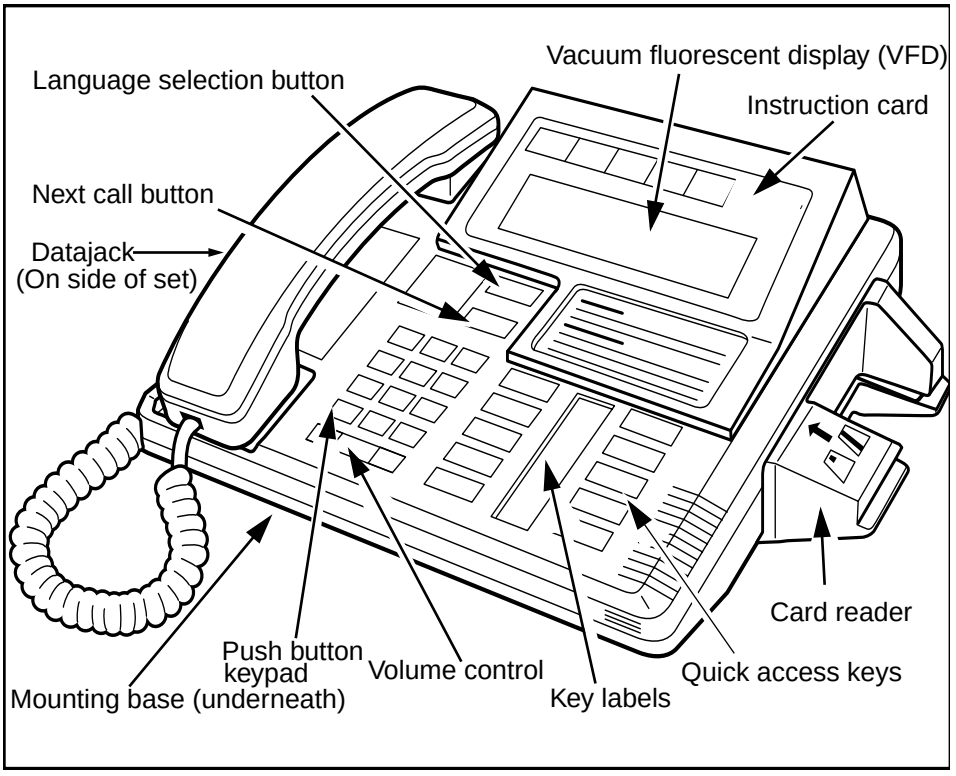
The special features for each type of terminal will be noted in the text. Figure 1-1 shows an example of a typical terminal.

Physical characteristics

A Millennium desk terminal has the following physical characteristics:

Height approx.	112 mm (4.41 in.)
Width approx.	305 mm (12.01 in.)
Depth approx.	218 mm (8.58 in.)
Weight approx.	1,500 g (3 lb. 5 oz.)

Figure 1-1: External view of the desk terminal



How this guide is organized

Millennium Desk terminals: installing and repairing terminal hardware is organized into the following sections:

Chapter 1: **Introduction** describes the contents of the module and defines the Desk terminal.

Chapter 2: **Pre-installation overview** describes pre-installation issues such as selecting a site, connecting peripheral equipment, and a list of tools required for installation and maintenance.

Chapter 3: **Installing the hardware** describes how to install the terminal on-site and make it ready to have the INSTALL routine run.

Chapter 4: **Replacing parts** describes the various components on the desk terminal which can be replaced, and how to replace them.

Appendix A: **Regulatory notes** lists the Canadian and American regulatory information which affects Desk sets.

Appendix B: **INSTALL routine quick reference** provides the basic prompts of the INSTALL routine, as well as a section describing the most common errors which occur during the INSTALL routine. For detailed information about the INSTALL routine, refer to *Millennium terminals: using the craft interface*.

Index: provides an information cross-reference guide for this module.

2 Pre-installation overview

This chapter provides a quick check that the hardware provisioning for the terminal has been met, including information about:

- selecting the site
- on-site terminal specifications
- cable length requirements and recommendations
- tools and equipment
- installing peripheral equipment
- pre-mounting installations

For detailed provisioning information refer to the *Millennium terminals provisioning guide*.

Installation overview

The major steps to installing Millennium desk terminals are listed in the following sections.

Setting up the site

Before you install the terminal, the terminal and the site must be properly prepared. This chapter describes the following steps.

- selecting the site
- ensuring the site provisioning is correct
- ensuring any peripheral equipment is connected

Installing the terminal hardware

When the site is ready, the terminal is mounted and connected to the central office (CO) line. Chapter 3 describes these procedures.

- installing the terminal on a desk top or to the wall
- connecting the terminal to the outside line

Installing and testing terminal functions

Once the terminal is installed, the function tables must be downloaded into the terminal using the craft interface.

The craft interface is described in *Millennium terminals: using the craft interface*, which is used to perform following final steps to activating the terminal features:

- installing software in the terminal using the INSTALL routine
- testing the terminal

Selecting a site

Follow the operating company standards and guidelines when selecting a site for the Millennium desk terminal.

The site should be:

- secure from unauthorized access to the tip and ring conductors
- indoor with semi-supervised access for public use
- adequately lit
- private for the user
- free from excessive noise or vibration
- away from excessive grease, smoke, and dust
- away from moving machinery, piled merchandise, narrow aisles, or stairways

- at least 152 mm (6 in.) from neon light fixtures, transformers, or other equipment that could have inductive effects.
- inexpensive to repair if the terminal is removed
- close to a supplementary power source, not accessible to the public, to prevent vandalism.

Desk terminal specifications

The following specifications must be met for the terminal to work to the optimum level.

Environmental requirements

Operating temperature between: 0°C and +50°C

Humidity: up to 90% at +40°C

Power consumption: between 5.0 and 8.6 W

Supplementary power requirements:

Each terminal needs a supplementary low-voltage DC power source, typically less than 500 mA at 24V DC. A wall transformer connected to a commercial 110 V AC line can provide this power. The supplementary power source must be provided by the operating company.

Power source:

Local power using a wall plug transformer (110 V AC), or direct-current power from a central location.

Recommended source: 0.5 A, 24 V DC±15%

Acceptable voltage for start-up: 19V DC to 30 V DC

Acceptable voltage after start-up:14V DC to 30 V DC

Source resistance: less than 10 ohms

Recommended power supply: Northern Telcom 500 mA transformer.

Line requirements: The terminal can make data and voice calls on the same line. This lets the terminal receive credit and calling card validation and smart card rate information before dialing out the number the caller wants.

Line: Standard analog loop; not a coin line; loop start.

Answer supervision: required, or else an IAS module must be installed in the set

Cutoff on disconnection (COD): required

Maximum cable length specifications

Table 2-1 gives the specifications for the cable length from terminal to the power supply based on wire size for single unit, assuming 24 V DC ±15% (± 3.6 v DC) power source.

Note: Irregular performance could result if cables are too long, caused by increased voltage drop across the cable. In this instance, some terminal functions may still work, however, when increased power is required, for example, for a modem call the terminal will terminate the transaction and power down and up.

Table 2-1: Cable length specifications

Wire gauge	Maximum cable length	Comment
#26	41.8m (137 ft)	See warning below
#24	66.5m (218 ft)	See warning below
#22	105.6 (346 ft)	
#20	168 m (551 ft)	
#18	226.7 m (875 ft)	
#16	424.3 m (1392 ft)	
#14	674.8 m (2214 ft)	
#12	1072.9 m (3520 ft)	

Table 2-1: Cable length specifications (continued)

Wire gauge	Maximum cable length	Comment
Cable length warning The output impedance of the power supply should be less than 10 ohms. Excessive cable lengths may cause terminal power problems.		

Suggested tools and equipment

Table 2-2 lists the tools and equipment used for installing, maintaining, and testing the desk terminal.

Table 2-2: Recommended tools and equipment

Tools	Use
multimeter	to measure the voltage of the supplementary power supply
butt-end test set	to test the CO line, and to use during fault-clearing procedures
cleaning card P0713140 (dry type)	to clean the card reader
test card – any commercial credit card	to determine if the terminal can process credit card calls
craft interface key access card	to access the craft interface for installing and maintaining the terminal
#2 type 1A cross recess screwdriver	to tighten and loosen the screws that attach the base to the bottom of the terminal
flat screwdriver	to take out the small rectangular panel while mounting the terminal on the wall
PLCC extractor	for inserting and removing IC chips in the field
datajack port tester	for testing the datajack

Installing peripheral equipment

Machines such as TDD/TTY (electrotype for the deaf) units are tied into the line outside the terminal. Refer to the instructions that accompany the particular unit for installation and operation instructions, or follow the installation procedures given by the operating company that installed the devices.

Using a TDD/TTY device

Using a TDD/TTY device to make a call

1. A call is placed from a Millennium terminal. The sequence dialed indicates that the call is being placed to another TDD device.

2. When the call connects with the unit at the other end, the device is activated. The terminal handset is left off-hook for the duration of the call.

3. When the call is finished, the handset is replaced on-hook.

Other documentation

For more information about provisioning requirements or terminal features refer to:

- for a general description of all Millennium terminals and features, refer to the *Millennium terminals product guide*.
- for provisioning instructions, refer to the *Millennium terminals provisioning guide*.

3 Installing the hardware

This chapter provides instructions for installing the Desk terminal to the point where it is ready to receive function tables, which are downloaded using the craft interface.

Testing the line to the terminal

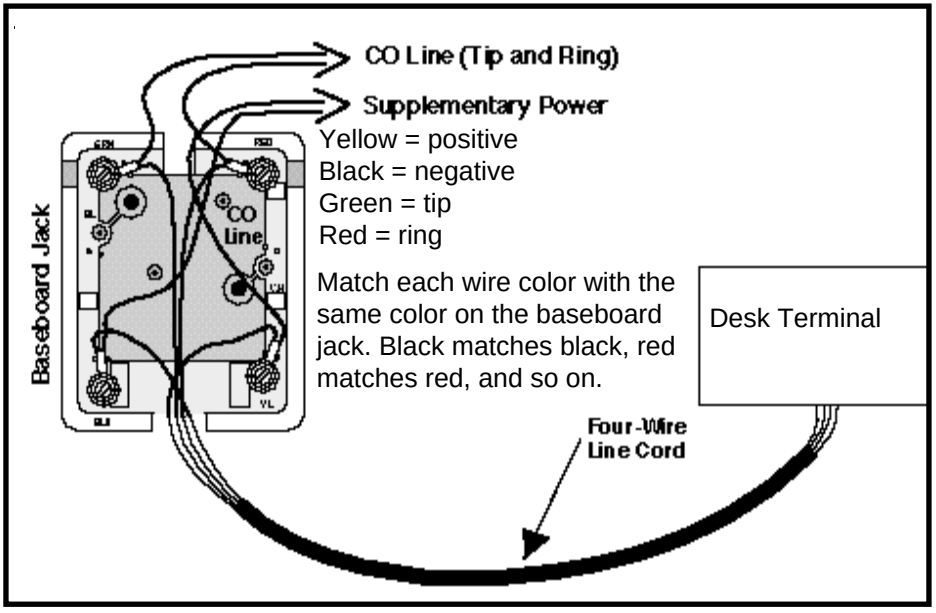
Before installing the terminal, make sure the telephone line is supplying tip and ring and the proper level of supplementary power. This information is listed in **Desk terminal specifications** on Page 2-3

- check the CO line to the terminal for dial tone and answer supervision by using your butt end test set at the wall jack.
- use a multimeter to measure the voltage of the supplementary power supply
- supplementary power is connected as shown in **Figure 3-1**

CAUTION	**Reversed polarity**
	The terminal will not function if the polarity of the supplementary power is reversed.

