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Millennium Card-based terminals:

Replacing parts

Document number: P0883899 Document issue: 00.01

Document status: Standard Date: June 1998

Information in this document includes:

- Card terminals
- Inmate terminals

Standard



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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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v

Publication history

June 1998

This is the standard release of the repair procedures for Millennium Card and Inmate terminals, reflecting the modularization of the Millennium terminals installation, operation and maintenance information. This document includes all information from the previous two standard releases, listed below.

This issue also introduces the following new hardware revisions

- datajack card reader bezel
- universal telephony PCP, which has the datajack connector
- new keypad assembly which requires updates of both the upper bezel assembly and lineswitch assembly to reflect new connections of the keypad PCP and alerter functions

April 1997

Standard release for Millennium card terminals based on firmware release MTR 1.9. This guide reflects an upgrade of the Millennium Manager platform to MSR 2.0.

The MSR 2.0 release is backwards compatible with MSR 1.6, 1.7, and 1.8 terminal vintages, therefore the previous versions of this document and support documents still apply for those terminals.

October 1996

Standard release of this document reflecting the release of the IAS module, datajack module, and smart card alert feature for MSR 1.7/1.8-based terminals.

Millennium Card-based terminals: replacing parts





vi





Table of contents

1	Introduction	1-1
	How this module is organized	1-2
	Replaceable components	1-3
	Terminal components	1-4
	Identifying your terminal type	1-6
	Telephony/control board identification	1-7
	Tools and equipment required	1-7
	Setup/restore flowchart	1-9
2	Maintenance overview	2-1
	Before you enter the terminal	2-1
	Saving call detail records (CDRs)	2-2
	Preparing the terminal for maintenance	2-2
	If you need to uninstall the terminal	2-5
	Opening and closing the terminal	2-6
	Opening the unlocked terminal	2-6
	Restoring the terminal to operation	2-11
	Replacing the front housing assembly	2-14
	Flowchart	2-14
	Removing the front housing	2-15
	Replacing the housing lock	2-20
	Flowchart	2-20
	Replacing the lock	2-21
	Replacing the handset, cord, and swivel	2-23
	Flowchart	2-23
	Replacing the swivel/handset assembly	2-25
	Replacing the rear terminal PCP	2-28
	Flowchart	2-28
	Replacing the rear terminal board	2-29





viii Table of contents

Describing inferred answer supervision	2-31
Flowchart	2-33
Positioning and connecting the IAS module	2-34
Upgrading tiebar pivots	2-39
Before you start	2-39
Flowchart	2-41
Removing the pivots	2-42
Installing new pivots	2-44
3 PCP assembly components	3-1
Removing the PCP assembly	3-2
Flowchart	3-3
Working with the PCP assembly	3-5
Removing the telephony or control PCP	3-11
Replacing firmware on the control PCP	3-15
Installing smart card alert (SCA)	3-18
Flowchart	3-18
Replacing the SCA daughter board	3-19
4 Upper bezel components	4-1
Replacing the display (VFD)	4-2
Flowchart	4-3
Replacing the two-line VFD	4-4
Replacing the upper bezel assembly	4-7
Flowchart	4-8
Replacing the upper bezel assembly	4-9
Replacing the display window	4-15
Flowchart	4-16
Replacing the window	4-17
Installing an internal instruction card	4-19
Installing the Inmate instruction plate	4-19
Replacing the external instruction card	4-20
Replacing the quick access keys bezel	4-21
Flowchart	4-22
Replacing quick access keys	4-23
Replacing the quick access keys label card	4-25





5 Card and hookswitch parts	5-1
Replacing the card reader	5-2
Flowchart	5-3
Replacing card reader assembly parts	5-4
Explaining the datajack feature	5-11
Installing a card reader datajack bezel	5-12
Assembling an upgrade kit	5-12
Installing the datajack bezel	5-13
Making a datajack call	5-16
Replacing the alerter module	5-17
Flowchart	5-18
Steps for replacing the alerter module	5-19
Replacing the hookswitch module	5-22
Flowchart	5-23
Replacing the hookswitch	5-24
Replacing the hookswitch/alerter bezel	5-28
Flowchart	5-29
Replacing the bezel	5-30
Replacing the number card	5-32
6 Inmate terminal	6-1
Before you enter the terminal	6-1
Flowchart	6-2
Attaching a portable display	6-4
ESD precautions	6-6
Installing the portable display	6-7
Re-entering the craft interface	6-9
Removing the portable display	6-10
Index	I-1
Figures	
1 Introduction	
Figure 1-1: Replaceable parts on the terminal, part 1	1-4
Figure 1-2: Replaceable parts on the terminal, part 2	1-5
Figure 1-3: Locating the product ID label	1-6
Figure 1-4: Flowchart — preparatory and completion process	1-9





x Table of contents

2 Maintenance overview

Figure 2-1: Unlocking the upper housing	2-4
Figure 2-2: Proper sequence to open housing	2-7
Figure 2-3: How the housing assembly swings open	2-7
Figure 2-4: ESD connection and rear terminal PCP	2-8
Figure 2-5: Rear terminal PCP power connections	2-9
Figure 2-6: Connecting the IAS module and rear terminal PCP	2-10
Figure 2-7: Checking that the left tiebar is down (unlocked)	2-11
Figure 2-8: Flowchart — replacing the front housing	2-14
Figure 2-9: Hinge sockets and tiebar locations	2-17
Figure 2-10: Locking/unlocking the terminal with the tiebar	2-18
Figure 2-11: Flowchart — replacing the housing lock	2-20
Figure 2-12: Exploded view of lock assembly	2-21
Figure 2-13: Handset cord attaches through swivel	2-23
Figure 2-14: Flowchart — replacing handset and swivel assembly	2-24
Figure 2-15: Accessing the armored cord in the swivel	2-26
Figure 2-16: Accessing the armored cord in the swivel	2-27
Figure 2-17: Flowchart — replacing the rear terminal PCP	2-28
Figure 2-18: Replacing the rear terminal PCP	2-30
Figure 2-19: The IAS module in the front housing	2-31
Figure 2-20: Interconnection diagram showing IAS	2-32
Figure 2-21: Flowchart — installing an IAS module	2-33
Figure 2-22: Connections on the IAS module	2-35
Figure 2-23: Interconnect cable connector polarity	2-36
Figure 2-24: Wire positions on the terminal block	2-37
Figure 2-25: IAS module terminal block connections	2-38
Figure 2-26: Pivot locations on the rear housing	2-40
Figure 2-27: Flowchart — Replacing tiebar pivots	2-41
Figure 2-28: Locating the horizontal tie bar	2-43

3 PCP assembly components

Figure 3-1: PCP assembly components	3-2
Figure 3-2: Flowchart — working with the PCP assembly, page 1	3-3
Figure 3-3: Control PCP cable connections	3-7
Figure 3-4: PCP assembly in position	3-7
Figure 3-5: PCP assembly removed	3-9
Figure 3-6: Removing/replacing PCP assembly	3-10
Figure 3-7: Control/telephony PCP connection	3-12
Figure 3-8: Locating the PCP assembly frame tabs	3-13
Figure 3-9: Replacing firmware on the through-hole control PCP	3-17
Figure 3-10: Flowchart — replacing SCA daughter board, page 1	3-18
Figure 3-11: Positioning the SCA daughter board	3-21



Table of contents xi

Figure 3-12: Keypad PCP smart card alert cable	3-23
Figure 3-13: Alerter/keypad SCA connections	3-23
Figure 3-14: External interface hookswitch connections	3-24
Figure 3-15: Smart card alert board connections (overhead view)	3-24

4 Upper bezel components

Figure 4-1: Upper bezel assembly outside view	4-1
Figure 4-2: Exterior view of VFD on Card-based terminals	4-2
Figure 4-3: Flowchart — Replacing the display	4-3
Figure 4-4: Locating the display screws	4-5
Figure 4-5: Exploded view of clamp plate/display	4-6
Figure 4-6: Upper bezel assembly outside view	4-7
Figure 4-7: Flowchart — Replacing upper bezel assembly	4-8
Figure 4-8: Bezel A alerter/hookswitch connectors	4-10
Figure 4-9: Hookswitch — Bezel B keypad/alerter connections	4-11
Figure 4-10: Locating the ID bezel and screws	4-12
Figure 4-11: Removing the clamp plate	4-12
Figure 4-12: Screws securing the upper bezel	4-13
Figure 4-13: Removing the assembly	4-14
Figure 4-14: Display window external view	4-15
Figure 4-15: Flowchart — Replacing the window assembly	4-16
Figure 4-16: ID bezel screws hold clamp plate	4-18
Figure 4-17: Removing the clamp plate	4-19
Figure 4-18: Replacing the external instruction card	4-20
Figure 4-19: Quick access keys bezels	4-21
Figure 4-20: Flowchart — Replacing the quick access keys bezel	4-22
Figure 4-21: Screws securing the bezel	4-24
Figure 4-22: Removing the quick access keys bezel	4-24

5 Card and hookswitch parts

Figure 5-1: Hookswitch and card reader bezels	5-1
Figure 5-2: Exterior view of the card reader assembly	5-2
Figure 5-3: Flowchart — replacing the card reader assembly	5-3
Figure 5-4: Rain shield sits on back of card reader	5-5
Figure 5-5: Accessing the card reader assembly	5-6
Figure 5-6: Lower view of card reader assembly	5-7
Figure 5-7: Attaching the card reader to the bezel	5-7
Figure 5-8: Bent-card guide on the multi-card reader	5-8
Figure 5-9: Upper view of multi-card reader and bezel	5-9
Figure 5-10: Setting the rain shield on the card reader	5-9
Figure 5-11: Rain shield in place	5-10
Figure 5-12: Locating the firmware on the through-hole control PCP	5-11



xii Table of contents

Figure 5-13: Datajack plug fits into card reader bezel	5-13
Figure 5-14: Installing the teladapt support inside the bezel	5-14
Figure 5-15: Datajack connector with shorting loop	5-16
Figure 5-16: Locating the alerter in relation to external housing	5-17
Figure 5-17: Flowchart — replacing the alerter module	5-18
Figure 5-18: Accessing the alerter module	5-20
Figure 5-19: Locating the mattock fender	5-21
Figure 5-20: Position of the hookswitch on the external face	5-22
Figure 5-21: Flowchart — replacing the hookswitch module	5-23
Figure 5-22: Accessing the hookswitch module	5-25
Figure 5-23: Positioning the hookswitch rain shield	5-26
Figure 5-24: Underside of Module B	5-26
Figure 5-25: External view of the hookswitch/alerter bezel	5-28
Figure 5-26: Flowchart — replacing the hookswitch/alerter bezel	5-29
Figure 5-27: Locating the bezel screws	5-31
Figure 5-28: Locating the number plate window	5-32
Figure 5-29: Accessing the number card from inside	5-33
Figure 5-30: Locating the mattock fender	5-34

6 Inmate terminal components

Figure 6-1: Flowchart — Installing/removing portable display, page 1	6-2
Figure 6-2: Proper sequence to open housing	6-5
Figure 6-3: ESD and power connections inside the terminal	6-6
Figure 6-4: Connecting the VFD to the control PCP	6-8
Figure 6-5: Locking/unlocking the terminal with the tiebar	6-10
Figure 6-6: Reconnecting cables to the control PCP	6-11
Figure 6-7: Following the proper closing sequence	6-12

Tables

Table 1-1: Installation and maintenance tools	1-7
Table 3-1: Control PCP connections	3-6
Table 3-2: Telephony PCP and internal components connections	3-8





1 Introduction

This guide is intended for the craftspeople who maintain the Millennium Card-based terminals on-site.

It describes in detail how to correctly access the terminal to do maintenance and how to replace each component.

Included is a chapter describing specific maintenance procedures for the Inmate terminal, which is a displayless, Card-based terminal. The main difference in procedure involves installing and removing an external portable display used to view the craft interface menus.

The replaceable components can be ordered by the operating company, unless otherwise noted. Information about ordering parts is available from Nortel sales offices.

Ensure that you read and understand the steps that must be carried out before any parts are replaced.

Before you enter the terminal, always upload CDRs.

When you enter the terminal:

- Always connect your ESD wrist strap to an ESD point inside the terminal.
- Always disconnect the power to the terminal

Specific instructions for these procedures are included in this module.

This chapter also includes a flowchart giving the key points to accessing the terminal for a maintenance session and returning the terminal to operation.



1-2 Introduction

How this module is organized

This module is organized into the following sections:

Chapter 1: Introduction describes the guide contents and gives an overview of the terminal and the replacement components.

Chapter 2: Accessing the terminal provides instructions about accessing the terminal, replacing the entire front housing, installing a housing lock, and replacing the handset and cord and swivel mount. It also includes procedures for replacing the rear terminal PCP and installing an inferred answer supervision (IAS) module.

Chapter 3: PCP assembly components provides instructions about removing the PCP assembly so the internal components are accessible, removing the telephony and control PCPs from the assembly, replacing firmware, and installing a smart card alert daughter board.

Chapter 4: Upper bezel components provides procedures for replacing the parts associated with the upper bezel assembly. This includes: the vacuum fluorescent display (VFD), display window, the upper bezel itself (two versions), quick access keys bezel.

Chapter 5: Card and hookswitch parts provides procedures for replacing: the card reader assembly, with or without datajack connector; two versions of the hookswitch module; the alerter module; and the hookswitch/alerter bezel.

Chapter 6: Inmate terminal provides instructions for procedures relating specifically to the Inmate terminal.





Index: provides cross-reference for information in this module.

Replaceable components

Many of the components on the terminal are replaceable. The list below lists these replaceable parts.

Some terminals may not have all the parts listed. For instance, the Inmate terminal does not have quick access keys. Instead, a blank bezel covers this area of the terminal.

- * ID bezel, specific to operating company
- * front housing assembly
- upper housing lock, specific to operating company
- handset and armored cord assembly, swivel assembly and cotter pin
- telephony printed-circuit pack (PCP)
- control PCP, control and voice firmware
- smart card alert daughter board (optional)
- rear terminal board
- IAS (inferred answer supervision) module (optional)
- * upper bezel assembly with integral keypad
- * display window assembly
- instruction card, provided by the operating company
- vacuum fluorescent display (VFD) with ESD shield
- * five-button and ten-button quick access keys bezel
- * card reader assembly
- alerter module
- hookswitch module with rain shield
- * hookswitch/alerter bezel assembly
- number card, provided by the operating company
- data jack connector (optional)

* These assemblies should have gaskets included. Do not install these components without a gasket. Ensure the gasket is undamaged if replacing it in the set.



1-4 Introduction

Terminal components

Figure 1-1 and Figure 1-2 illustrate the various components of the terminal.