DANGER	
	• **Do not** install a terminal during a lightning storm • **Do not** install telephone jacks in wet locations, unless they are designed for wet locations • **Do not** touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

Figure 3-1: Wall jack polarity connections



CAUTION	
	Some terminals are different This wiring arrangement is for terminals manufactured after May 17, 1996. For older terminals, the wiring arrangement is: Black = positive Green = tip Red = ring Yellow = negative

Mounting and connecting the terminal

The Millennium desk terminal can be mounted on the desk or on the wall.

Desk mounting the terminal

Connect the spade tips at the end of the line cord to the baseboard jack as shown in **Figure 3-1**.

This message appears on the VFD:

The terminal is now ready to receive data from the Millennium Manager.

Use the craft interface INSTALL routine to perform this download. For details, refer to *Millennium terminals: using the craft interface*.

Wall mounting the terminal

This procedure involves these steps:

- opening the telephone
- connecting to the wall jack
- mounting the phone
- closing the phone

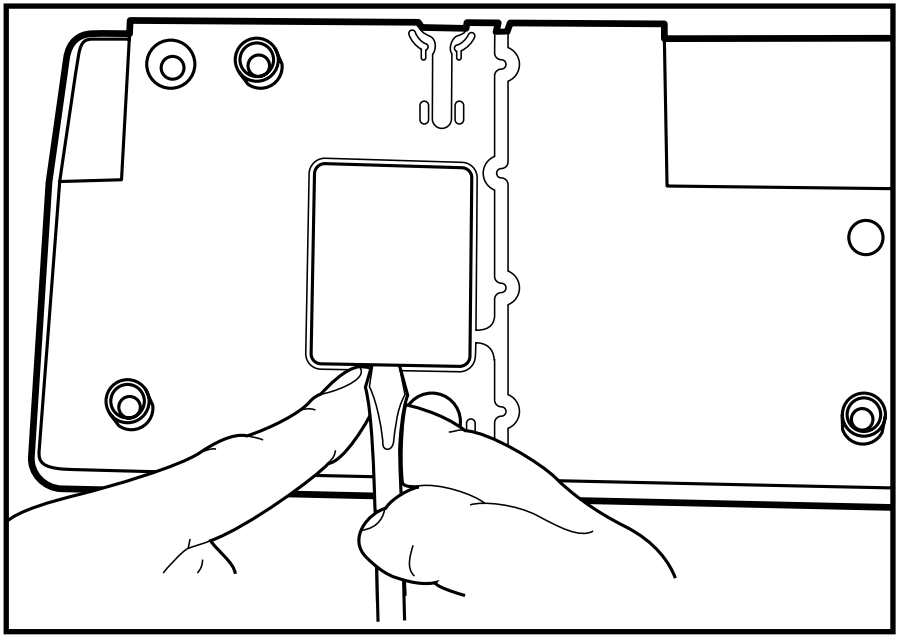
CAUTION	**Damage to internal components**
	Be careful when inserting the screwdriver in the base. You can damage the internal components. • Carefully insert the screwdriver in the lower end of the panel. • Be careful not to strip the plastic screw holes.

Opening the telephone

1. Turn the desk set upside down to access the bottom.

2. Remove the small rectangular panel from the stand by inserting a flat screwdriver head, or a similar tool, in the lower end of the panel. Refer to **Figure 3-2**.

Figure 3-2: Removing the access panel



3. Remove the wall mounting base from the back of the terminal by removing the two screws in the middle of the base.

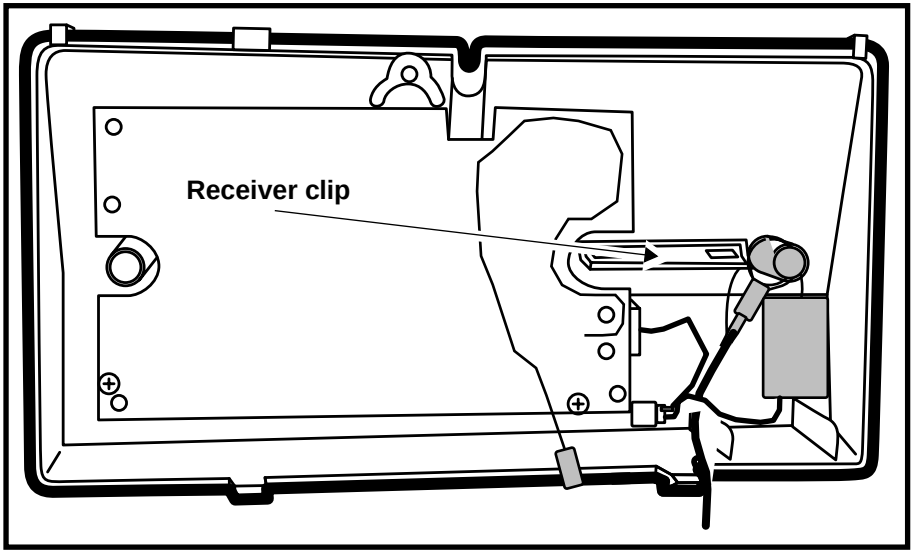
4. Squeeze the wide edge of the base with your thumbs. The wall mounting base will pop out.

5. Turn the base over.

6. Remove the receiver clip from the base.

   This is the grey plastic rectangle next to the PCP shown in **Figure 3-3**. Put it aside.

Figure 3-3: Inserting the receiver clip from inside

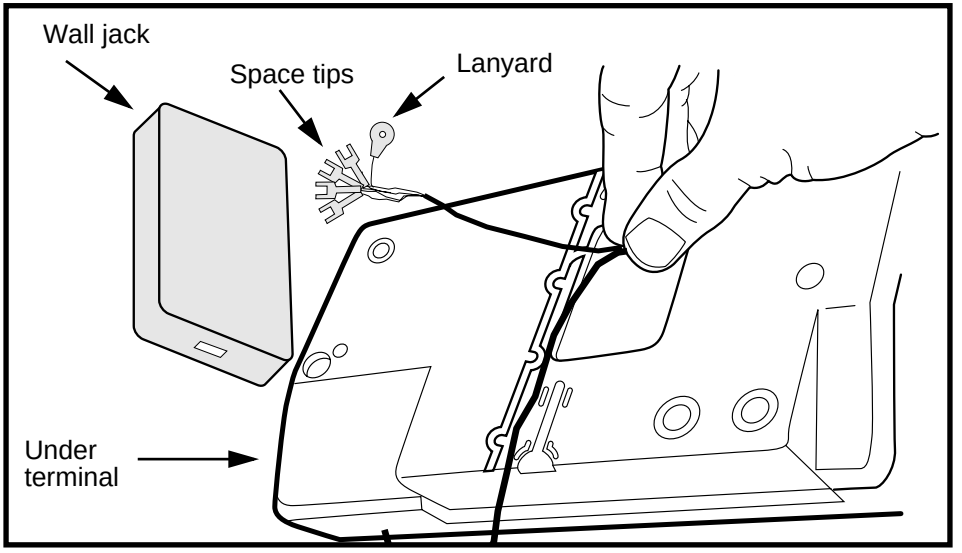


Mounting the desk set

1. Route the line cord through the cord guide in the bottom of the terminal.
   - Coil the excess cord in the hollow spaces in the base.
   - Leave enough line cord to reach the wall jack.
2. Connect the spade tips at the end of the line cord to the wall jack, as shown in **Figure 3-4**.
3. Screw the lanyard in place, if there is one.
4. Screw the wall mount base on the wall so that the wall jack projects through the small rectangular space created in **step 2**.

   The wide edge with the two prongs should be at the bottom.

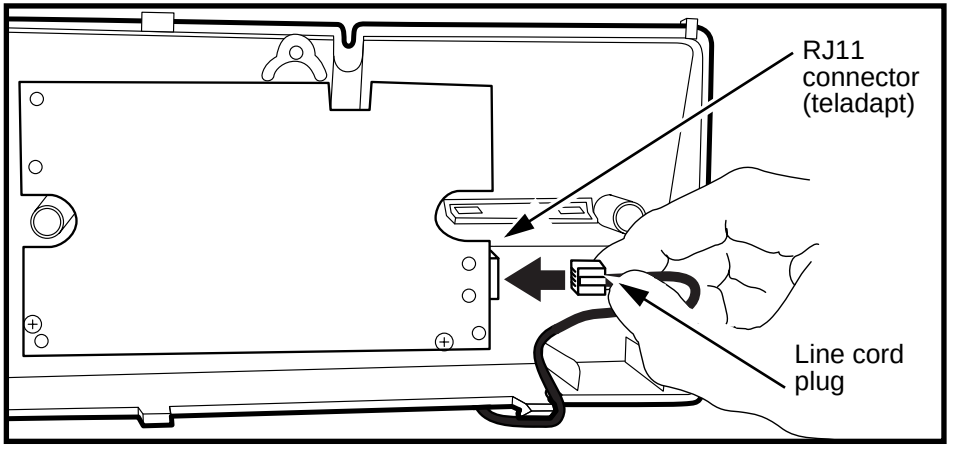
Figure 3-4: The spade-tip connectors



5. Plug the other end of the line cord into the jack in the power PCP as shown in **Figure 3-5**, or into the IAS module if there is one.

   In the latter case, you should have a slightly different line cord with four wires at the terminal end instead of an RJ11 plug. Refer to **Bypassing the IAS module** on Page 4-23.