Figure 1-1: Replaceable parts on the terminal, part 1

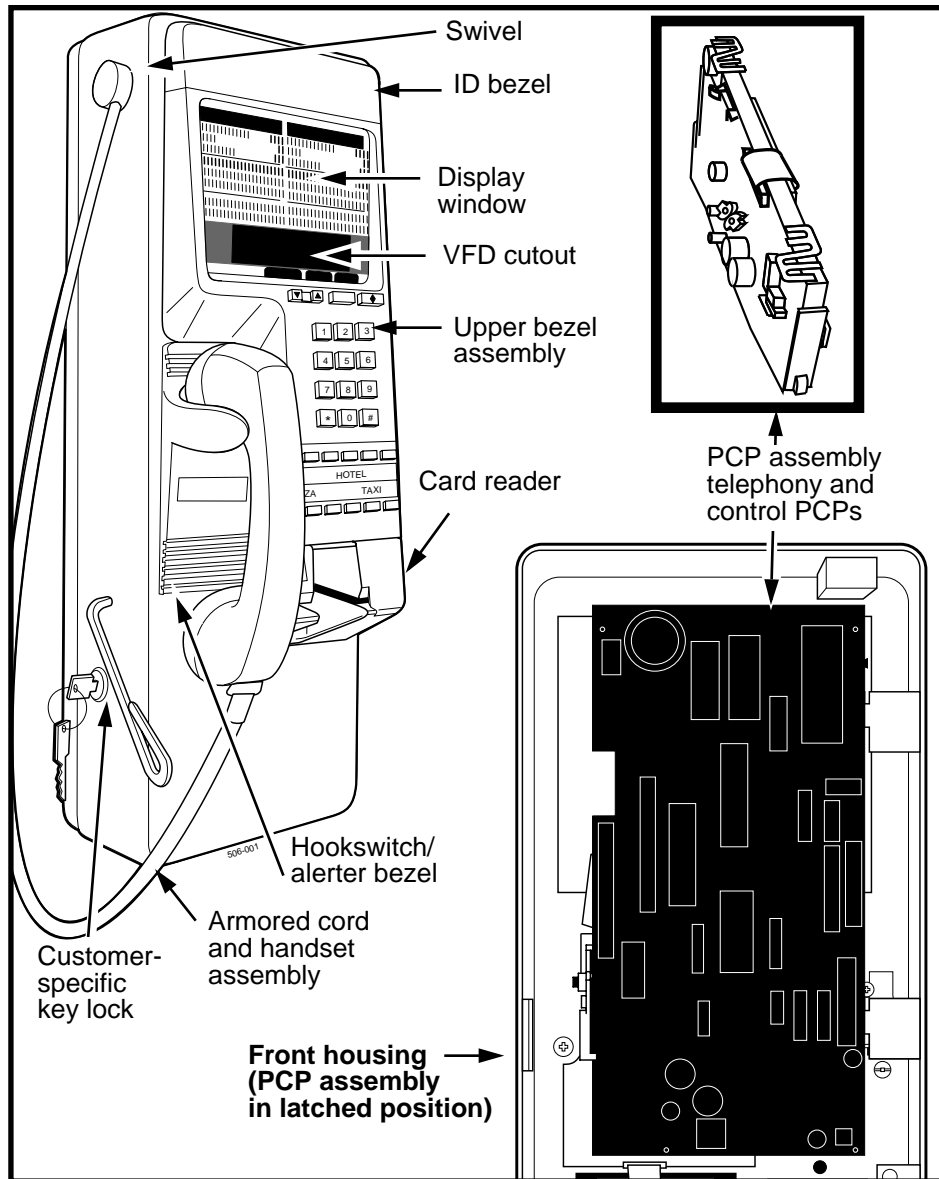
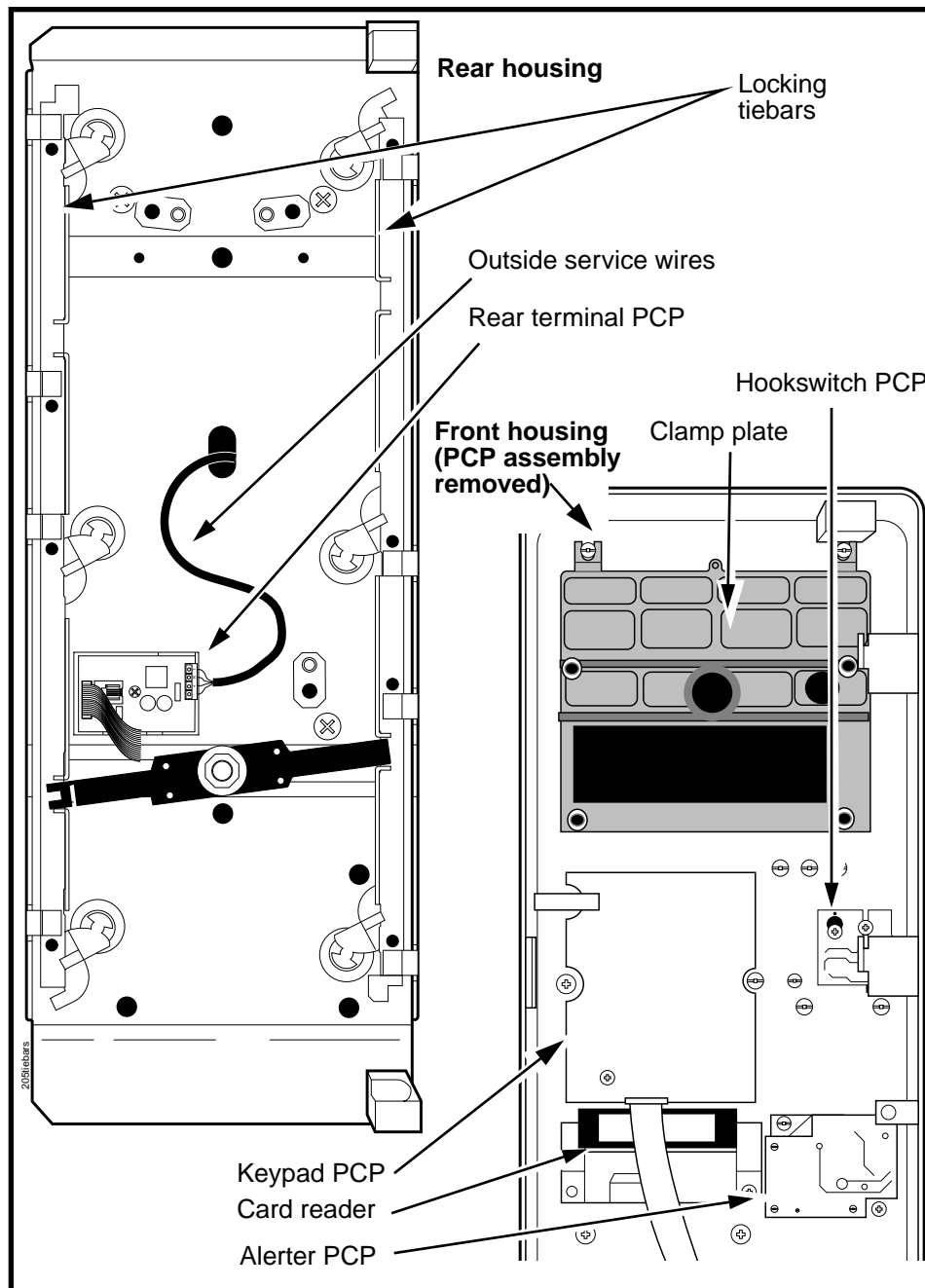


Figure 1-2: Replaceable parts on the terminal, part 2





1-6 Introduction

See this:



Inmate terminal

The Inmate terminal does not have a window assembly, a VFD assembly, or quick access keys. A blank bezel covers this area the quick access keys portion.

The card reader is optional. If a card reader is not installed, the bezel is blank.

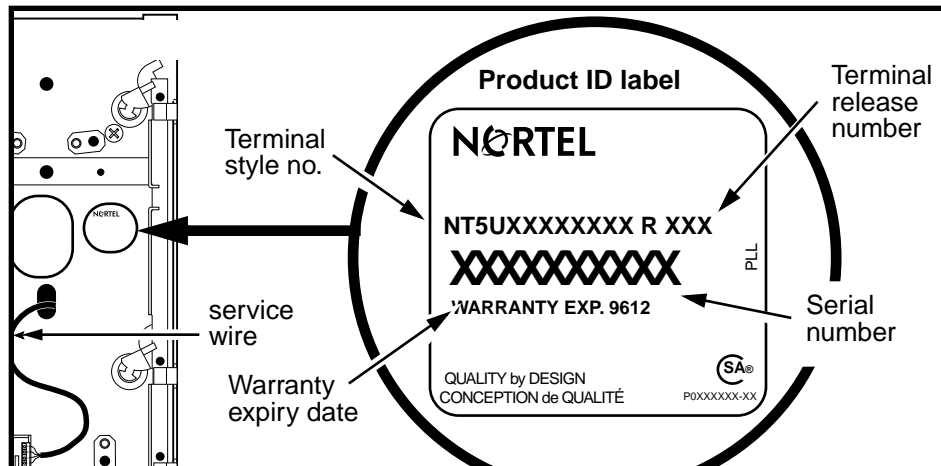
Identifying your terminal type

Each terminal has a **product ID label** located in the top righthand corner on the outside, and somewhere on the inside, of the rear housing.

Refer to Figure 1-3.

- This label tells you the type of terminal and the release number, which you may need to refer to when ordering components.
- This label also has the warranty expiry date of the terminal.

Figure 1-3: Locating the product ID label





Telephony/control board identification

The following table lists the label color and the product engineering code (PEC) that appears on control and telephony PCPs:

Board type	PEC	Color
Datajack telephony PCP	NT5U4045	Yellow
MTR 1.7: Datajack control PCP	Will vary	Blue
MTR 1.7/1.9: control PCPs, standard and datajack telephony PCPs	Will vary	White
Repaired boards		Green
Note: Boards shipped with new terminals have a PEC which represents the firmware shipped with the board. Replacement boards, shipped without firmware, will have a different PEC.		



Tools and equipment required



Table 1-1 lists the tools and equipment required to install, maintain, and test the Card terminal.

Table 1-1: Installation and maintenance tools

Tool	Use to
multimeter	measure the voltage (Vdc) of the supplementary power supply
ESD wrist strap	protect electronic components from electrostatic discharge (ESD) damage
T-tool or L-tool	open the housing assembly
butt-end test set	test the line to the terminal
dry type cleaning card	clean the card reader.
test cards: mag and chip cards	test the ability of the terminal to process card calls





1-8 Introduction

Table 1-1: Installation and maintenance tools (continued)

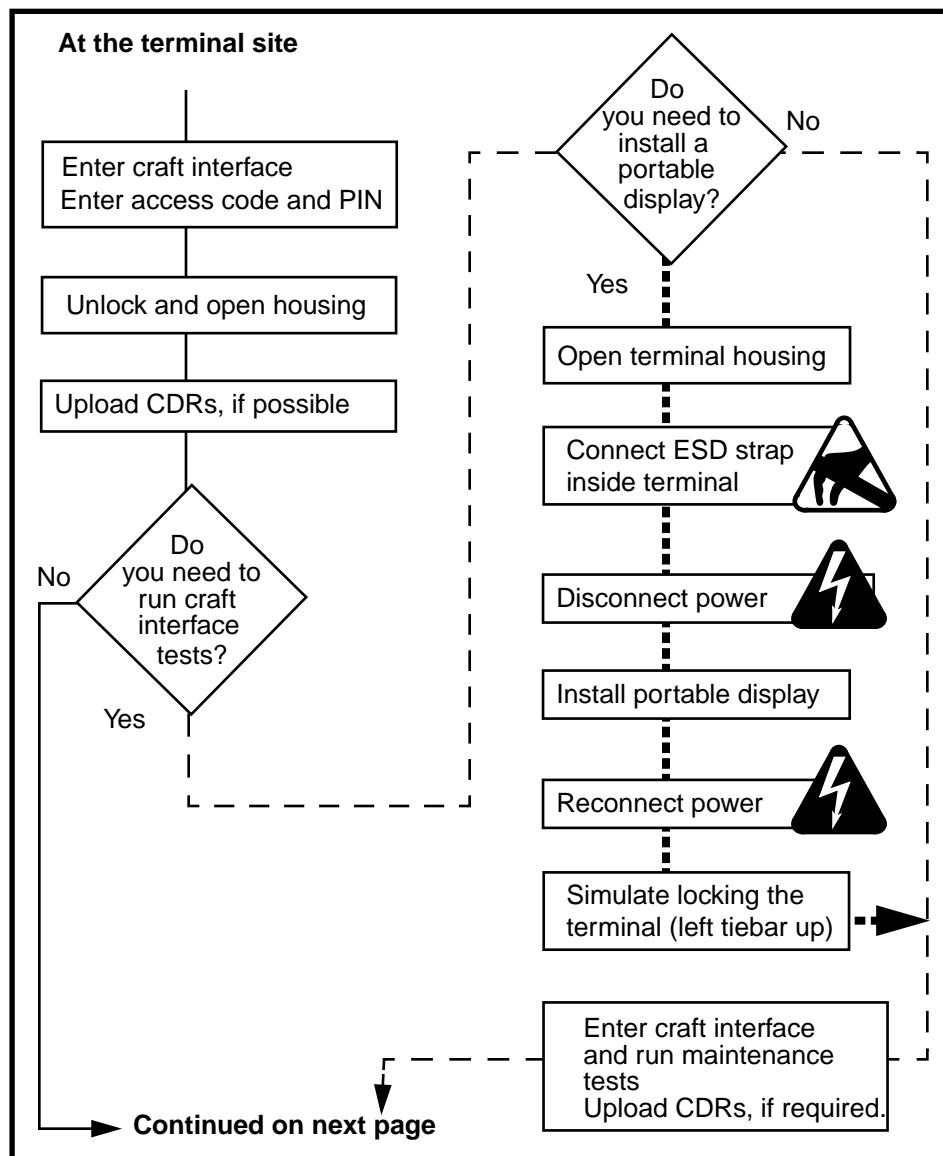
Tool	Use to
upper housing key	unlock the terminal
wire cutters	trim line to attach to terminal connector.
electrical tape	insulate live wires
7/16-inch wrench	attach the lock cam to the lock.
7/8-inch wrench	install the housing-assembly lock.
#1 type 1A cross-recess screwdriver	tighten and loosen M3 screws and to remove the number-card window.
#2 type 1A cross-recess screwdriver	tighten and loosen M3.5 screws and M5 screws.
chip puller	replace firmware chips on the control PCP.
spare anti-static bags	place PCP assembly or other ESD-sensitive components into bags when they are removed from the terminal, but not being worked on.



Setup/restore flowchart

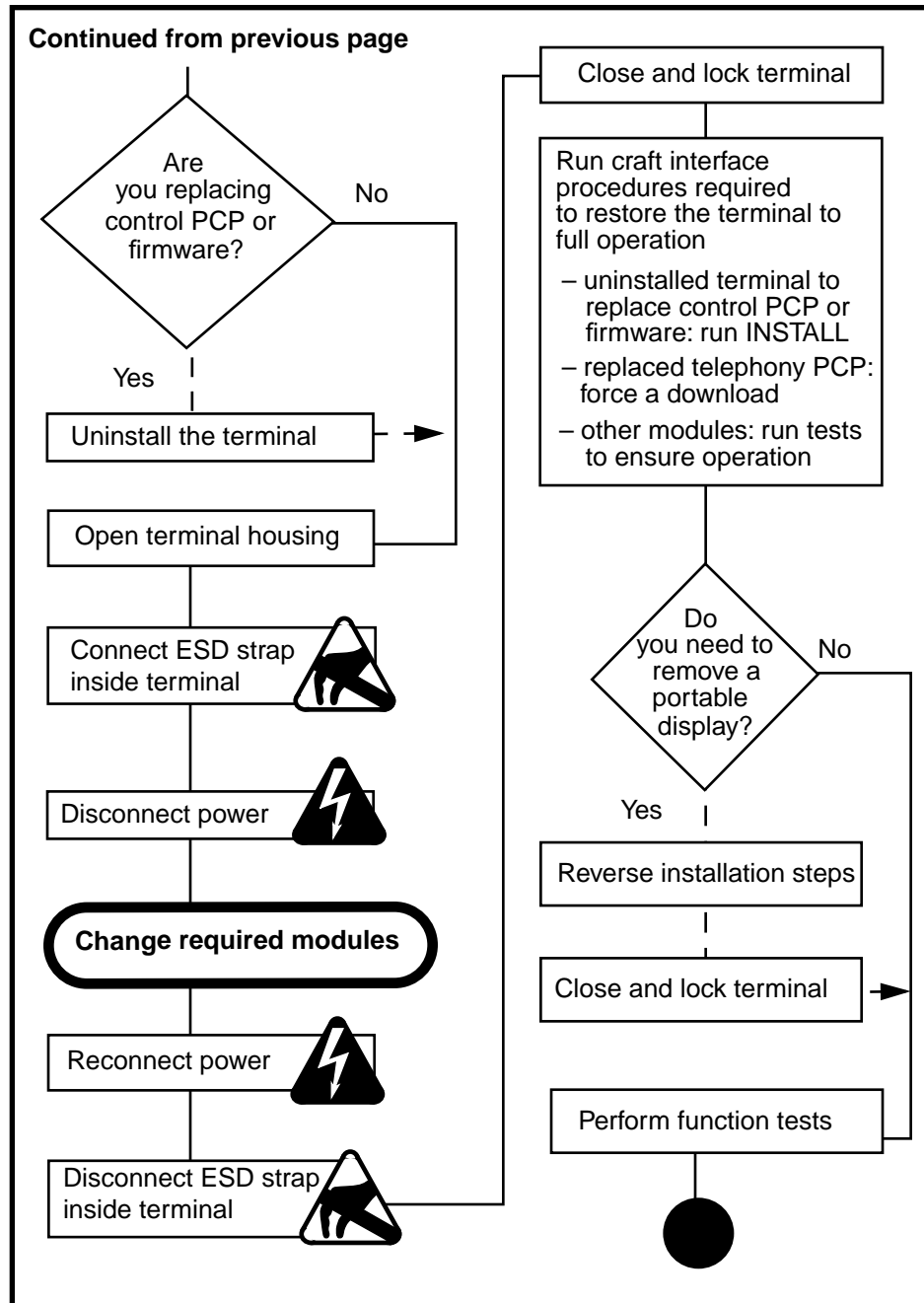
The following flowchart describes the process for preparing the terminal for maintenance procedures, and restoring it to service when maintenance is complete.

Figure 1-4: Flowchart — preparatory and completion process



1-10 Introduction

Flowchart — Preparatory and completion, page 2





2-1

2 Maintenance overview

This chapter describes the procedures for accessing the terminal to do maintenance procedures. As well, it includes procedures for:

- replacing the entire front housing
- installing a housing lock
- replacing the handset and cord or the swivel mount
- replacing the rear terminal PCP
- installing or replacing an IAS module



Before you enter the terminal

To access the inside of the terminal you require maintenance-level privileges, a housing key, and a locking tool (T- or L-tool).

You may need to access the terminal if the terminal is out of service or if you have run the craft interface tests and discovered a faulty component.

- If you know you will be replacing the **control PCP** or **firmware** on it, you need to **uninstall the terminal** before you start replacing parts.

When your maintenance tasks are complete, you then re-INSTALL the terminal.

In this instance, it is imperative that you upload CDRs before you start your maintenance procedures.

Millennium Card-based terminals: replacing parts





2-2 Maintenance overview

- If you do not plan to change the control board or firmware, you do not need to re-INSTALL the terminal when you complete your tasks.

However, we recommended that you still upload the CDRs as a precautionary measure.

Saving call detail records (CDRs)

It is important to upload all CDRs from the terminal before performing maintenance tasks inside the terminal. Although records may not be directly affected by what you are doing, uploading the CDRs assures that the terminal records are up-to-date as of the time of maintenance.

Preparing the terminal for maintenance

If you need to enter the terminal to replace parts, or for further testing you will need to enter the craft interface and upload the CDRs.

See this:



Inmate terminal

To do maintenance tests on an Inmate terminal, you need to attach the portable display immediately.

Chapter 6 describes the proper installation procedure. Follow those instructions and then proceed with **Opening and closing the terminal** on page 2-6.






Maintenance overview 2-3

To access the terminal to 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. This will be necessary if the terminal has never previously been installed or if you replaced the control PCP.

2. Enter your personal identification number (PIN) code

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

3. Press *.

This message appears on the VFD:

Please use key now
& open the terminal

Note: If you attempt to unlock the terminal without pressing *, the terminal will send an alarm to the Millennium Manager indicating an illegal entry.

If you don't want to continue into the craft interface, press #.

4. Put the key into the key lock on the left side of the housing assembly and turn it clockwise. Refer to Figure 2-1.

See this:



It is important to unlock and open the terminal quickly after entering your PIN. If you do not open the terminal within three minutes, the terminal times out.

5. If you have not already done so, insert the T- tool or L- tool into the hole above the key lock.





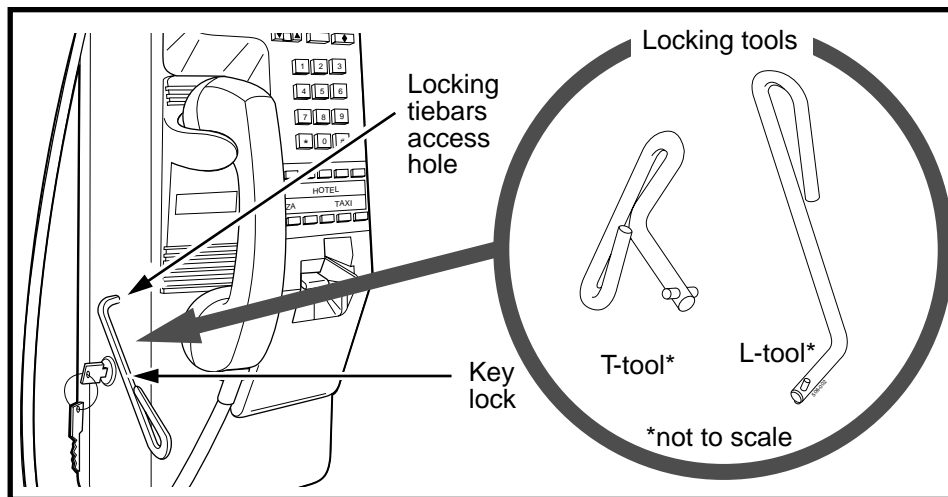
2-4 Maintenance overview

This hole connects to the locking tiebars which secure the front housing to the rear housing.

6. Rotate the T- tool or L- tool counterclockwise until the tool stops turning to release the housing. Refer to Figure 2-1.

Do not open the terminal housing.

Figure 2-1: Unlocking the upper housing



See this:



Inmate terminal

At this point you will have to open the terminal to install the portable display if you have not already done so.

BEFORE YOU INSTALL THE DISPLAY, ensure you follow ESD precautions outlined below:

- Connect your ESD strap to an ESD point inside the terminal.
- Disconnect the power from the control PCP.
- Refer to **Attaching a portable display** on Page 6-4 for details.





7. Upload the terminal status and call-detail records (CDRs) with the following procedure:
 - a) If the prompt does not appear when you enter the maintenance menus, enter 732 from the keypad.
 - b) Press 1.
 - c) Press *.
 - d) If there were call records in the terminal, repeat **Steps 7b to 7c** until, the following message appears on the VFD:

No call records
To continue, press *

- e) Press *.
8. If you do not need to uninstall the terminal, go to the section **Opening and closing the terminal**.

If you need to uninstall the terminal, follow the procedures given in **If you need to uninstall the terminal**, below and then go to **Opening and closing the terminal** on page 2-6.

If you need to uninstall the terminal

Follow these steps to uninstall a terminal if you are replacing a module which will require the INSTALL routine.

1. Close and lock the terminal with the t-tool.

See this:



Inmate terminal

Since the portable display cable prevents the terminal from closing, move the left side housing tiebar **up (to lock)** or **down (to unlock)** to simulate locking and unlocking.

2. With the handset on-hook, enter the access code.





2-6 Maintenance overview

3. When the PIN prompt appears, press # on the keypad. The terminal is uninstalled.
4. Go to the section **Opening and closing the terminal**.

Opening and closing the terminal

Once you have completed the section **Preparing the terminal for maintenance** on page 2-2, you are ready to open the terminal housing to access the components.

This section describes:

- how to properly open and close the terminal housing
- ESD precautions to take
- how to properly disconnect the power to the terminal
- how to restore the terminal to operation after maintenance



Opening the unlocked terminal



Follow these steps to open the terminal housing and prepare the terminal for maintenance.

1. Grasp the housing firmly by the top and bottom of the front housing.
2. Pull the bottom of the front housing away from the back housing.
3. Pull the top of the front housing away from the back housing and swing the front housing towards your right, rotated as shown in Figure 2-2.
4. Check that the hinges are still connected inside the terminal.
5. As you pull it forward, rotate the housing assembly on its pivot points so the front of the assembly faces your right, as shown in Figure 2-3.





Figure 2-2: Proper sequence to open housing

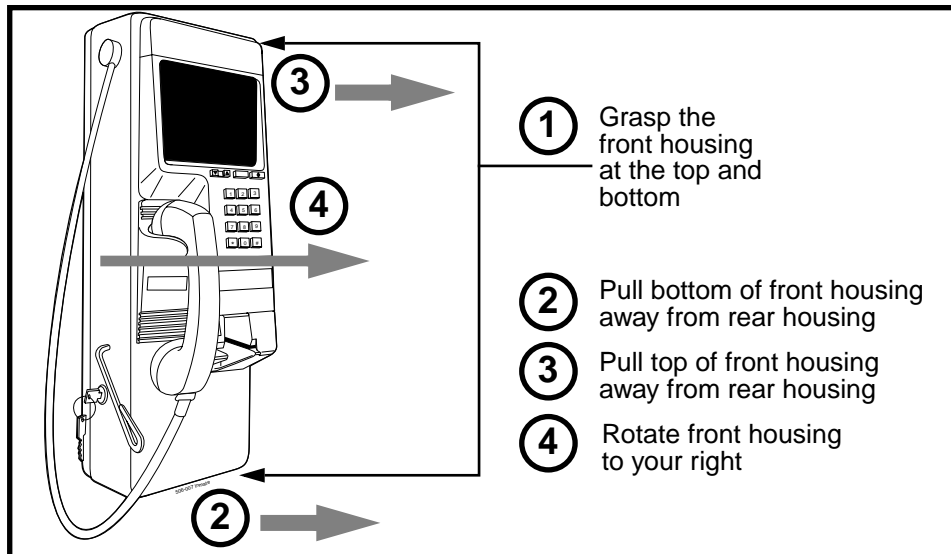
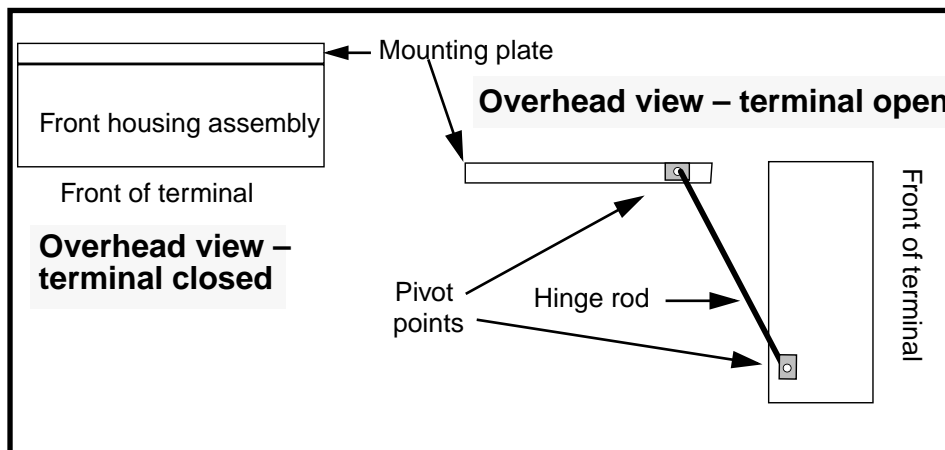


Figure 2-3: How the housing assembly swings open



6. Attach your ESD wrist strap to an ESD connection point. Refer to Figure 2-4.



2-8 Maintenance overview

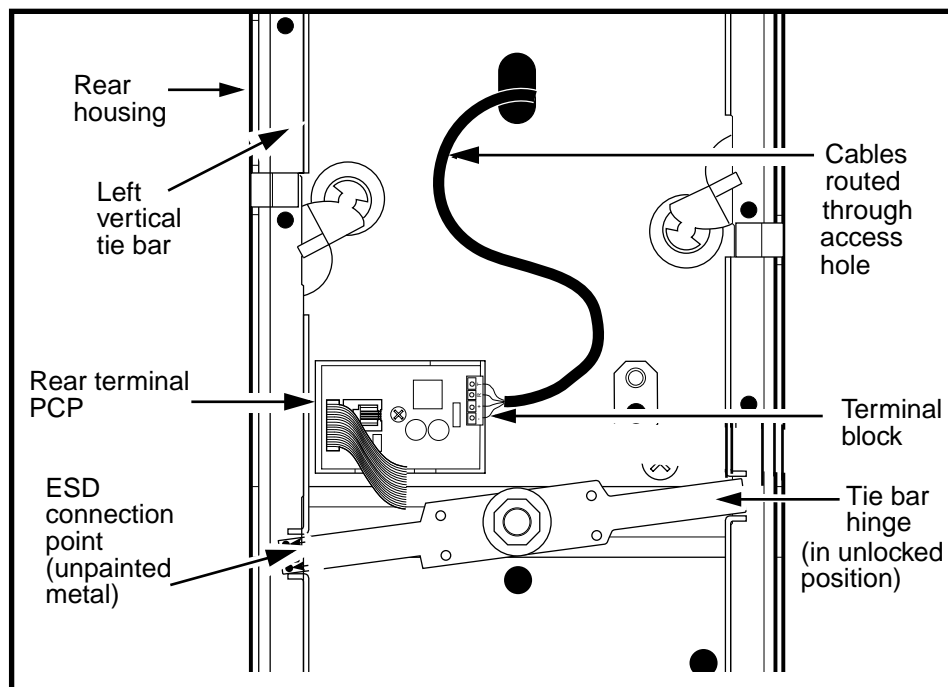
Electrostatic discharge (ESD) precautions



Failure to follow these precautions may damage the electrostatic-sensitive components.

- Electronic components are sensitive to electrostatic discharge. Before working with the PCP assembly, **put on your ESD wrist strap** and connect it to the ESD points shown in Figure 2-4.
- Before replacing any component, **disconnect the power supply** as described in this section.
- DO NOT reconnect the power until you are finished replacing parts.
- When removing any component with a PCP, put it in an anti-static bag or on an anti-static surface to work with it.