Figure 3-5: Plugging the line cord into the power PCP

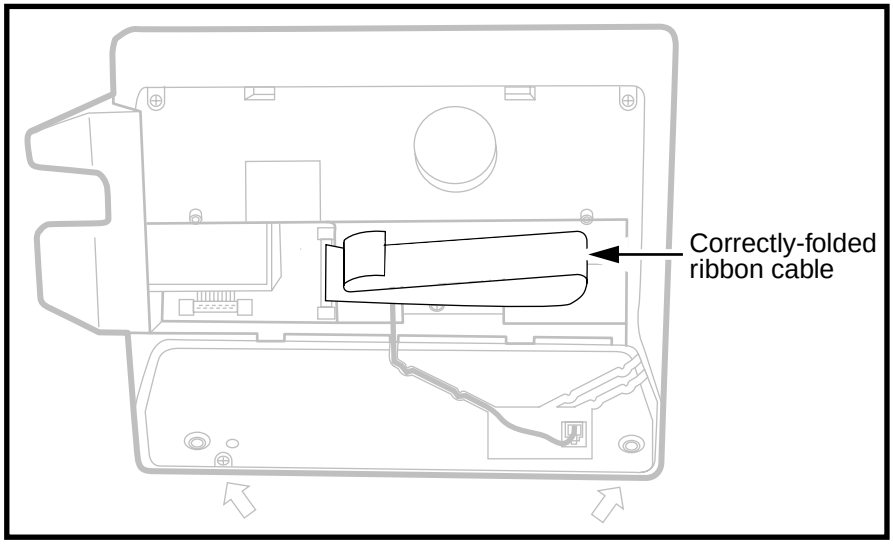


Closing the desk set

1. Fold the ribbon cable carefully so that the excess fits in the hollows of the terminal back.

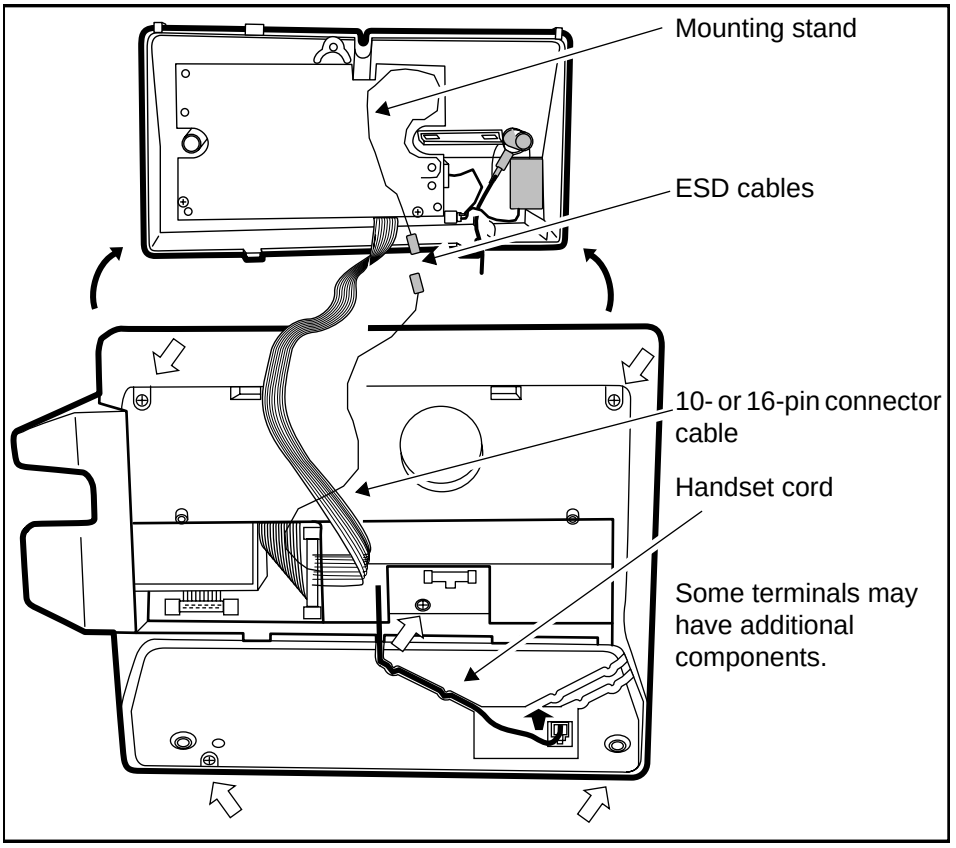
   Do not let the cable kink or crimp. It might break. Refer to **Figure 3-6**.

Figure 3-6: Folding the ribbon cable



2. Match the prongs on the wall mounting base with the slots on the terminal and hook the two together. Figure 3-7 shows the two pieces of the housing.

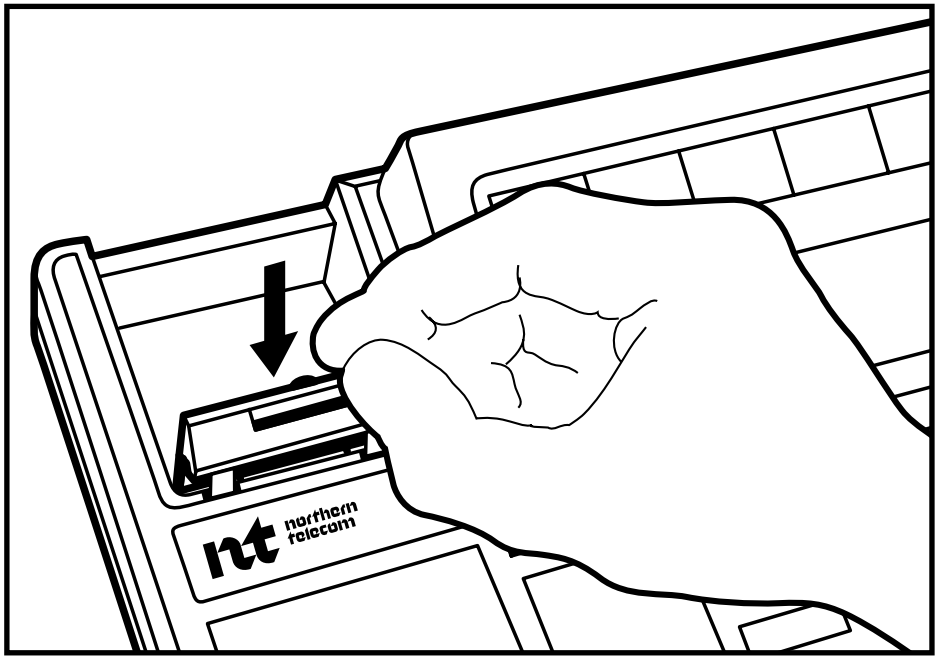
Figure 3-7: Mounting the terminal on the wall



3. Install the receiver clip, in the forward lip of the receiver rest under the handset.

   Refer to **Figure 3-8**.

Figure 3-8: Installing the receiver clip



4. The message shown below appears on the VFD:

```
Out of service
```

   You are now ready to perform the INSTALL terminal-configuration routine.

5. Cover the exposed line cord with a security channel to prevent unauthorized access to the wall jack, if it is exposed to the public.

4 Replacing parts

The Millennium desk terminal contains some parts that can be replaced in the field.

The replaceable components are:

- number card (customer-supplied)
- external instruction card (customer-supplied)
- quick access keys label or quick access keys cover
- handset and cord assembly
- mounting stand
- line cord
- card reader and bezel
- coin shield
- data jack connector daughter board
- firmware (control and voice chips)
- IAS cables and lanyard line cord

Saving call detail records

Upload all call detail records (CDRs) before you perform maintenance inside the terminal.

Although records may not be directly affected by what you are doing, uploading the CDRs means the terminal records are up to date as of the time of maintenance, in case the terminal cannot regain operation.

Upload CDRs

Use the call records item on the maintenance menu to send the call-detail records (CDRs) in the main PCP memory in the terminal to the Millennium Manager.

If the keypad or the card reader is defective, you will have to carry out the emergency CDR upload procedure. Refer to **Emergency CDR upload procedure** on page 4-3.

To access the terminal and upload the CDRs, use the following procedure:

1. While the handset is on-hook, enter the access code from your instruction card.

   If the buttons work but the access code produces no effect, enter the default access code.

   If the terminal has never been installed before, also use the default access code.

   If the buttons are damaged, refer to the emergency procedures at the end of this section.

2. Enter your personal identification number (PIN) code

   If you make a mistake, press the ◆ button, then re-enter the number.

3. Press ✳.

   The following message appears on the VFD:

4. Insert and remove your key card.

5. Upload the terminal status and call-detail records (CDRs) with the following procedure:

   a) Enter 732 from the keypad.

   b) Press 1.

c) Press ✳.

d) If there were call records in the terminal, repeat Steps 5b and 5c until, this message appears on the VFD:

```
No call records
To continue, press ✳
```

e) Press ✳.

f) Press # to end the session.

6. If you need to **uninstall the terminal**, such as for replacing firmware chips, perform these last two steps:

   a) Access the craft interface and unlock the terminal again, as described in **steps 1** to **4**.

   b) Press # on the keypad. The terminal is uninstalled.

Emergency CDR upload procedure

This procedure describes how to upload CDRs from a desk terminal whose card reader or keypad does not work.

This procedure follows the CDR upload procedure above, except that key presses can replace card swipes and card swipes replace key presses.

Uploading CDRs without key card

1. Enter your maintenance access code on the key pad.

   This lets you into the restricted maintenance level.

2. Enter 832, the code designated for an emergency CDR upload.

3. Carry out normal CDR upload procedure.

4. Replace the card reader.

   Refer to **Replacing the card reader** on page 4-15.

Uploading CDRs without keypad

Follow these steps to upload the CDRs if the keypad is not usable.

1. Swipe your key card through the card reader
2. One of the following messages appears.
   - If a message appears saying CDRs are available, go to **step 3**
   - If a message appears saying CDRS are not available, go to **step 4**
3. Swipe your card through the reader again.
   - If a success message appears, go to **step 4**
   - If a failure message appears, repeat **step 3**
   - If you get nothing but failure messages, replace the phone.
4. Exit the CDR upload procedure

If neither the card reader nor keypad are working, replace the phone and inform the operating company that the CDRs could not be uploaded.