Figure 2-4: ESD connection and rear terminal PCP



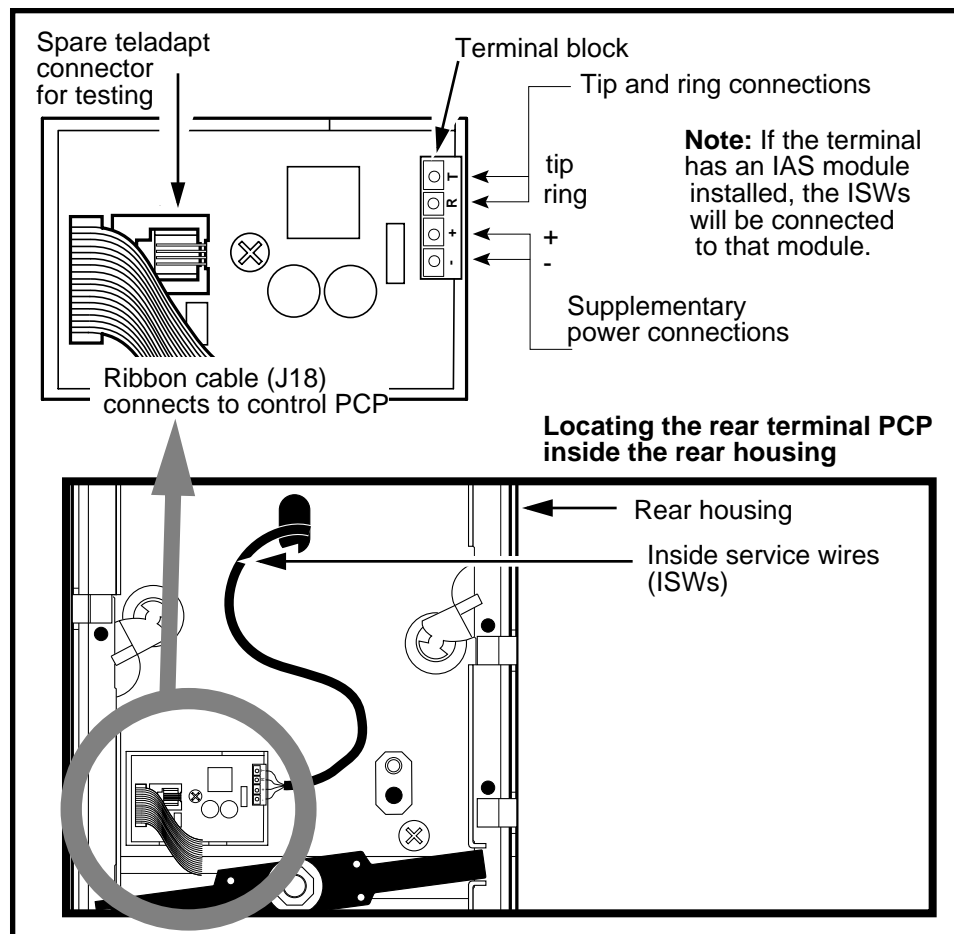
7. Disconnect the power from the terminal by disconnecting the ISWs from the terminal block on the rear terminal PCP.

Wrap the bare parts of the wire in tape to insulate them from the ESD-sensitive boards.

Note: On newer terminals, the terminal block can be disconnected from the rear terminal PCP and it is unnecessary to remove the wires.

Refer to Figure 2-5.

Figure 2-5: Rear terminal PCP power connections



2-10 Maintenance overview

See this:

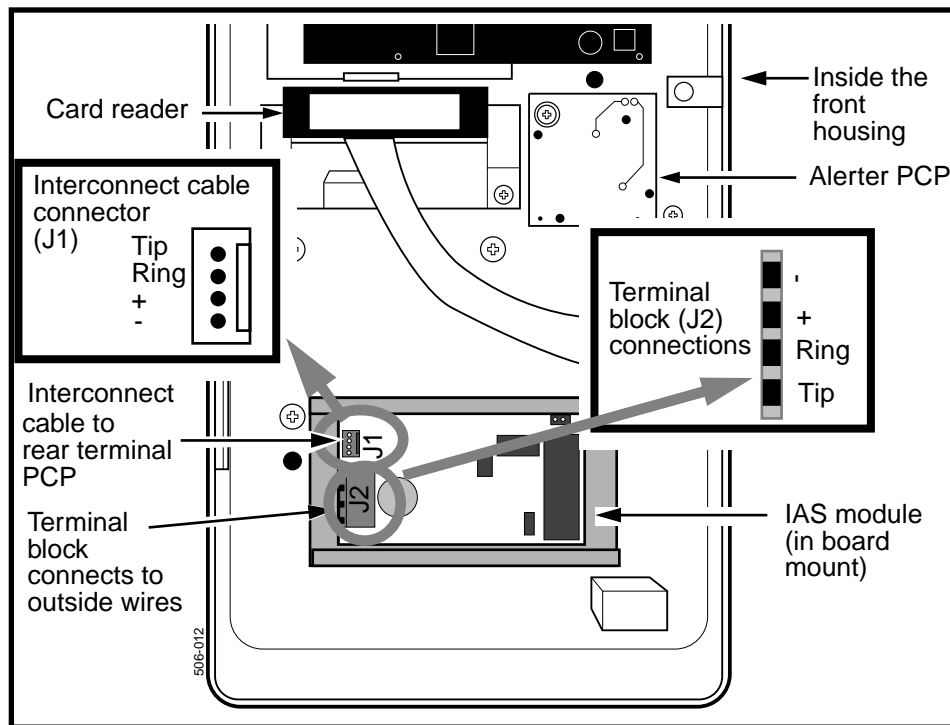


IAS module

If the terminal has an IAS module, which will be installed on the front housing:

- Disconnect the interconnect cable running between the IAS module and the rear terminal PCP from connector J1 on the IAS module. Refer to Figure 2-6.
- Unplug the terminal block from the IAS module.

Figure 2-6: Connecting the IAS module and rear terminal PCP



8. Install or replace the necessary parts.



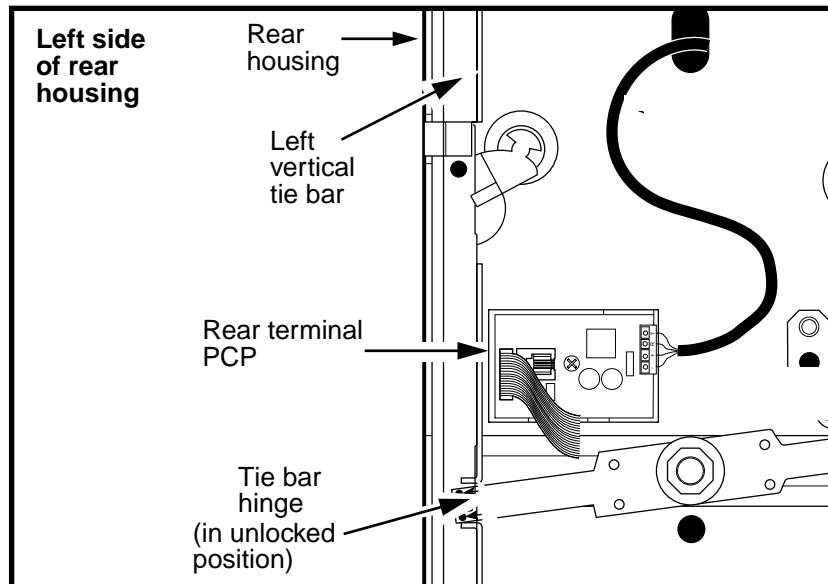
Restoring the terminal to operation

After you replace modules, you need to restore the terminal to operation.

This section describes the checks to make before you close the terminal and the steps to restoring it to operation.

1. Check that the locking tiebars are in the unlocked position, in that the left vertical tiebar of the locking mechanism is down. Refer to Figure 2-7

Figure 2-7: Checking that the left tiebar is down (unlocked)



2. Check that the cable connectors are all properly and firmly seated.

See this:



IAS module

If the terminal has an IAS module, reconnect the interconnect cable from the rear terminal PCP to J1 on the IAS module.





2-12 Maintenance overview

3. Reconnect the power by reconnecting the ISWs to the terminal block on the rear terminal PCP or the IAS module, if there is one.

If, after connecting power to the terminal, **Telephony board not responding** appears on the display. With the terminal open and the handset on-hook, allow the terminal to power up for three minutes.

- During this time, the terminal will not respond to install or maintenance instructions.
 - If **Telephony board not responding** still shows after three minutes, replace the telephony PCP by following the steps in **Removing the PCP assembly** on Page 3-2 and **Removing the telephony or control PCP** on Page 3-11.
4. Close the terminal.
 5. Turn the L- or T-tool clockwise until it stops turning in the housing aperture to secure the housing. Then turn the key in the lock counterclockwise.

See this:



Inmate terminal

Simulate locking the terminal, by pulling up the left vertical tiebar.

- If you need to run the INSTALL or use the craft interface, continue with Step 6, below.
- If you are finished with the craft interface and want to return the terminal to operation, refer to **Removing the portable display** on Page 6-10 for the detailed procedure for removing the portable display.





Maintenance overview **2-13**

6. If necessary, return the terminal to operation with the appropriate procedure listed below:
 - If you took the **terminal out of service**, return it to service through the craft interface.
 - If you **uninstalled the terminal** to replace the control PCP or the firmware, run the INSTALL routine.
 - If you replaced the telephony PCP, use the maintenance level of the craft interface to perform a forced download.

These procedures are described in *Millennium terminals: using the craft interface*.

7. When you are finished using the craft interface, close and lock the terminal.
8. Perform operation tests to confirm that the terminal is fully functional.





2-14 Maintenance overview

Replacing the front housing assembly

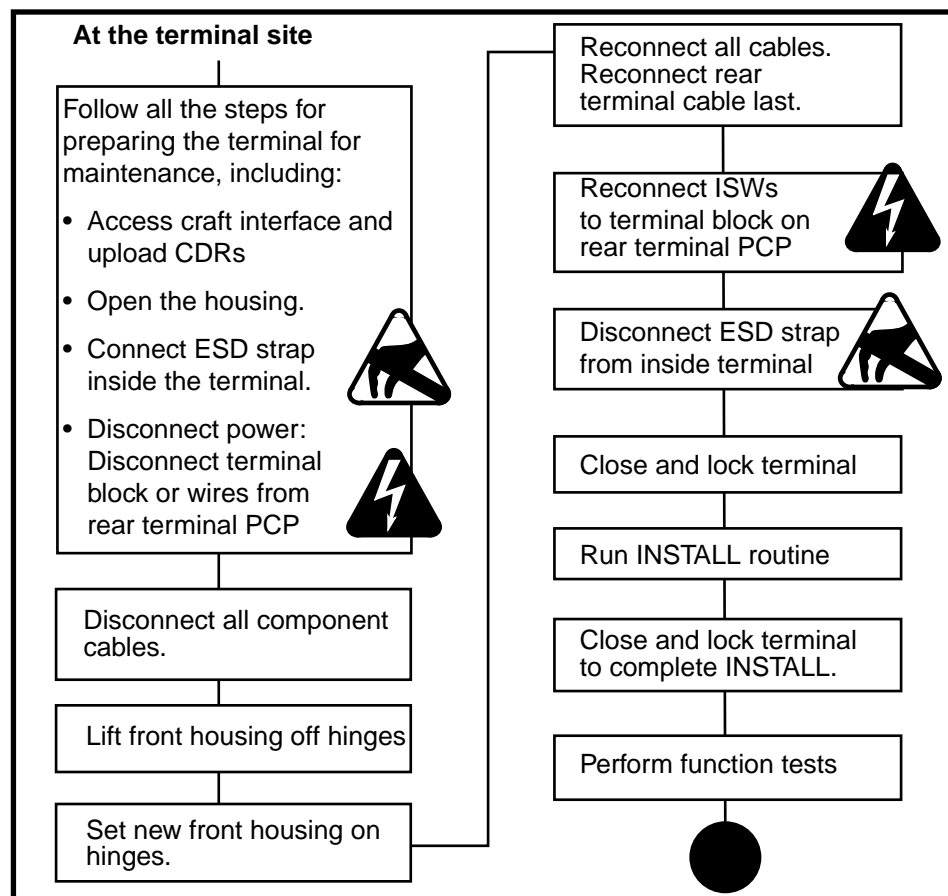
The following procedure describes how to remove and replace the entire front housing assembly.

This procedure would be necessary if the housing casing itself is vandalized, requiring that the housing assembly be turned in for repair.

Flowchart

The following flow chart describes the key points to replacing the front housing assembly.

Figure 2-8: Flowchart — replacing the front housing





Removing the front housing

To remove the entire front housing assembly, including the PCP assembly, follow these steps:

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6.

Upload CDRs before you start!

- Upload the CDRs to the Millennium Manager before you start.
- In some cases it will not be possible to do this step because of problems on the control PCP. In these cases, notify the operating company that the CDRs could not be uploaded.

Uninstall the terminal

- Remember to uninstall the terminal through the craft interface before you replace this part.
- This means you need to run the INSTALL routine when you are finished.

- connected your ESD wrist strap inside the terminal

Electrostatic discharge (ESD) precautions



- Before working inside the terminal, put on your ESD wrist strap and connect it to the ESD connection points inside the terminal.
- Place any components you remove from the terminal into an anti-static bag.





2-16 Maintenance overview

- confirmed that the terminal block is disconnected from the rear terminal PCP

See this



- Before disconnecting any cables, disconnect the supplementary power supply.
- **Do not reconnect power until you are ready to close the terminal.**

Failure to follow these precautions may damage ESD-sensitive components.

2. Disconnect the rear terminal PCP cable (J18) from the control PCP connector.
 - If the terminal has an IAS module, disconnect the interconnect cable between the IAS module and the rear terminal PCP.
3. Lift the housing assembly until the hinge rods clear their brackets on the rear mounting plate.
4. To reinstall the assembly, support the front housing vertically parallel to the rear mounting plate and insert the hinge rods into the hinge brackets on the rear mounting plate. Refer to Figure 2-9.
5. Reconnect the cables to the PCP assembly boards.