External replacements

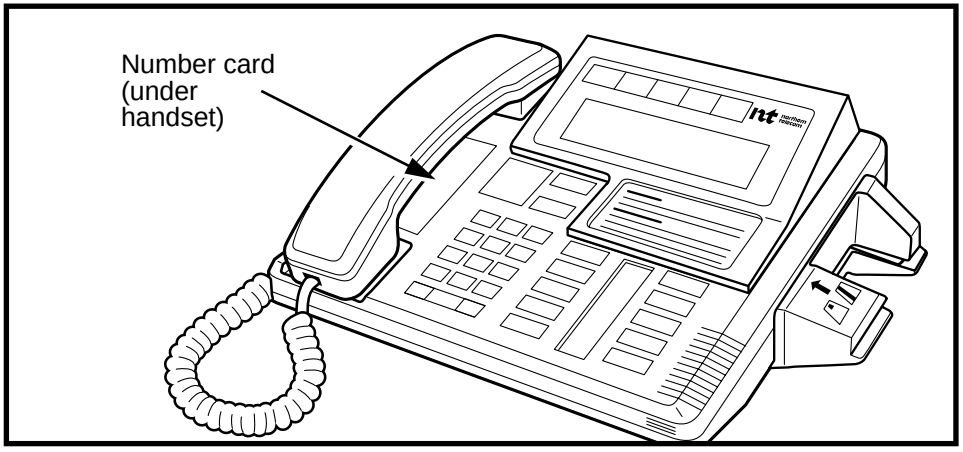
This section describes the labels and covers which can be replaced without opening the set.

Removing and replacing the number card

The number card is provided by the operating company. It is located on the cover under the handset.

1. Use a paper clip to pry the window up so it bends in the middle.
2. Grasp the window with your fingers and pull it out.
3. Insert or remove the number card behind the window.
4. Replace the number card window.
   a) Insert one end of the window in position in the opening in the cover.
   b) Bend the window outward.
   c) Insert the opposite end into position and release.

Figure 4-1: Locating the number card on the set



Replacing the instruction card

The operating company provides instruction cards.

These cards fit very tightly, so take care when removing and installing a card.

You may need a knife or a screwdriver blade to get the edges out of and into their slots.

1. Bend the external instruction card enough to pop it out of the housing assembly.

2. Install the new card:

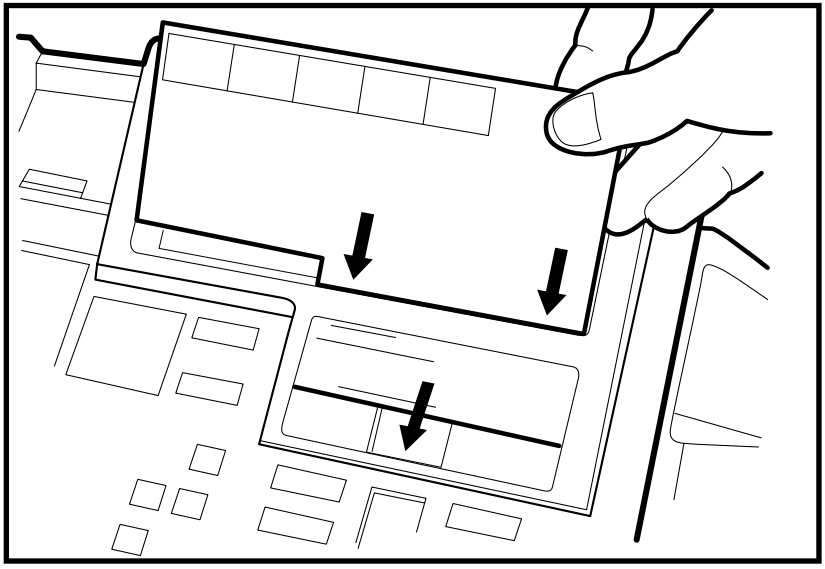
   a) Place its lower edge under the bottom lip of the opening

   b) Apply pressure to its outer edges, bending it until it snaps under the edges of the opening.

   Refer to Figure 4-2.

3. Position the new card so that its outer edges are covered.

Figure 4-2: Installing the instruction card

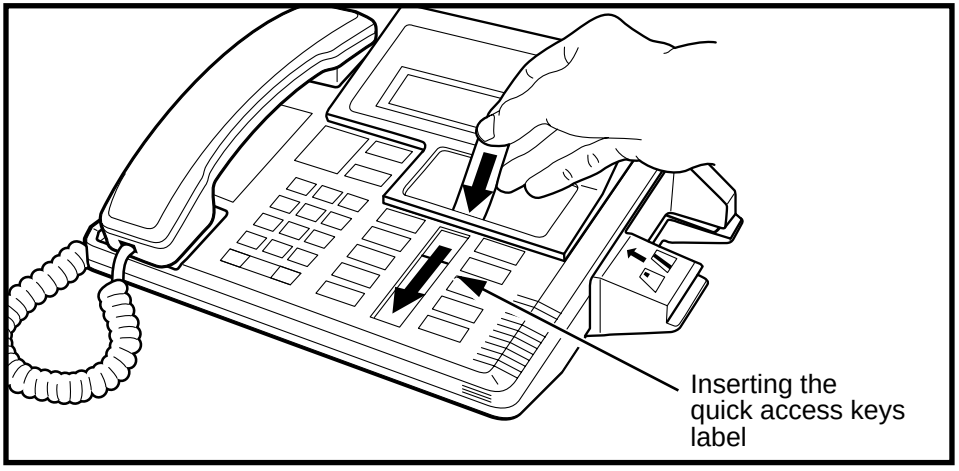


Replacing the quick access keys label

The operating company provides the quick access key card.

1. Take out the external instruction card.
2. Insert the quick access key card in the slot.
3. Replace the external instruction card.

Figure 4-3: Installing the quick access keys label



Installing the quick access keys cover

If the quick access keys are not used, cover them with a blank cover.

1. Take the cover off the glue strip.
2. Insert the tabs of the cover into the holes under the instruction card cover.
3. Stick the cover on the terminal.

Inside the desk set

The most common reasons to go inside the terminal are to replace the handset and cord, the power cord, the card reader, the datajack daughter board, or the firmware.

This section describes how to:

- remove the mounting stand.
- replace the handset and cord assembly
- replace the power cord

Removing the mounting stand

The mounting stand contains the power supply to the Desk set. You must remove this part in order to gain access to the back of the terminal housing.

Follow these steps to remove the mounting stand.

1. This procedure assumes you have followed the directions in **Saving call detail records** on page 4-1.

2. Disconnect the terminal from the wall jack, if possible.

3. Turn the terminal over, setting the handset beside it.

4. Set the top of the terminal to face away from you, with the card reader on your left.

5. Remove the two screws that hold the mounting stand on the base.

   Note: Be careful with the screws – the screw holes are only plastic and strip easily.

6. Remove the mounting stand by pressing inward along the top.

   This releases the two plastic tabs holding it to the terminal.

Disconnecting the power

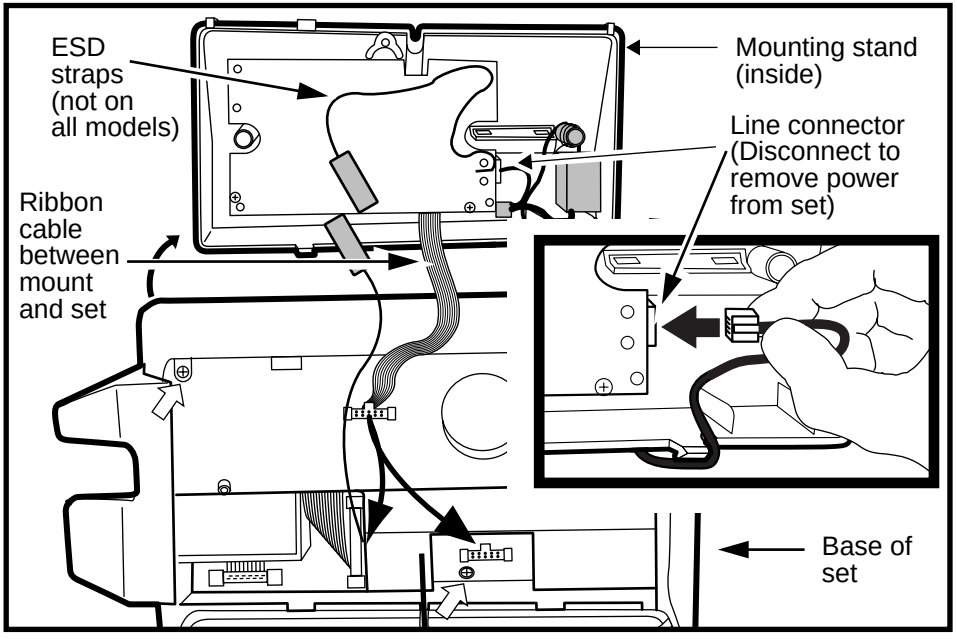
Follow these steps to disconnect the power.

CAUTION	**Do not attempt to unplug or remove any internal components until the power has been disconnected.**

1. Face the underside of the mounting stand towards yourself, to expose the connecting jacks, as shown in **Figure 4-4**.
2. Pull out the connector on the underside of the mounting stand.

   If the terminal has been disconnected at the wall jack, this is not necessary unless you are replacing the set.

Figure 4-4: Disconnecting power from the set



3. Disconnect the ESD straps from each other, if provided.

   Refer to **Cable layouts inside the set** for locations on various models of sets.

4. Unplug the ribbon connector between the mounting stand and the control board in the base.

5. Set the mounting stand aside.

Cable layouts inside the set

You will find one of several different layouts once you open the phone. Refer to Figure 4-5, Figure 4-6, and Figure 4-7.

Note connections of the ESD cables when you first open the housing so you can replace them correctly if they get removed.

In one layout, a number of ESD cables are attached to one of the card reader retaining screws. Ensure you reattach them when you finish your maintenance.