See this:



Inmate terminal

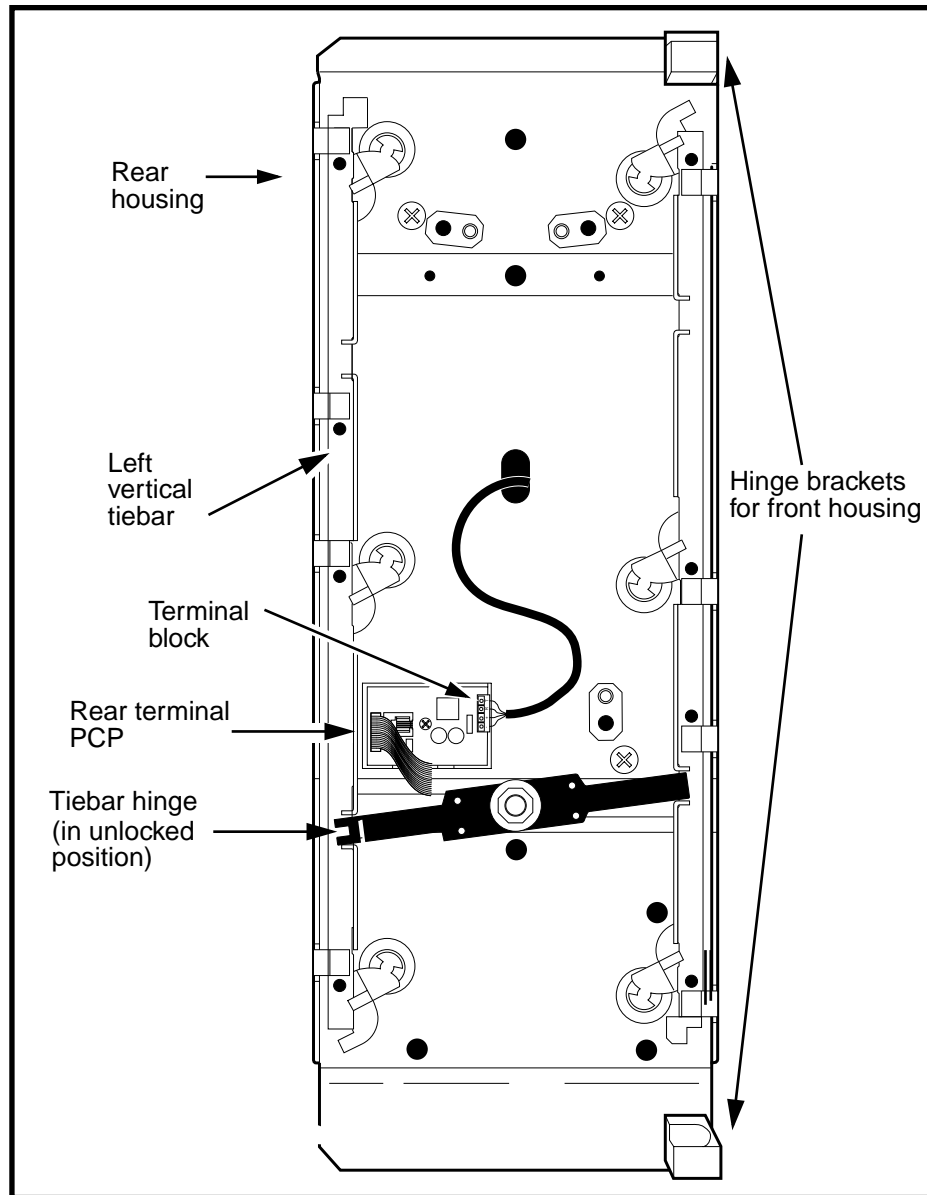
If this is an Inmate terminal, install the portable display now.

Refer to Chapter 6 for details.

6. Reconnect the power to the rear terminal PCP.
7. Before closing the terminal:
 - a) Check that the locking tiebars are in the unlocked position — the left-hand side of the locking mechanism on the rear housing should be down. Refer to Figure 2-9.



Figure 2-9: Hinge sockets and tiebar locations



- b) Check that the cable connectors on the PCP assembly are all properly and firmly seated.

2-18 Maintenance overview

- c) If the terminal needs an IAS module, ensure that it has been installed and properly connected. Refer to the section on installing an IAS module later in this chapter, if necessary.

8. Close and lock the terminal.

See this:



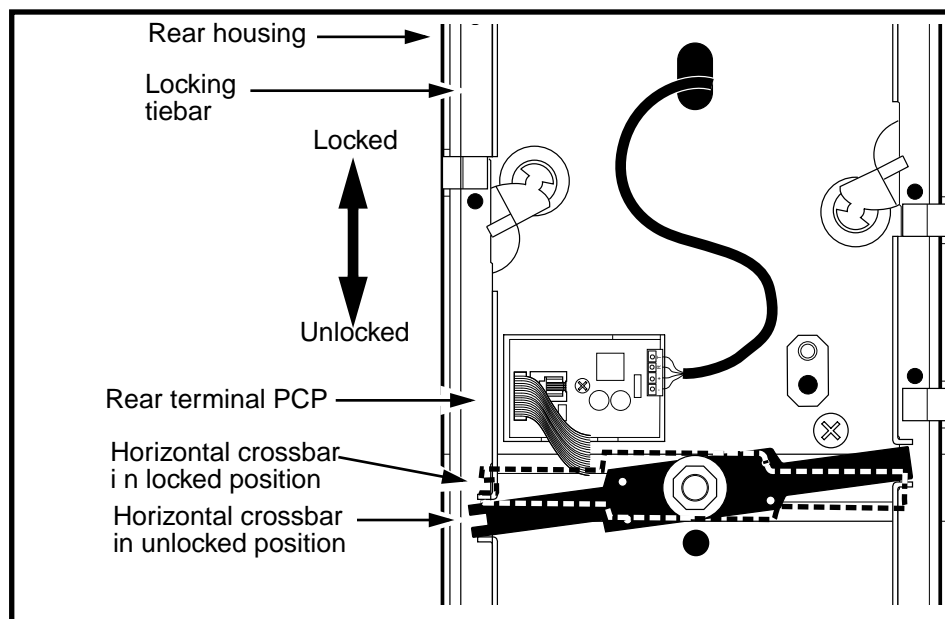
Inmate terminal

Since you cannot completely close the housing, you must simulate locking the terminal.

- To simulate locking the terminal, pull **up** the left side housing tiebar.
- When you re-enter the craft interface to perform the INSTALL procedure (Step 9), simulate unlocking the terminal by pulling **down** the left side housing tiebar.

Refer to Figure 2-10.

Figure 2-10: Locking/unlocking the terminal with the tiebar





9. Run the INSTALL routine.

This procedure is described in *Millennium terminals: using the craft interface*.

10. When the routine is complete, close and lock the terminal.

See this:



Inmate terminal

Refer to **Removing the portable display** on Page 6-10 for a detailed steps for removing the portable display.

WARNING: Always disconnect the power before you disconnect the portable display.

11. Perform operations tests to confirm that the terminal is fully functional.





2-20 Maintenance overview

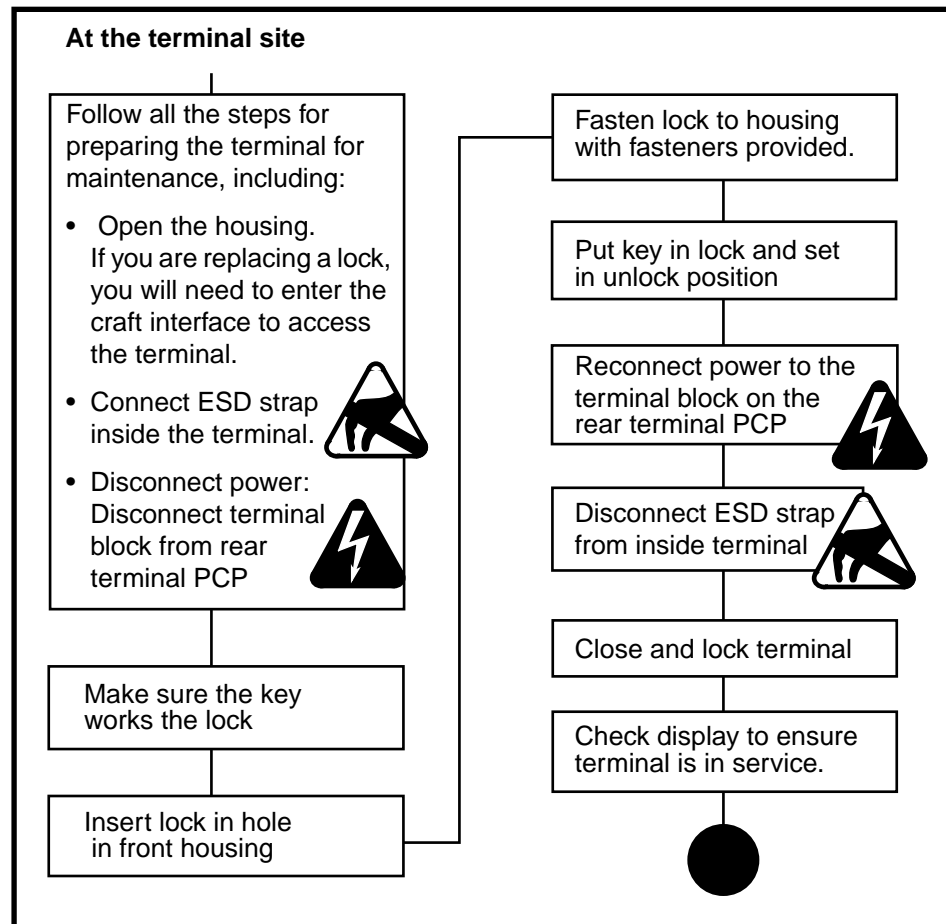
Replacing the housing lock

The housing key lock is a customer-specific item. The following section describes how to replace this lock.

Flowchart

The following flow chart describes the key points to installing or replacing the lock assembly.

Figure 2-11: Flowchart — replacing the housing lock

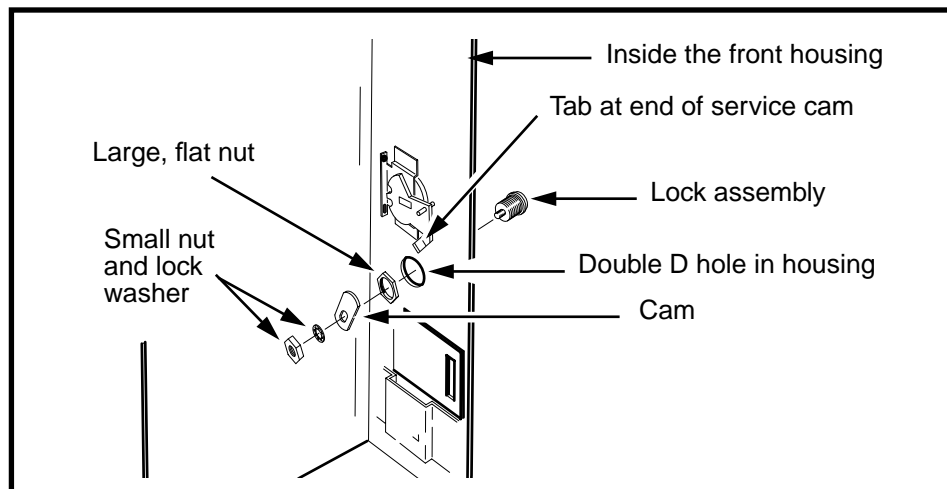


Replacing the lock

The following procedure gives the details for changing a lock on the terminal.

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6.
 - It is not necessary to disconnect the power for this procedure, it is recommended that you do so.
 - **DO CONNECT your ESD strap** to an ESD point inside the terminal, such as the locking tiebars on the side of the rear terminal housing.
2. Ensure that the key operates the lock.
3. Insert the lock assembly in the double D hole in the front housing with the key slot pointing to the open edge of the housing.

Figure 2-12: Exploded view of lock assembly



4. Thread the large, flat nut over the lock assembly and lock in place using a 7/8-inch wrench.



2-22 Maintenance overview

5. Slide the cam over the threaded end of the lock assembly, with the long end of the cam pointing upwards. Refer to Figure 2-12.

This projection should rest against the black tab at the end of the service cam above it.
6. Slide the locking washer onto the threaded end of the lock assembly.
7. Fasten the cam in place with the small nut, using a 7/16-inch wrench.
8. Place the key in the lock and rotate it clockwise until it stops. This puts the lock in the unlocked position.
9. Reconnect the power to the rear terminal PCP if you disconnected the power.
10. Remove the ESD wrist strap connection.
11. Close and lock the terminal. Refer to the steps in **Restoring the terminal to operation** on page 2-11, if necessary.
12. Test that the terminal can be locked and unlocked.
13. To remove the lock, reverse the preceding steps.

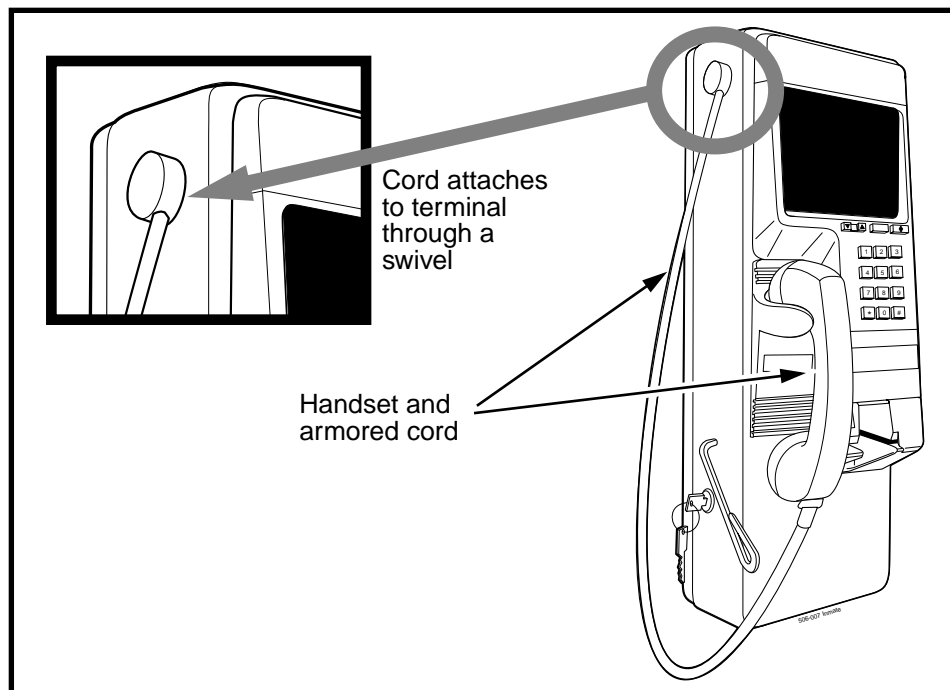


Replacing the handset, cord, and swivel

If the handset is damaged, both the handset and cord are replaced as one assembly.

The armored cord leading from the handset attaches to the terminal housing through a swivel unit, which occasionally may also need replacement. Refer to Figure 2-13.

Figure 2-13: Handset cord attaches through swivel

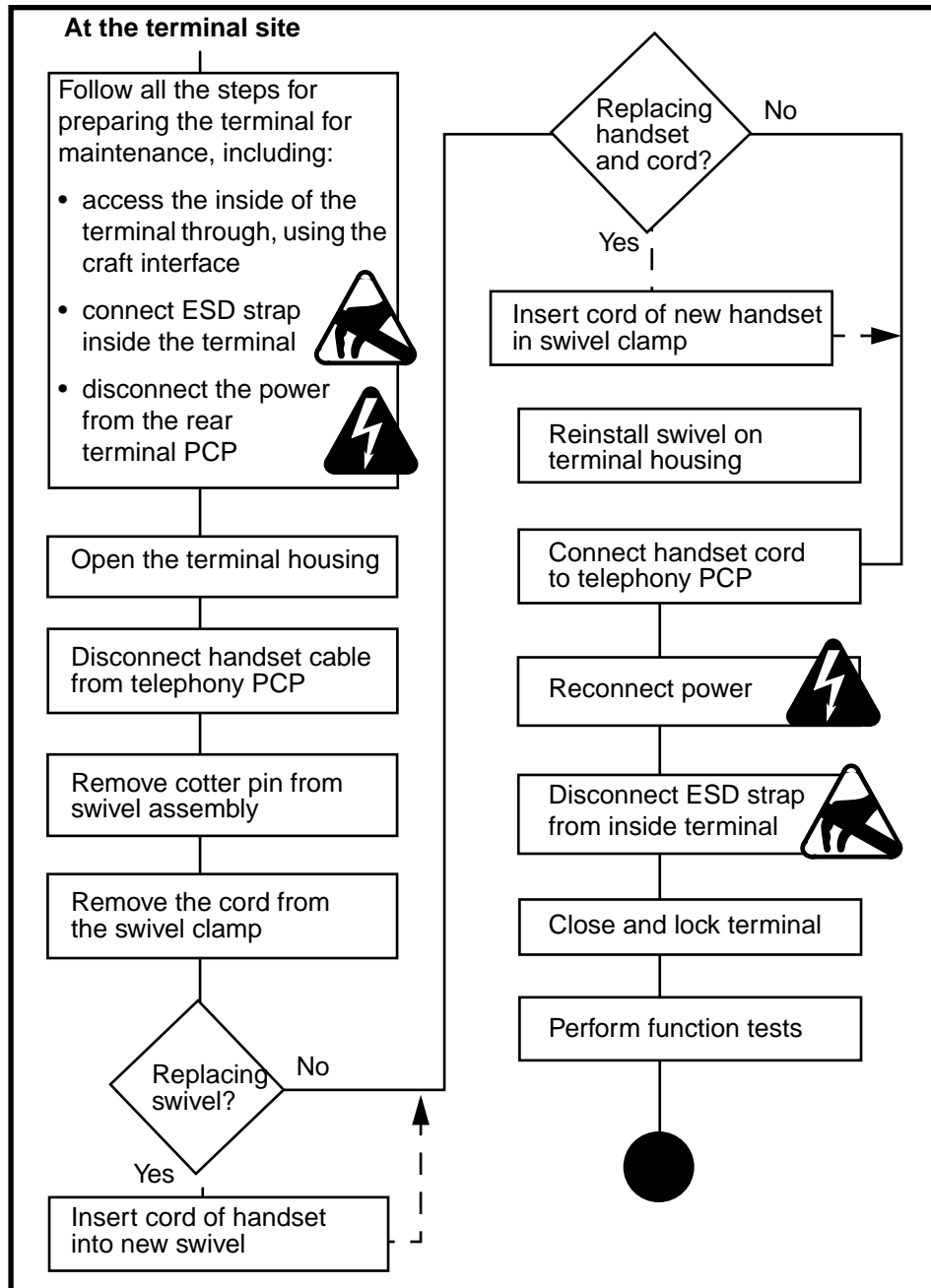


Flowchart

The flowchart shown in Figure 2-14 describes the key points to replacing the handset and cord assembly and the swivel.

2-24 Maintenance overview

Figure 2-14: Flowchart — replacing handset and swivel assembly





Replacing the swivel/handset assembly

Directions for replacing the handset and cord assembly and the swivel are given below.

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6

Note: It is not necessary to upload CDRs for this procedure.

- connected your ESD wrist strap inside the terminal
- confirmed that the terminal block is disconnected from the rear terminal PCP

Electrostatic discharge (ESD) precautions



- Before working with the PCP assembly, put on your ESD wrist strap and connect it to the ESD connection points.
- Disconnect the supplementary power supply.
- **Do not reconnect until the end of this procedure.**
- Place any components you remove from the terminal into an anti-static bag.

Failure to follow these precautions may damage ESD-sensitive components.

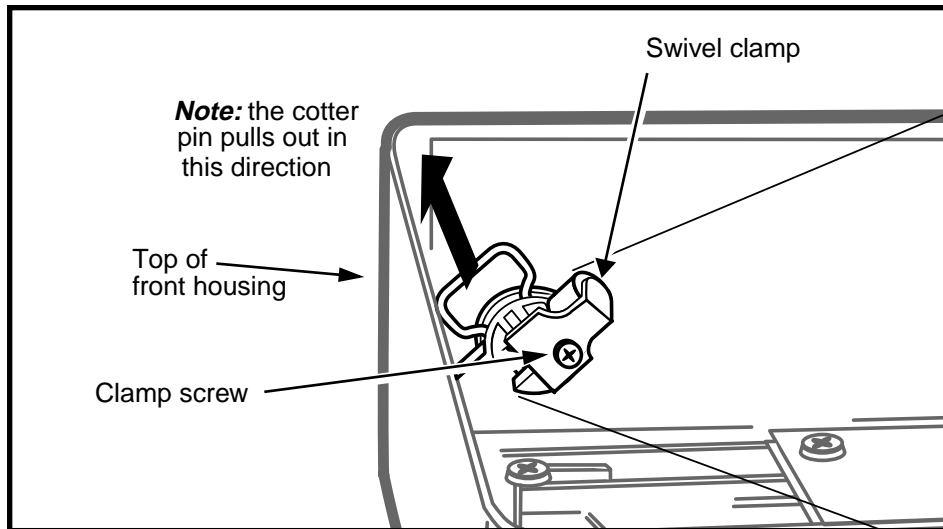
2. Disconnect the handset cord plug (J15) from the connector on the telephony PCP (J10B). Look for the name of the connection on the PCP.
3. Inside the housing, remove the cotter pin from the swivel as shown in Figure 2-15.

The cotter pin fits into a groove in the swivel and lies flush against the inside of the housing.



2-26 Maintenance overview

Figure 2-15: Accessing the armored cord in the swivel



4. Slide the swivel assembly out of the hole in the housing, pulling the handset leads through as well.
5. Remove the screw securing the swivel clamp to the swivel.

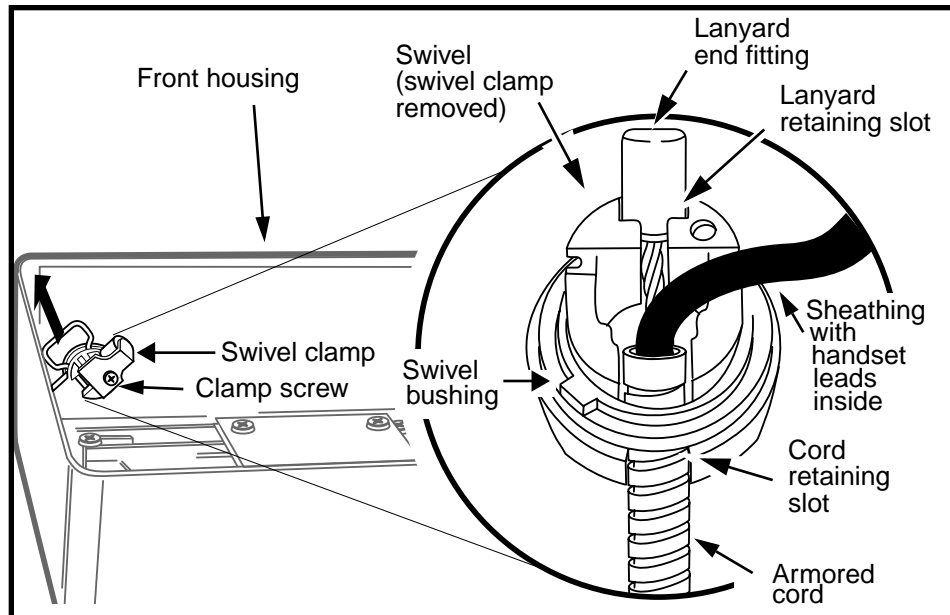
Refer to Figure 2-16 to find the appropriate screw. Use a #1A cross-recess screwdriver.

The swivel clamp holds the lanyard end-fitting in the swivel.

6. Remove the swivel bushing from the swivel.
7. Slide the lanyard end fitting out of its retaining slot in the swivel. Refer to Figure 2-16.

Note: The lanyard is a metal core wire that runs through the metal sheathing beside the handset wires.

8. Slide the armored cord, which includes the lanyard cord and handset leads, out of the retaining slot.

Figure 2-16: Accessing the armored cord in the swivel

9. Replace the handset and swivel by reversing the preceding steps.
 - a) Insert armored cord into the cord retaining slot on swivel. Ensure it sits right into the slot.
 - b) Insert the lanyard into its retaining slot, ensuring that the end fitting sits tight against the swivel at a slight angle.
 - c) Ensure that the black sheathing is inserted into the swivel by at least one inch.
 - d) Replace the swivel bushing.
 - e) Replace the swivel clamp and screw.
 - f) Reinsert the swivel in the terminal.
 - g) Secure the swivel with the cotter pin.
10. Route the handset cord through the cable clamp on the inside of the housing and reconnect it to the telephony PCP connector.
11. Reconnect the power.

2-28 Maintenance overview

12. Close and lock the terminal. Refer to **Restoring the terminal to operation** on page 2-11, if necessary.
13. Make a call to check the handset.

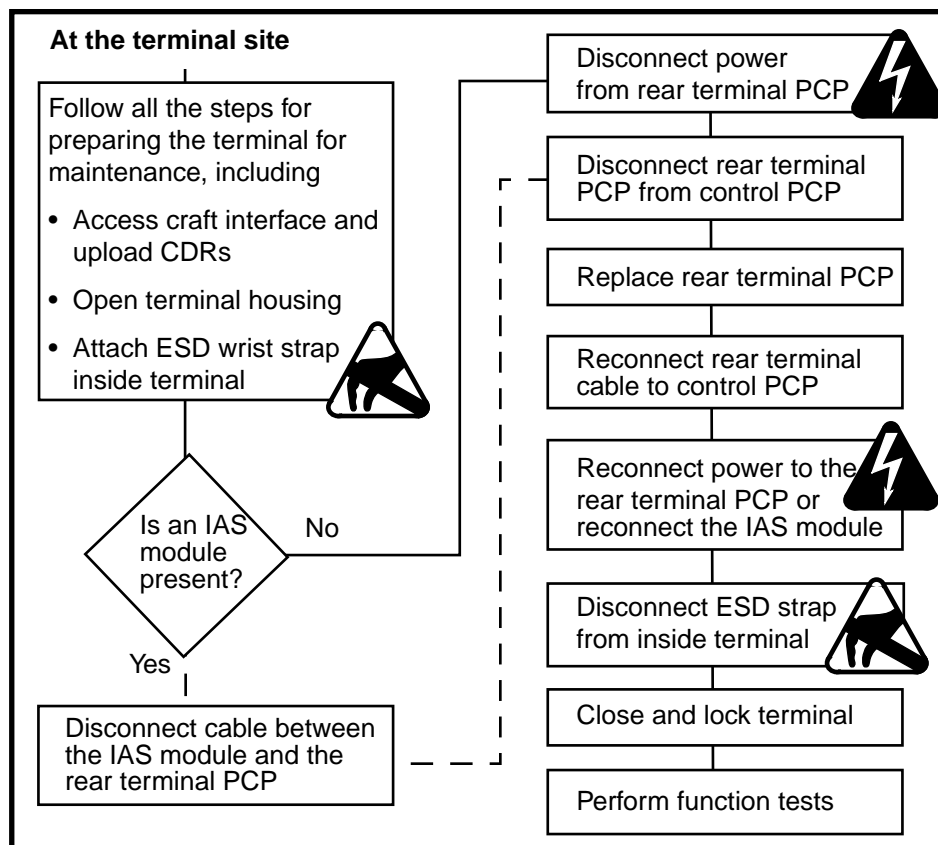
Replacing the rear terminal PCP

The rear terminal PCP controls power input into the terminal.

Flowchart

The following flowchart describes the key points to replacing the rear terminal PCP.

Figure 2-17: Flowchart — replacing the rear terminal PCP





Replacing the rear terminal board

To replace the rear terminal PCP, follow this procedure:

1. This procedure assumes you have:
 - followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6

Upload CDRs before you start!

Upload the CDRs to the Millennium Manager before you perform internal maintenance on the terminal.

- attached your ESD wrist strap inside the terminal
- disconnected the power by disconnecting the upper terminal block or the wires on the rear terminal PCP, shown in Figure 2-18.

Electrostatic discharge (ESD) precautions



- Before working with the PCP assembly, put on your ESD wrist strap and connect it to the ESD connection points.
- Disconnect the power.
- **Do not reconnect the power until you are read to close the terminal.**
- Place any components you remove from the terminal into an anti-static bag.

Failure to follow these precautions may damage ESD-sensitive components.

If you remove the wires from the rear terminal block, wrap the bare ends in tape to insulate them from the boards while you are working on the terminal.





2-30 Maintenance overview

See this:



IAS module

In this configuration, the inside service wires are connected to the IAS module terminal block, which can be removed without disconnecting the wires.

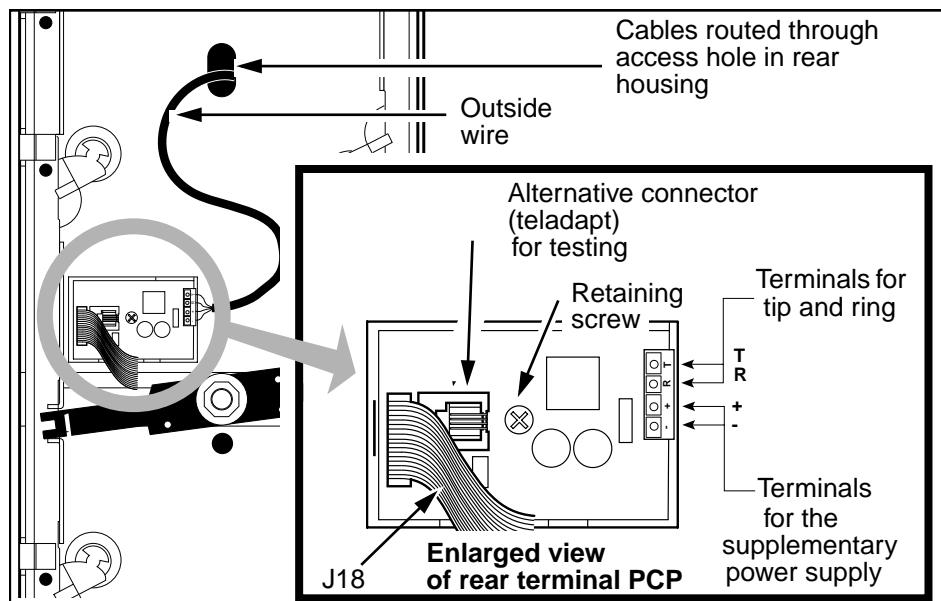
To disconnect the power from the rear terminal PCP: disconnect the interconnect cable between the IAS module and the rear terminal PCP.

2. Remove the retaining screw in the middle of the rear terminal PCP, shown in Figure 2-18.
3. Remove the rear terminal PCP from the mount.
4. Install a new rear terminal PCP into the mount.

Position it so the alignment pins on the terminal mount fit into the holes in the rear terminal PCP.



Figure 2-18: Replacing the rear terminal PCP



5. When complete, reconnect the ISWs to the terminal block on the rear terminal PCP.

Note: Take care to ensure correct polarity when connecting the supplementary power supply. Refer to Figure 2-18.

If there is an IAS module, reconnect the interconnect cable from that module to the terminal block.