Figure 4-5: ESD cables clipped to card reader screw

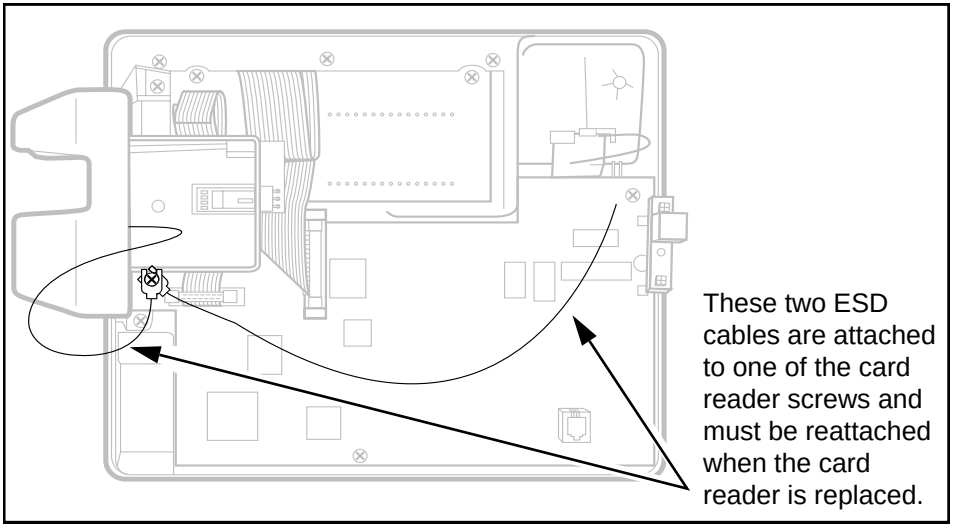


Figure 4-6: Layout with ESD and SCA cables

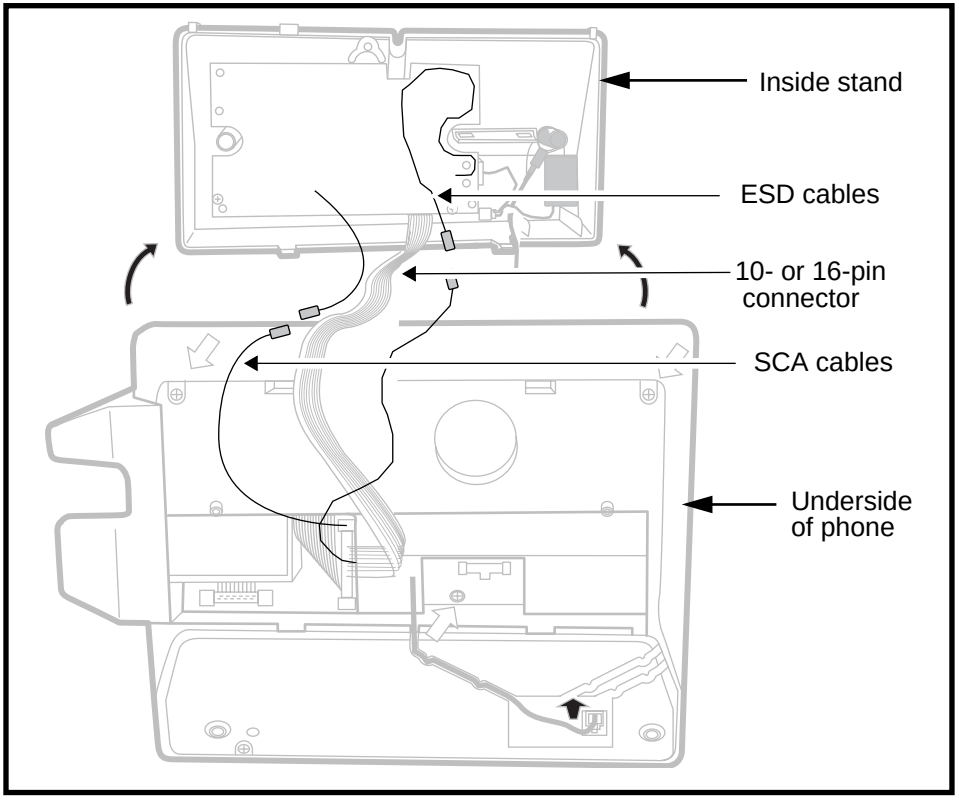
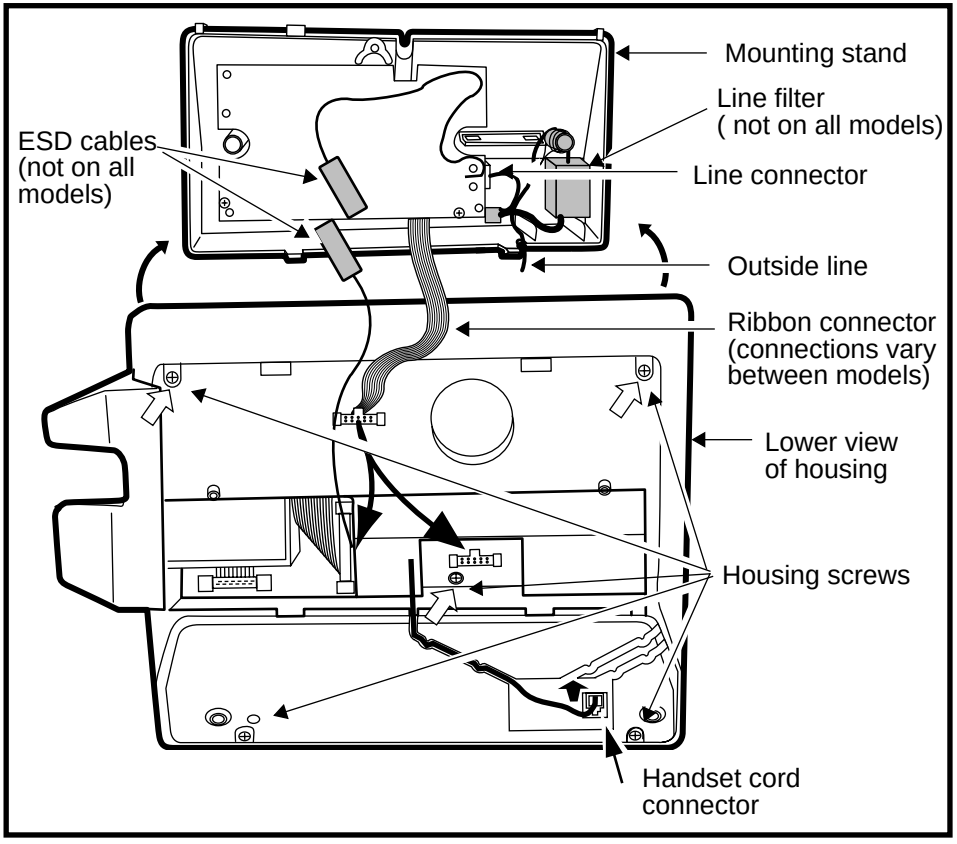


Figure 4-7: Layout with ESD cables



Replacing the handset assembly

The handset assembly consists of the handset and the coiled cord attached to it. The connector is located on the outside of the Desk set, under the mounting stand.

To replace this assembly, follow these steps:

1. Access the inside of the terminal as described in **Removing the mounting stand** on page 4-8.
2. Remove the handset and cord assembly by unplugging it from the telephone jack on the back of the set. Refer to Figure 4-7.
3. Plug the new cord into the telephone jack.
4. Route the cord through the cord guide in the base of the phone.
5. Restore the terminal to operation by reversing the steps in **Removing the mounting stand** on page 4-8.

Removing and replacing the line cord

To access the line cord connector inside the terminal, remove the mounting stand.

1. Remove two screws and unclip the mounting stand as described in the first part of **Removing the mounting stand** on page 4-8.

   This will allow the stand to separate enough from the base of the terminal to replace the line cord.
2. Ensure that the replacement line cord is dressed properly to provide the necessary strain relief.
3. Replace the mounting stand:

   a) Arrange the ribbon cable so it does not pinch

   b) Clip the mounting stand to the base.

   c) Re-install the two screws into the base.

Accessing the inside of the set

Once the mounting stand has been removed, you can remove the back of the set to gain access to such modules as the card reader and the datajack daughter board.

This section describes this procedure.

1. Unplug the handset and remove the cord from its channel. Refer to Figure 4-7.

   The tabs on the plug may have been removed to discourage vandalism.

   In this case, use a stiff, thin tool, such as a pen tip, to release the plug.

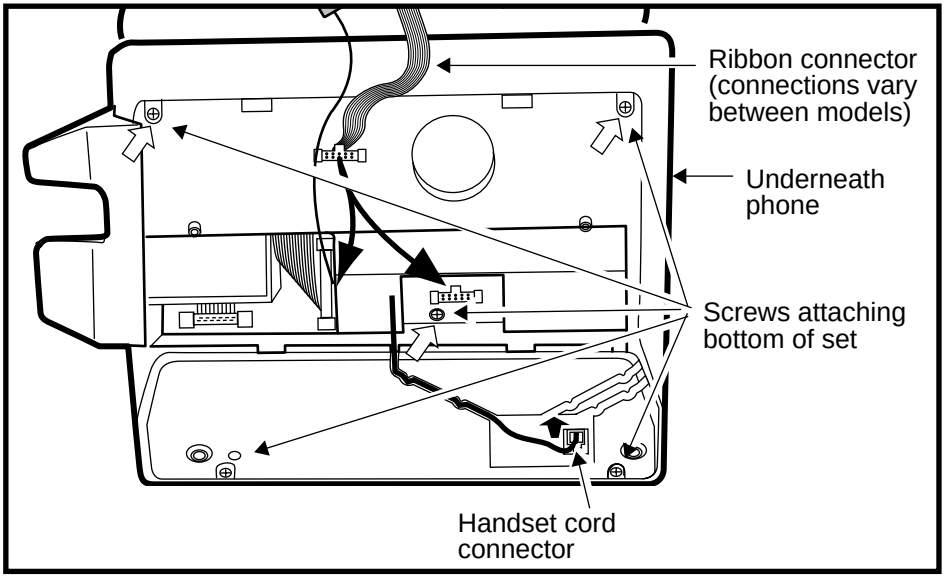
2. Set the handset aside.

3. Unscrew the five screws that hold the base on the terminal.

   There is one screw in each corner and one in the centre. Refer to Figure 4-7.

4. Pull the back away from the terminal.

Figure 4-8: Housing access screws



Replacing the card reader

This section describes how to replace the card reader and the coin shield. To access this unit, you must enter the set as described in previous sections.

1. Upload CDRs.

   Refer to **Upload CDRs** on page 4-2.

2. Remove the mounting stand.

   Refer to **Removing the mounting stand** on page 4-8, if necessary.

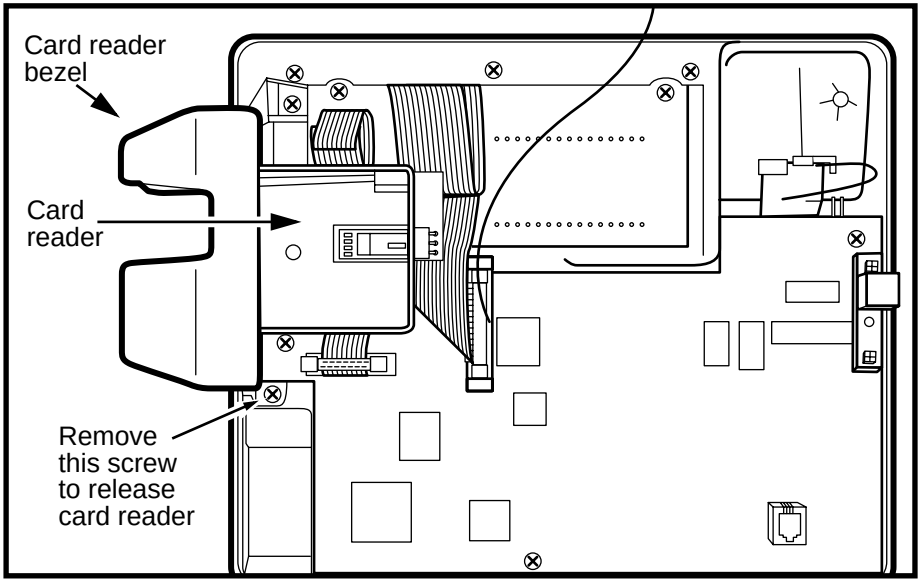
3. Remove the back of the terminal.

   Refer to **Accessing the inside of the set** on page 4-14, if necessary.

4. Remove the bottom screw holding the card reader, as shown in Figure 4-9.

Note: The upper screw hole is used when the terminal back is replaced.

Figure 4-9: Locating the card reader screw



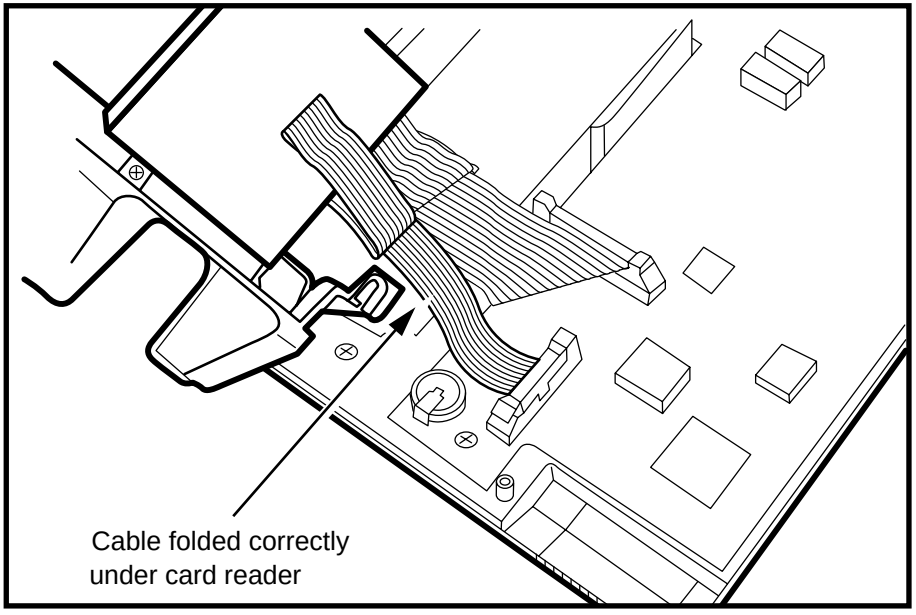
5. Lift the card reader assembly straight up.

6. Disconnect the ribbon cable attached to the card reader from the connector on the control board.

7. Connect the ribbon cable from the new card reader to the control board.

   Figure 4-10 demonstrates how to fold the cable so it does not get pinched or crimped when the card reader is replaced on top of it.

Figure 4-10: Folding the ribbon cable correctly



8. Position the card reader over the ribbon cable

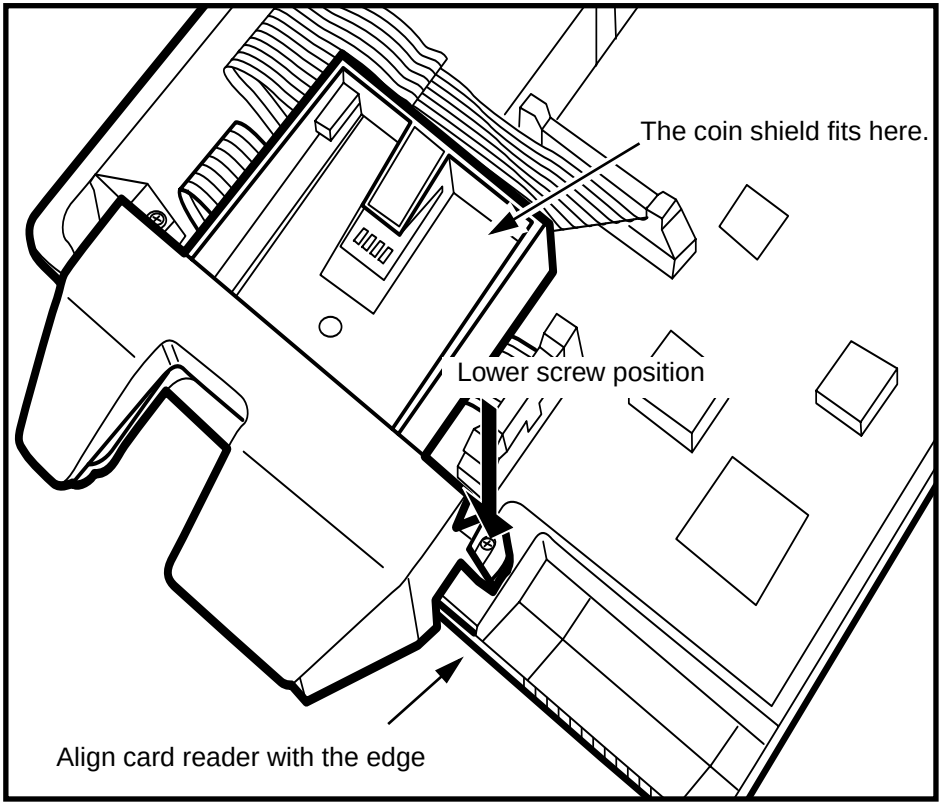
   a) Set it in place by aligning the screw holes on the sides.

   b) Ensure that the card reader is level, overlapping the outside of the plastic housing.

      Refer to Figure 4-11 for correct replacement of the card reader.

   c) Replace the lower screw.

Figure 4-11: Card reader seated properly



9. Replace the back on the terminal by reversing procedures in **Accessing the inside of the set** on page 4-14 and **Removing the mounting stand** on page 4-8.

10. Test the card reader by using the card reader test in craft interface.

Note: Do not overtighten the screws, as this will strip the threads inside the plastic sleeves.

Inserting the coin shield

A plastic shield the size of a business card fits over the open back of the card reader to keep coins out of the circuitry of the terminal.

If you need to add or replace this piece, follow this procedure:

1. Take the back off the terminal.

   Refer to **Removing the mounting stand** on page 4-8 and **Accessing the inside of the set** on page 4-14.

2. Fit the coin shield over the open underside on the card reader.

   The tab goes on the right.

3. Reassemble the phone.

Replacing the datajack module

The following section describes the procedure for replacing the datajack module. The connector for this module is located on the handset-side of the set, on the side of the set.

To replace the module:

1. Upload CDRs.

   Refer to **Upload CDRs** on page 4-2.

2. Remove the mounting stand.

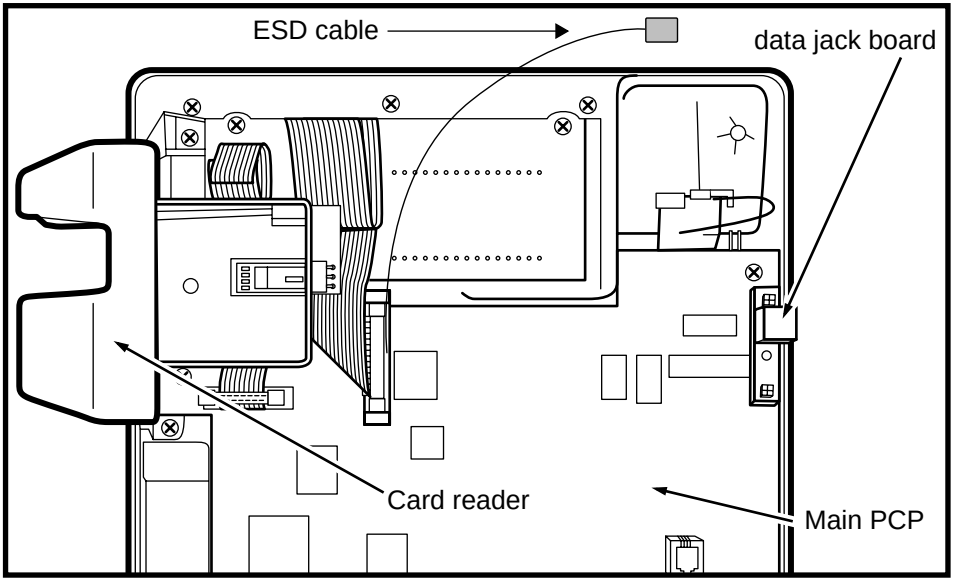
   Refer to **Removing the mounting stand** on page 4-8, if necessary.

3. Remove the back from the set.

   Refer to **Accessing the inside of the set** on page 4-14.

4. Locate the datajack board on the main PCP, as shown in Figure 4-12.

Figure 4-12: Datajack board on the main PCP

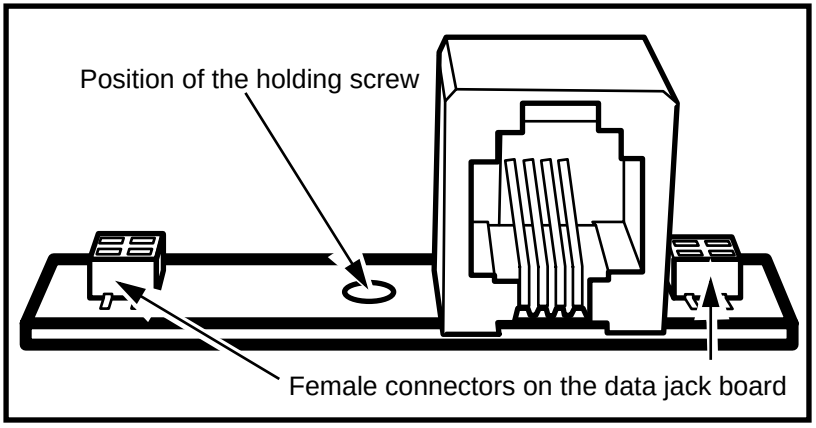


5. Undo and remove the holding screw in the centre of the datajack board.

6. Grasp the board at either end and lift straight up.

   Figure 4-13 shows the datajack board in detail.

Figure 4-13: The datajack board



7. Grasp the board by the ends and line it up with the male connectors on the main board to seat it, as shown in Figure 4-14.

   Ensure the datajack connector is aligned with the notch in the terminal housing and faces out.