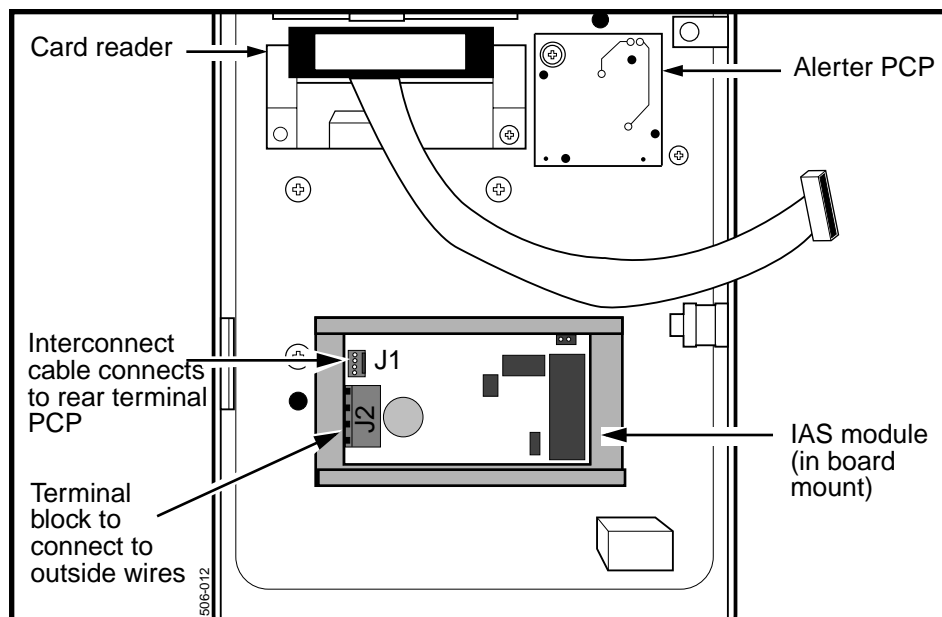
6. Close and lock the housing assembly. Refer to **Restoring the terminal to operation** on page 2-11, if necessary.

Describing inferred answer supervision

Millennium terminals require that answer supervision be present so that calls can be accurately billed. For CO lines that do not have this feature, an inferred answer supervision (IAS) module is installed inside the terminal.

The IAS module is installed inside the card terminal near the bottom of the front housing, as shown in Figure 2-19.

Figure 2-19: The IAS module in the front housing

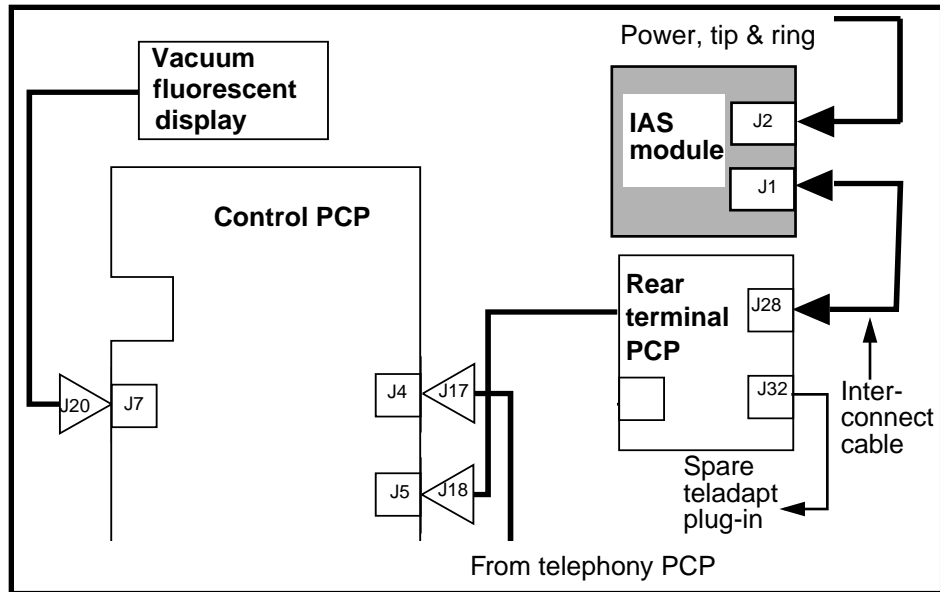


Millennium Card-based terminals: replacing parts

2-32 Maintenance overview

The module connects between the telephone line and the rear terminal board, as shown in the block diagram in Figure 2-20.

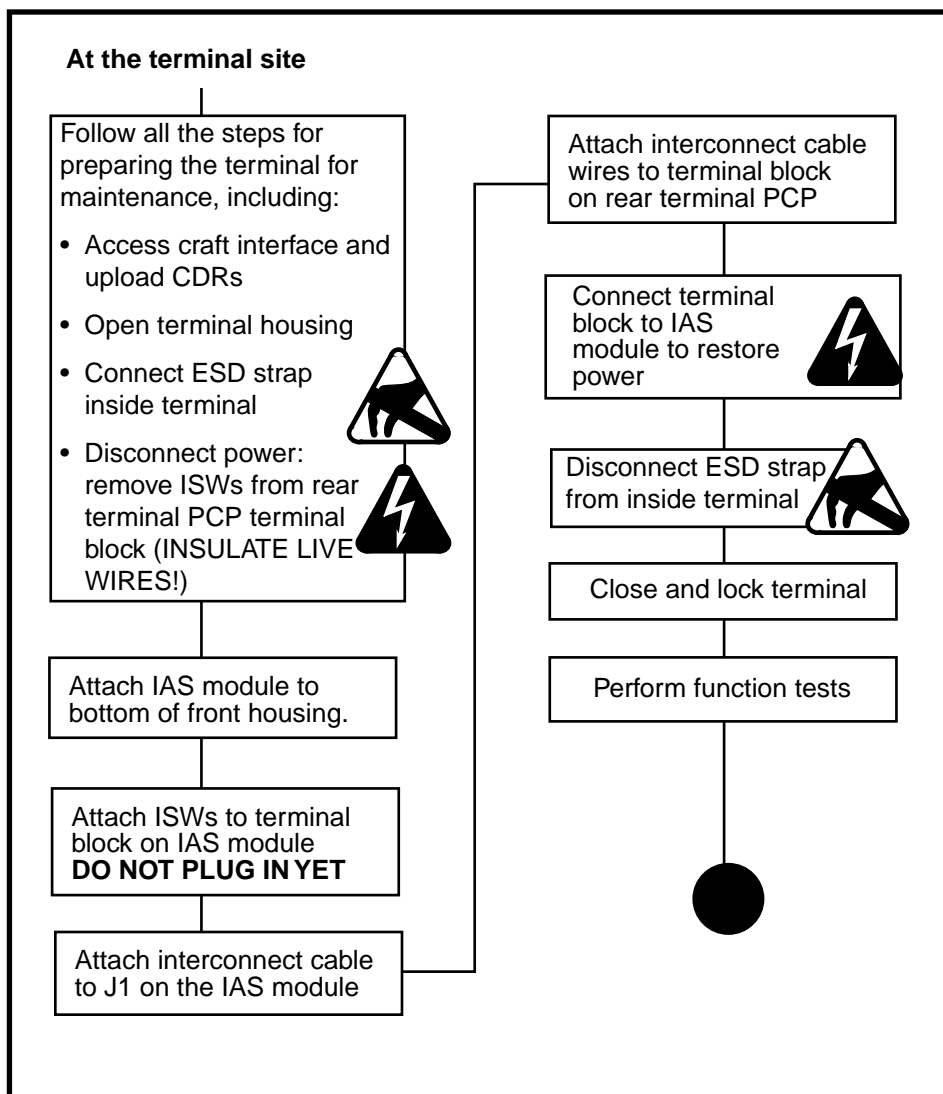
Figure 2-20: Interconnection diagram showing IAS



Flowchart

The following flowchart describes the key points to installing an IAS module.

Figure 2-21: Flowchart — installing an IAS module





2-34 Maintenance overview

Positioning and connecting the IAS module

The IAS module can be installed in the field. The following steps describe how to install or replace the module in the terminal.

1. This procedure assumes you have:
 - followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6
 - connected your ESD strap inside the terminal
 - disconnected the power by disconnecting the ISWs from the terminal block on the rear terminal PCP and insulate the ends of the wire with electrical tape.
 - If the terminal has an IAS module already installed, disconnect the terminal block from the IAS module (J2). Refer to Figure 2-22.

Electrostatic discharge (ESD) precautions



- Before handling cables or boards, put on your ESD wrist strap and connect it to an ESD connection point inside the terminal.
- Disconnect the power at the rear terminal PCP.
- **Do not reconnect the power until you are ready to close the terminal.**

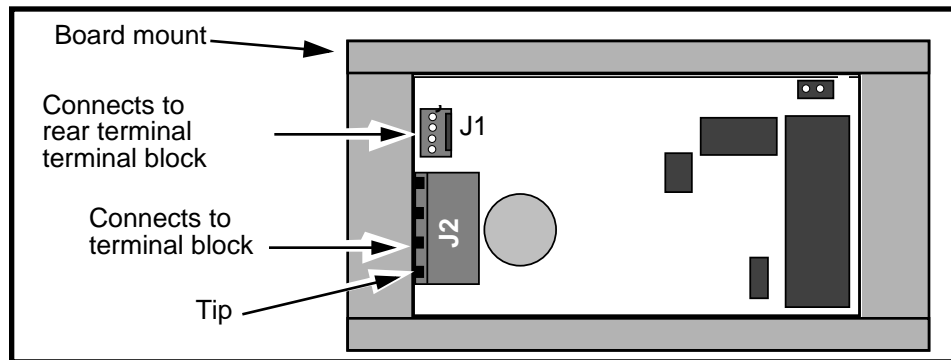
Failure to follow these precautions may damage ESD-sensitive components.

2. If there is an existing IAS module, both the module and mount must be removed:
 - a) **Disconnect the power** from the module by unclipping the terminal block from the IAS module.
 - b) Unplug the interconnect cable connector from J1 on the IAS module. Refer to Figure 2-22.



This cable connects to the upper terminal block on the rear terminal PCP (J28).

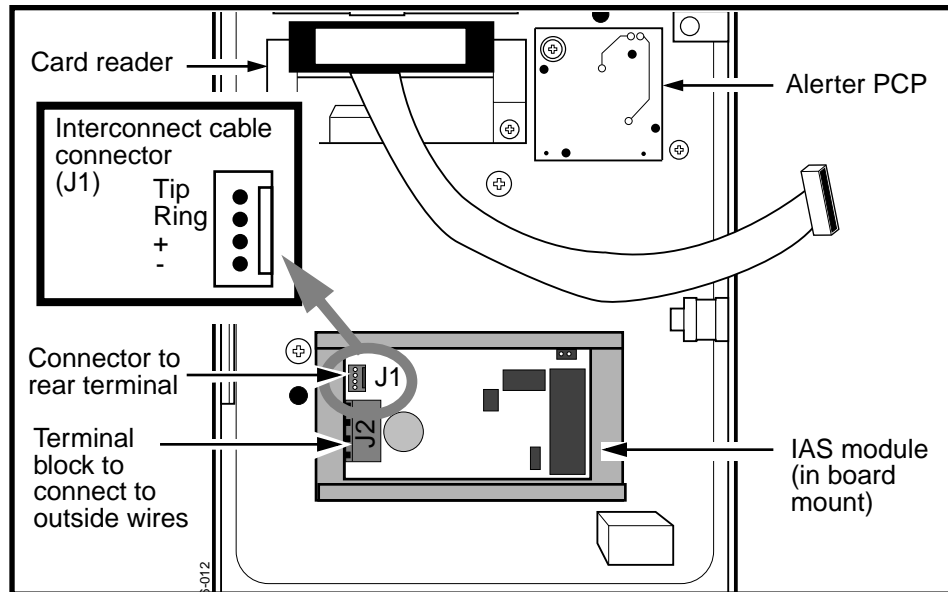
Figure 2-22: Connections on the IAS module



- c) Insert a screwdriver behind the mount and pull forward until the mount comes loose.
3. Once you have removed the old module, or if you are installing the module for the first time, follow this procedure to install a new module in the terminal:
 - a) Leave the protective paper on the board mount, and position the mount on the inside of the front housing, underneath the card reader. Refer to Figure 2-23.
 - b) Set the mount against the inside of the front housing, about 25 mm (1 inch) above the bottom of the front housing and centered horizontally. Mark an edge.
 - c) Ensure that connectors J1 and J2 are facing to the left.
 - d) Take the board mount out.

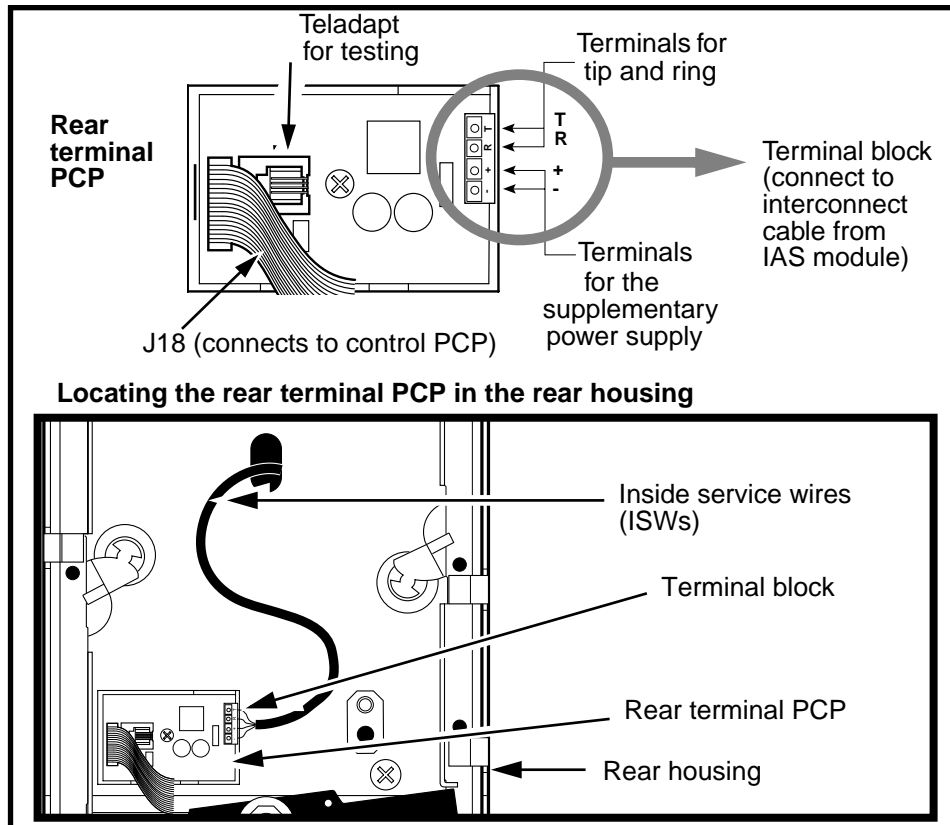
2-36 Maintenance overview

Figure 2-23: Interconnect cable connector polarity



4. Insert the interconnect cable connector into J1 on the IAS module.
Check that the cable terminates into the plug-in connector so the black edge of the cable is in the TIP position. Refer to Figure 2-23.
5. Insert the module into the terminal.
 - a) Remove the protective paper from the adhesive foam on its back.
 - b) Firmly press the board mount into the terminal, where you placed it in the previous sub-steps.
 - c) If this is a **new installation**, strip the ends of the wires from the free end of the interconnect cable connected to the IAS connector (J1).

Screw these wires into the terminal block on the rear terminal PCP (J28). **Note:** Ensure the wire connections Parallel those on the IAS module. Refer to Figure 2-23 and Figure 2-24.

Figure 2-24: Wire positions on the terminal block

6. If this is a new installation, remove the terminal block from the IAS module connector (J2) and attach the inside service wires (ISWs). Refer to Figure 2-25.