8. Use an even pressure on both ends of the board to push the board down to mate the connectors.

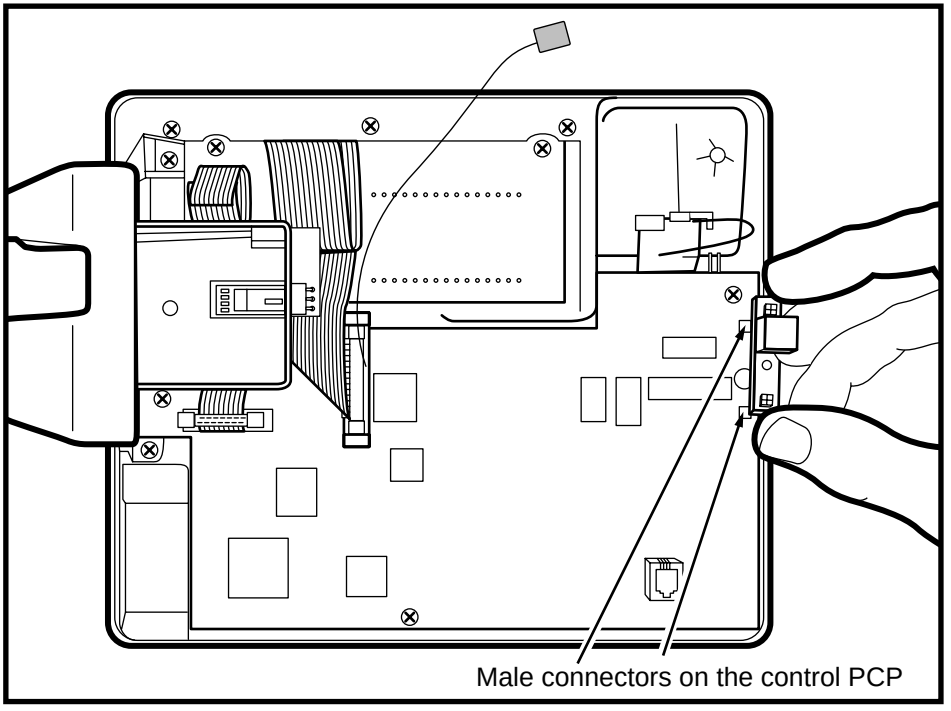
9. Replace the screw.

   Ensure the datajack is flush with the outside surface and fits squarely in the notch in the terminal housing.

10. Replace the back and assemble the terminal by reversing **Steps 2** and **3**.

11. Run a data test.

Figure 4-14: Connecting the datajack board



Removing and replacing firmware chips

When firmware is updated, it is possible to replace a chip on the control PCP, rather than having to replace the entire set.

To replace firmware, follow this procedure.

1. Upload CDRs.

   When you change firmware, you physically remove the memory from the terminal. Therefore, it is imperative that you upload the CDRs from the terminal.

   Refer to **Upload CDRs** on page 4-2 for specific instructions.

2. Uninstall the terminal, since you will need to perform an INSTALL routine after the chips are replaced.

   Refer to **step 6** in **Upload CDRs** on page 4-2 for specific instructions.

3. Open the terminal.

   a) Refer to **Removing the mounting stand** on page 4-8 and **Accessing the inside of the set** on page 4-14.

   b) Ensure you follow proper ESD precautions as described in the box below.

CAUTION	Electronic components are sensitive to electrostatic discharge (ESD). Before touching the PCP assembly, put on your ESD wrist strap and connect it to a convenient ground**.** Before replacing any components, disconnect the line cord from the wall jack. This disconnects the power from the terminal.

   c) Disconnect the ribbon cable.

   d) Unscrew the five screws securing the back of the housing and set the housing aside.

Be careful – the plastic screw holes are easily stripped.

4. Replace the firmware chip.

   a) Identify which chip you want to change.

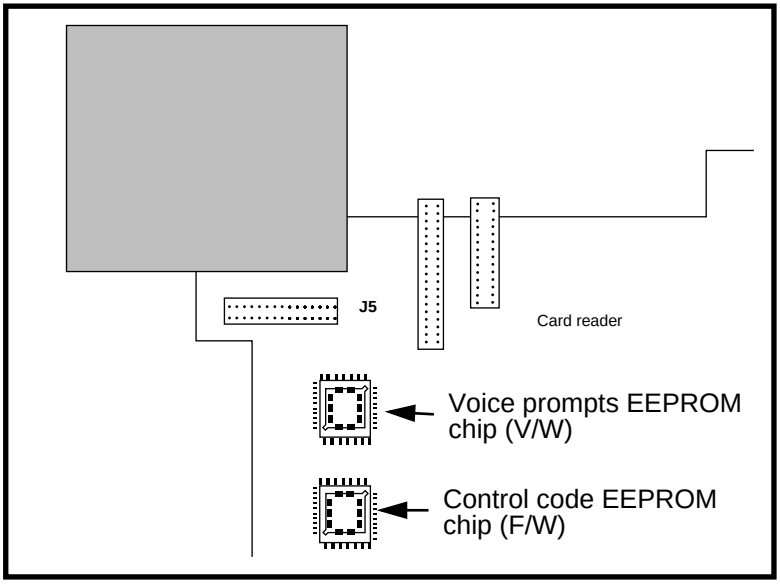
   There are only two that can be replaced. Both are located in the upper left corner of the circuit board. Refer to Figure 4-15.

   b) Gently pry the chip out with a PLCC chip puller. Pull straight up.

   c) Place the new chip in the socket so that the dot or carat (>) lines up with the dot or carat marked on the control board.

   e) Firmly seat the replacement, pressing straight down on the chip.

Figure 4-15: Field-replaceable chips on the main PCP



6. Reassemble the terminal
   a) Replace the back housing.
   b) Screw it back in place.
   c) Reconnect the ribbon cable to the mounting stand.
   d) Snap the mounting stand back in place.
   e) Plug the line cord into the wall jack.
7. Perform the INSTALL routine to reinstall the terminal.
8. Test terminal function.

Bypassing the IAS module

This section explains how to bypass the inferred answer supervision (IAS) module.

Some desk terminals come with an IAS module installed in their bases. These modules allow the terminals to detect when a call has been answered if the central office is unable to do so.

If the central office is later equipped with answer supervision (AS), it will conflict with the IAS in the phone.

In this case, the you must bypass the IAS module in the set as described in the following steps.

1. Upload the CDRs.

   Refer to **Upload CDRs** on page 4-2.

2. Uninstall the terminal.

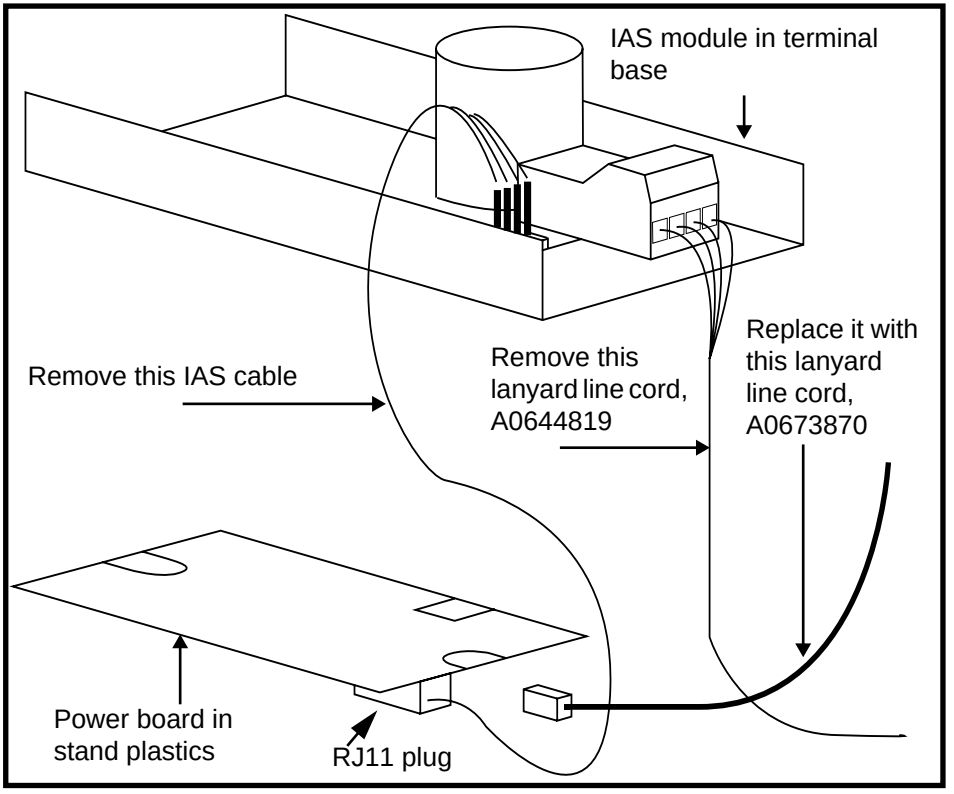
   Refer to **step 6** in **Upload CDRs** on page 4-2.

3. Remove the line cord from the wall receptacle.
4. Take off the wall mount and the base of the phone. Refer to **Removing the mounting stand** on page 4-8 and **Accessing the inside of the set** on page 4-14, if required.

5. Remove the lanyard line cord that leads from the line connector to the IAS module. Refer to Figure 4-16.

6. Remove the IAS cable that leads from the IAS module to the RJ11 plug on the power board.

Figure 4-16: Bypassing the IAS module



7. Run a new lanyard line cord from the wall receptacle to the RJ11 plug line connector on the power board.

8. Dress the line cord for strain relief.

9. Close the housing.

10. Re-connect the power.

11. Re-install the terminal.

12. Test terminal function.

Appendix A: Regulatory notes

This appendix includes various regulatory messages and safety instructions from the Canadian and American governments and from Underwriters Laboratories.

Industry Canada notice

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The method of connection approved for this equipment as designated by D.O.C. Standard CS-03 is a CA11A/CA14A or CA11W/CA14W connection arrangement. The A or W suffix indicates that either desk or wall mounting is approved.

In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified jack-plug-cord ensemble (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Existing telecommunications company requirements do not permit their equipment to be connected to customer-provided jacks except where specified by individual telecommunications company tariffs.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected.

Caution: Users should not attempt to make electrical ground connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

This telephone has been tested and found to comply with the limits for a Class A digital device in accordance with the specifications in CSA 108.8.

Caution: To eliminate the possibility of accidental damage to cords, plugs, jacks, and the telephone, do not use sharp instruments during the assembly procedures.

Warning: Do not insert the plug at the free end of the receiver cord directly into a wall or baseboard jack. Such misuse can result in unsafe sound levels.

	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

This symbol on the product is used to identify the following important information:

Certified Class 2 Level C power source (24 VDC/500 mA max.).

Shock hazard warning

To avoid potential electrical shock hazard to personnel or damage to the telephone, use only the manufacturer supplied equipment and installation procedures. Specifically, use only 4 conductor modular teladapt plug/cords with this product, and the AC transformer must be CSA/UL or CSA-NRTL/C approved Class 2, level C.

Address for warranty and repairs in Canada

Nortel
30 - Norelco Drive
Weston, Ontario
M9L 2X6

U.S. regulations

This section consists of U.S. federal rules and cautions.

Radio/TV interference

Terminals equipped with electronic push-key dials generate and use radio frequency energy, and if not installed and used properly and in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. These terminals have been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in Part 15 of the FCC rules. While these rules are designed to provide reasonable protection, there is no guarantee that interference will not occur in a particular installation.

Note: FCC registration does not constitute an expressed or implied guarantee of performance.

Federal Communications Commission notice

FCC registration number: This telephone equipment complies with Part 68, Rules and Regulations, of the FCC for direct connection to the Public Switched Telephone Network. (The FCC registration number appears on a sticker affixed to the inside of the telephone.)

Your connection to the telephone line must comply with these FCC rules:

Use only an FCC standard RJ11W/RJ14W or RJ11C/RJ14C network interface jack and FCC-compliant line cord and plug to connect this telephone to the telephone line. (To connect the telephone, press the small plastic tab on the plug at the end of the telephone's line cord. Insert into a wall or baseboard jack until it clicks. To disconnect, press the tab and pull out.)

If a network interface jack is not already installed in your location, you can order one from your telephone company. Order RJ11W/RJ14W for wall-mounted telephones or RJ11C/RJ14C for desk/table use. In some states, customers are permitted to install their own jacks.

Your telephone may not be connected to a party line or coin telephone line. Connection to Party Line Service is subject to state tariffs. (Contact the state public utility commission, public service commission or corporation commission for information.)

It is no longer necessary to notify the telephone company of your phone's registration and REN numbers. However, you must provide this information to the telephone company if it requests it.

If this terminal equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. If advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modification to maintain uninterrupted service.

Do not attempt to repair this equipment yourself. If trouble is experienced with this equipment, for repair or warranty information please contact 1-800-4NORTEL or write to Nortel, 640 Massman Drive, Nashville, TN 37210. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

Signaling method: The unit's push-key dial allows it to signal in tones (DTMF). It can complete calls to local and long distance lines and can also complete long distance calls via computer-phone systems such as MCI or SPRINT.

Ringer Equivalence Number: The FCC registration label (on the bottom of the phone), includes a Ringer Equivalence Number (REN), which is used to determine the number of devices you may connect to your phone line. A high total REN may prevent phones from ringing in response to an incoming call and may make placing calls difficult. In most areas, a total REN of 5 should permit normal phone operation. To determine the total REN allowed on your telephone line, consult your local telephone company.

Hearing aids: The telephone is compatible with hearing aids equipped with an appropriate telecoil option and is compliant with the requirements of the Americans with Disabilities Act (ADA).

CSA/NRTL/UL installation instructions

Warranty: Avoid electrical shock hazard to personnel or equipment damage. Observe the following precautions when installing telephone equipment:

Never install telephone wiring during a lightning storm.

1. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

2. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

3. Use caution when installing or modifying telephone lines.

	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

This symbol on the product is used to identify the following important information:

CLASS 2 power source (24 VDC/500 mA max).

Important safety instructions

When using your telephone equipment, basic safety precautions should always be followed to reduce risk of fire, electric shock, and injury to persons. Follow these precautions:

1. Read and understand all instructions.
2. Follow the warnings and instructions marked on the product.
3. Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this product near water, for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool.
5. Do not place this product on an unstable cart, stand or table. The product may fall, causing serious damage to the product.
6. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.
7. Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.
8. Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.
9. Never spill liquid on any area of the product.
10. To reduce the risk of electric shock, do not disassemble this product, but have it sent to a qualified service person when some service or repair work is required.

11. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
    - When the power supply cord or plug is damaged or frayed.
    - If the product has been exposed to rain or water, or if liquid has been spilled on the product, disconnect and allow the product to dry out to see if it still operates, but do not open up the product.
    - If the product housing has been damaged.
    - If the product exhibits a distinct change in performance.
12. Avoid using a telephone during an electrical storm. There may be a remote risk of electric shock from lightning.
13. Do not use the telephone to report a gas leak in the vicinity of the leak.
14. **Caution:** To eliminate the possibility of accidental damage to cords, plugs, jacks, and the telephone, do not use sharp instruments during the assembly procedures.
15. **Warning:** Do not insert the plug at the free end of the handset cord directly into a wall or baseboard jack. Such misuse can result in unsafe sound levels or possible damage to the handset.
16. Save these instructions.

Shock hazard warning

To avoid potential electrical shock hazard to personnel or damage to the telephone, use only the manufacturer-supplied equipment and installation procedures. Specifically, use only four-conductor modular teladapt plug/cords with this product. The DC transformer must be CSA/UL or CSA-NRTL/C approved Class 2 transformer.

Appendix B: INSTALL routine quick reference

Table 2-1 gives an overview of the INSTALL routine. For detailed information, refer to *Millennium terminals: using the craft interface*.

Also included in this chapter is a listing and description of the most typical errors which occur during the INSTALL routine. Refer to **Installation troubleshooting** on page 4.

Table 2-1: INSTALL quick reference

Step	Display	Action
1.	`*  out of service  *`	With the handset is on-hook, enter the default access code.
2.	`Enter PIN: ■■■■■` `◆=Fix,✳=Save, #=STOP`	Enter five-digit personal identification number (PIN) code.
3.	`Please insert the key card now`	Unlock and open the terminal

4.	*Uninstalled terminal*
	`Not installed`
	`Use # to INSTALL`
	Installed terminal
	`Use ✳=MENU, #=INSTALL`
	`or dial item number`
		Press #.

Table 2-1: INSTALL quick reference

Step	Display	Action
5.	**CO line check** **Go offhook**	Lift the handset off-hook.
	Checking CO connection	
6.	**Completed 00** **To continue, press ✳**	Press ✳.
7.	**Go back onhook**	Place the handset on-hook.
8.	■■■ - ■■■ - ■■■■ **Enter line tel. num.**	Enter the telephone number of the terminal.
9.	■■■ - ■■■ - ■■■■ **Use ◆=FIX, ✳=SAVE**	Press ✳.
10.	■■■■■■■■■■ **Enter serial number**	Enter the ten-digit serial number of the terminal.
11.	■■■■■■■■■■ **Use ◆=FIX, ✳=SAVE**	Press ✳.
12.	■■■■■■■■■■■ **Enter NCC tel. number**	Enter the telephone number of the Millennium Manager.
13.	■■■■■■■■■■■ **Use ◆=FIX, ✳=SAVE**	Press ✳.
14.	**Answer detect check** **Go offhook**	Lift the handset off-hook
	Checking answer detection	
15.	**Completed: 00** **To continue, press ✳**	Press ✳.
16.	**Go back onhook**	Put the receiver back on-hook.
17.	**Press ✳ to start NCC download**	Press ✳.
	*** Please wait ***	

Table 2-1: INSTALL quick reference

Step	Display	Action
	Download in progress *** Please wait ***	
18.	**Completed: 0X** **To continue, press ✳**	Press ✳.
19.	**Go offhook, press all buttons, then onhook**	Lift the handset off-hook.
20.	**(keypad character)** **Go on hook when done**	Press each keypad button.
21.		Put the handset on-hook.
22.	**Please insert and remove your card**	Insert your test card, a valid mag-stripe card.
23.	*** Please remove *** **your card**	Remove the card.
24.	**(card mag stripe #)** **To continue, press ✳**	Press ✳
25.	**Install is complete** **Close terminal now**	Press #.

Installation troubleshooting

This section describes how to troubleshoot the most common errors which occur during the INSTALL routine on a terminal.

Error	Troubleshooting
The errors codes associated with downloading and answer supervision are 22, 24, 26, 34, 41, 42 and 51.	
22: Busy modem Occurs when the terminal calls the Millennium Manager to perform a download and the modem is busy, you will see error 22.	Use the test hand set and dial out the modem number. This will indicate if the problem is inside or outside the terminal. • If the problem is outside the terminal, you will get a continuous busy signal and **`modem busy`** will be displayed every time the you try to download. Contact the system administrator to query the status of the modem. • If the problem is inside the terminal, there will be no signal. In that case, replace the set.
24: Data transmission problem Occurs when the terminal calls the Millennium Manager to perform a download and there is a problem with the connection to the Millennium Manager, error 24 is displayed.	Error 24 can occur at three different points in the download process: • immediately as it is initiated, before the **`Please wait`** message appears — the data call was not started, retry the download • at the beginning of the transmission process just after the **`Please wait`** message appears — the terminal has not yet been entered into the Millennium Manager • a couple of minutes into the transmission — the terminal connected, but the line failed; retry.

Error	Troubleshooting
26: No ringback signal Occurs when the terminal calls the Millennium Manager to perform a download and the terminal detects no ringback signal.	Error 26 usually occurs immediately after the **`Download in Progress please wait`** message appears. To troubleshoot error 26: 1. Use your test handset to test the CO line at the rear terminal pack. 2. If the line checks out, and there is no problem at Millennium Manager, replace the control PCP and run the INSTALL routine.
34: Vital table missing Occurs when the terminals calls the Millennium Manager to perform a download and the terminal requires a table not yet downloaded from the Millennium Manager.	Retry the download. If the problem continues, have the Millennium Manager system clerk set up the tables again, then retry the download.
41/42: Central office (CO) line check Two error codes can be generated: • Error Code 41 — The terminal does not detect voltage from the CO line. This could be a power source problem, or the handset could be defective. • Error Code 42 — The terminal does not detect dialtone from the CO line.	Refer to the troubleshooting documentation for suggestions about troubleshooting the power and CO lines: • *Millennium terminals: maintenance troubleshooting* • *Millennium terminals: pocket troubleshooting guide*.

Error	Troubleshooting
51: Failed supervision test Occurs when the terminal calls the Millennium Manager to perform an answer supervision test. This error indicates the terminal could not establish answer supervision.	• Retry the answer supervision test. • If the problem continues, use the test handset to test the CO line. Make sure the polarity light is on and dial out the modem number. • If the problem is inside the terminal the polarity light will change, i.e. the polarity reverses. You may need to replace the handset. If that does not fix the problem, replace the set. • If the problem is outside the terminal then the polarity does not change. Call dispatch to confirm that the line has been properly configured for local line side answer supervision. ***Note:*** If you perform the test, and you don't hear a click and see the polarity of the line reverse, you may need to replace the handset.

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