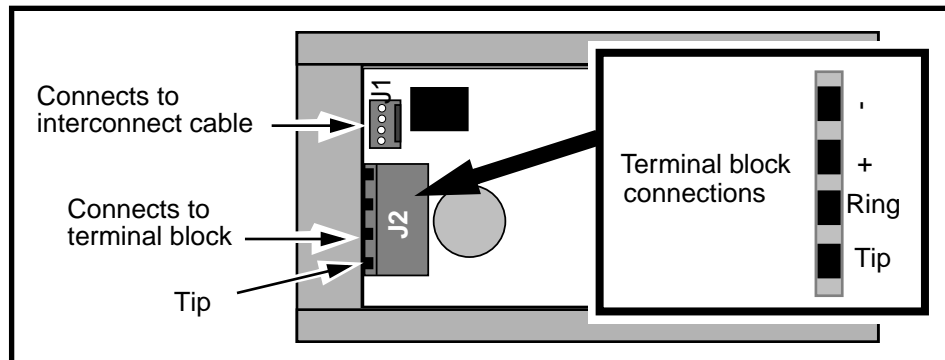
CAUTION

- Observe ESD precautions.
- Screw the wires into the IAS terminal block in the same order as when they were attached to the terminal block on the rear terminal PCP. Ensure that the ISWs do not touch the internal boards of the terminal.
- Ensure the proper polarity when connecting the wires.

2-38 Maintenance overview

7. When the ISWs are attached correctly, plug the IAS terminal block into J2 on the IAS module.
Route the two cables so they will not get caught when the housing is closed.

Figure 2-25: IAS module terminal block connections



8. Position the cables so they will not get caught by the edges of the housing when it is closed.
9. Close and lock the terminal. Refer to **Restoring the terminal to operation** on page 2-11, if necessary.
10. Test the function of the terminal.



Upgrading tiebar pivots

The following section describes how to remove the plastic pivots on a Card-based terminal to replace them with metal pivots.

Figure 2-26 shows the location of the pivots on the rear housing of the terminal.

This upgrade was primarily created for Inmate terminals, but can be used to increase the durability of any Card-based terminal.

Before you start

This procedure is easier to do if you remove the terminal from the wall. However, the following sections assume the terminal remains on the wall.

Besides the usual tools, you will need:

- a pivot upgrade kit with six metal pivots
- #2 cross-recess or Phillips screwdriver
- adjustable wrench

See this:



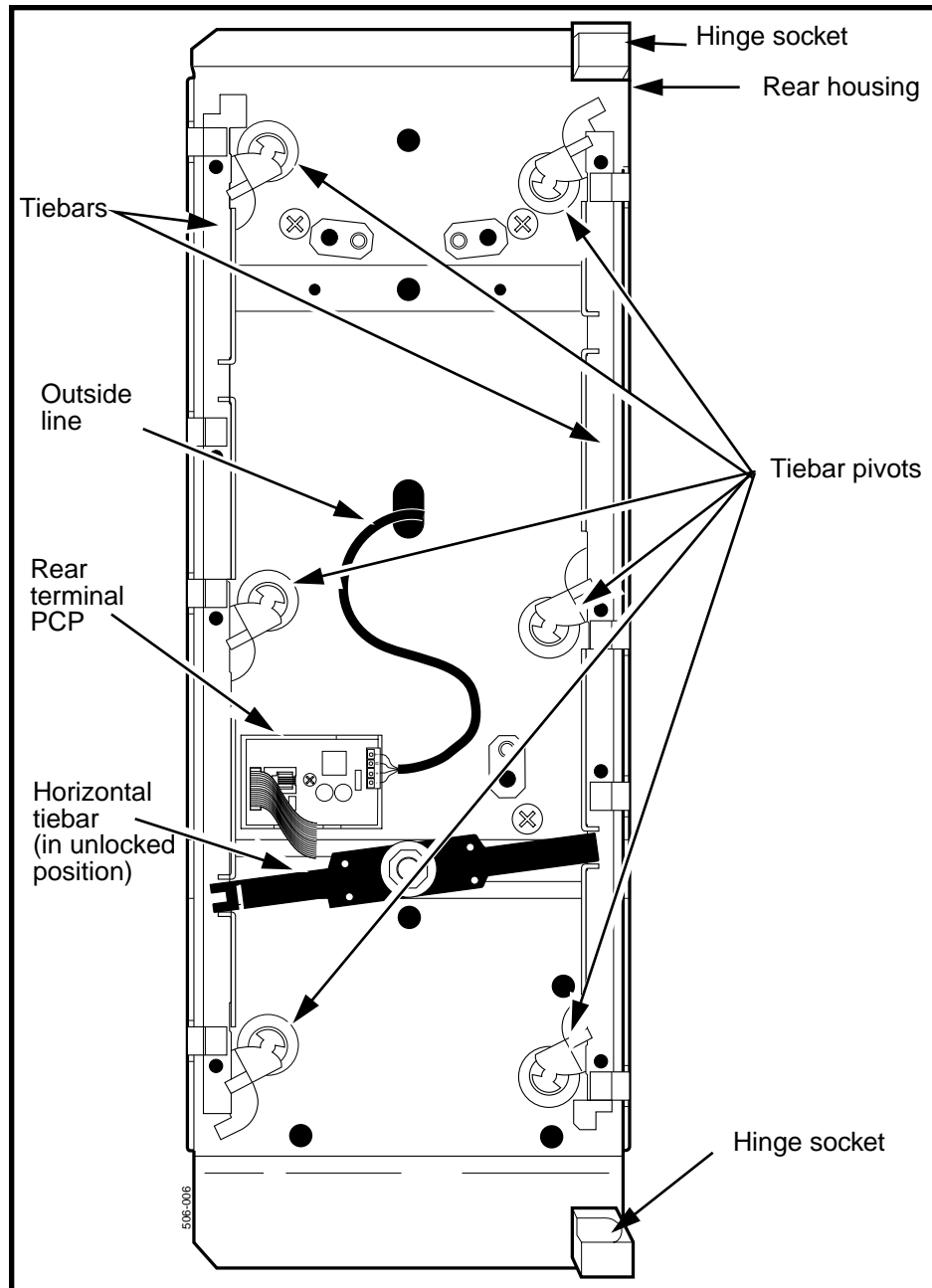
Inmate terminals

It is not necessary to install the portable display to do this procedure.



2-40 Maintenance overview

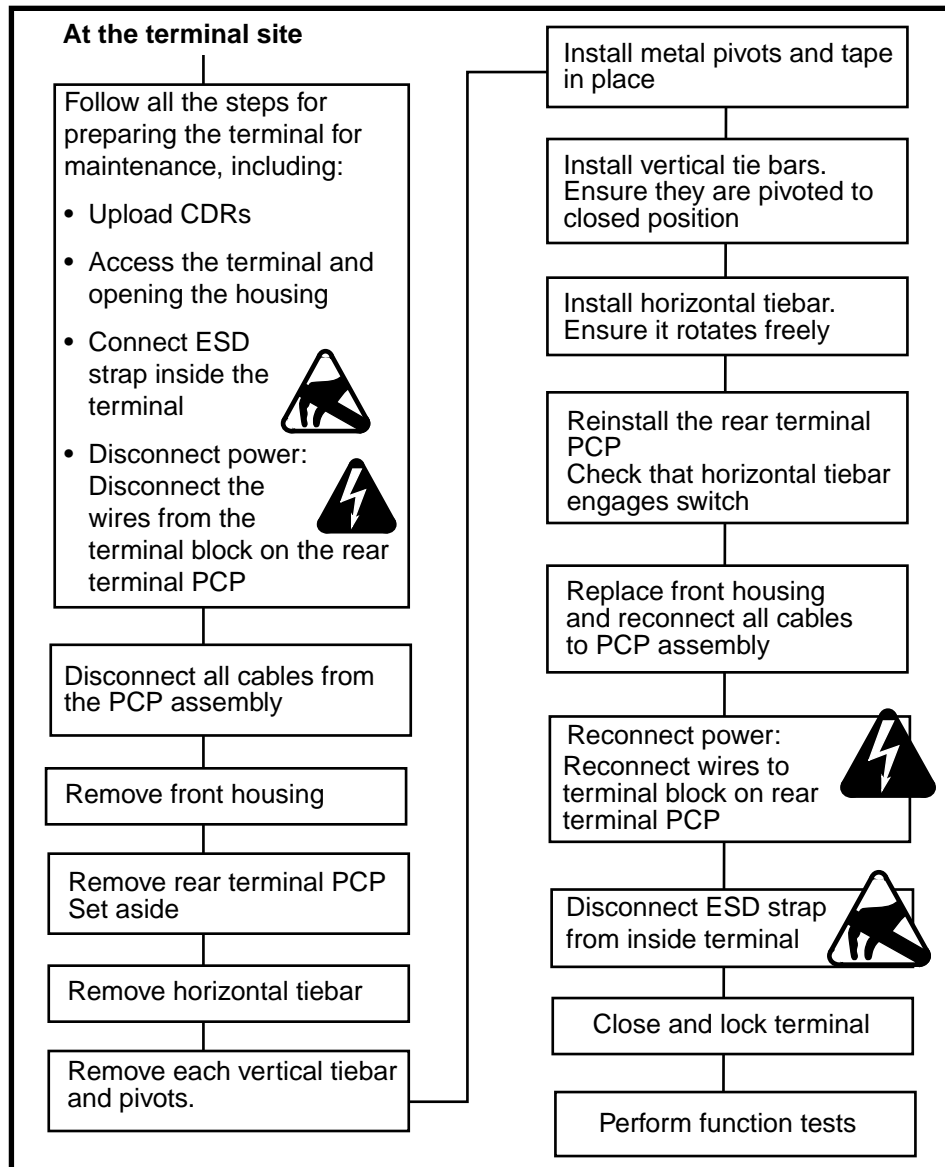
Figure 2-26: Pivot locations on the rear housing



Flowchart

The following flow chart describes the key points to replacing the tiebar pivots.

Figure 2-27: Flowchart — Replacing tiebar pivots





2-42 Maintenance overview

Removing the pivots

The following procedure describes how to access the tie-bar pivots, remove them, and replace them with metal pivots.

1. This procedure assumes you have:
 - followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6
 - attached your ESD wrist strap to the ESD connection point on the inside of the terminal
 - disconnected the inside service wires from the terminal block on the rear terminal PCP
 - wrapped the bare wires in tape to insulate them while you are working on the terminal.

See this:



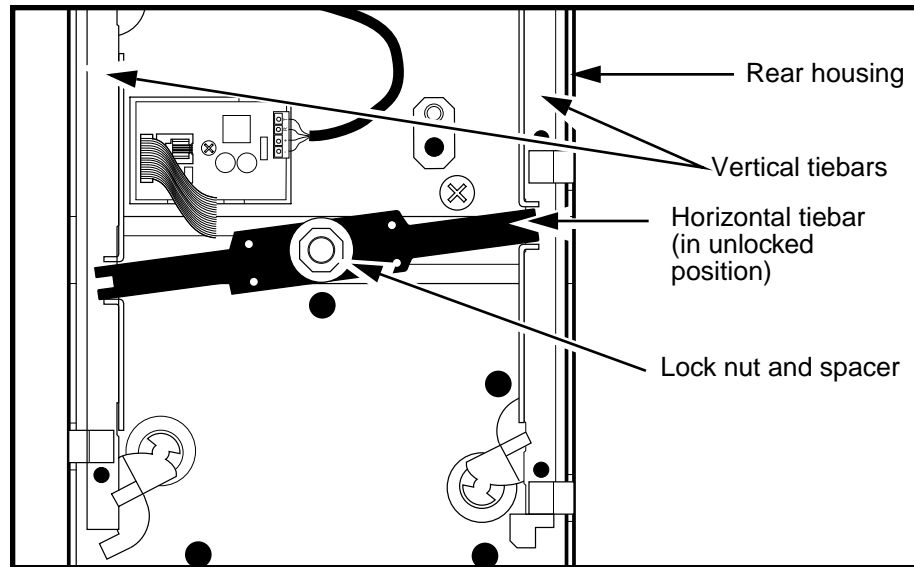
IAS module

In this configuration, the inside service wires are connected to the IAS module terminal block.

To disconnect the power:
disconnect the interconnect cable between the IAS module and the rear terminal PCP.

- removed the front housing as described in **Replacing the front housing assembly** on page 2-14.
2. Remove the retaining screw in the middle of the rear terminal PCP. Refer to Figure 2-26.
 3. Remove the rear terminal PCP from the terminal mount.
 4. Remove the lock nut and spacer attaching the horizontal tie bar to the terminal. Refer to Figure 2-28



Figure 2-28: Locating the horizontal tie bar

5. Remove the horizontal tie bar and set aside.
6. Remove the right vertical tie bar.
 - a) Push tiebar as far counterclockwise as it will go.
 - b) Twist the bar free of the pivots.
7. Remove the right-hand pivots.

Remember the position of the pivots for when you have to replace them.
8. Remove the left vertical tie bar.
 - a) Push tiebar as far counterclockwise as it will go.
 - b) Twist the bar free of the pivots.
9. Remove the left-hand pivots.

Remember the position of the pivots for when you have to replace them.



2-44 Maintenance overview

Installing new pivots

The following procedure describes how to install new pivots once the tiebars and old pivots have been removed.

1. Install three of the metal pivots on the left side in the same position as that of the plastic ones you removed.
 - a) Insert the “ears” of the pivot into the slot of the mounting plate.
 - b) The tabs of the pivots should point to the right and down.
 - c) Secure each pivot with tape to hold it in place. This is especially important if you are working on a terminal still attached to the wall.
2. Insert the left vertical tiebar:
 - a) Line up its holes with the pins on the pivot.
 - b) Rotate the bar so that the pins go all the way through the holes.
 - c) Push the pivot locks up until they are in the closed position.
3. Install three of the metal pivots on the right side in the same position as that of the plastic ones you removed.
 - a) Insert the “ears” of the pivot into the slot of the mounting plate.
 - b) The tabs of the pivots should point to the left and down.
 - c) Secure each pivot with tape to hold it in place. This is especially important if you are working on a terminal still attached to the wall.
4. Insert the right vertical tiebar:
 - a) Line up its holes with the pins on the pivot.
 - b) Rotate the bar so that the pins go all the way through the holes.
 - c) Push the pivot locks down until they are in the closed position.





5. Reinstall the horizontal tiebar.
 - a) Seat the forked end of the horizontal tiebar where it mates with the left vertical tiebar.
 - b) Press the horizontal tiebar down, over the central bolt.
 - c) Install the plastic spacer and the lock nut.

Note: Tighten the nut so the horizontal tie bar rotates easily, but it should not be able to wobble out of the slots on the vertical tiebar.

6. Rotate the locking mechanism to the open position.
7. Reinstall the rear terminal PCP but do not reconnect the wires yet. Refer to **Replacing the rear terminal PCP** on page 2-28, if necessary.
8. Test the rear terminal switch to ensure that it properly engages. Move the pivot assembly up and down and observe that it moves the switch.
9. Replace the front housing assembly and reconnect all the cables. Refer to **Replacing the front housing assembly** on page 2-14, if necessary.
10. Reconnect the outside line to the terminal block on the rear terminal PCP. Refer to **Replacing the rear terminal PCP** on page 2-28, if necessary.
11. Remove ESD wrist band connection.
12. Close and lock the terminal.

Refer to **Restoring the terminal to operation** on page 2-11, if necessary.

13. Test the function of the terminal.





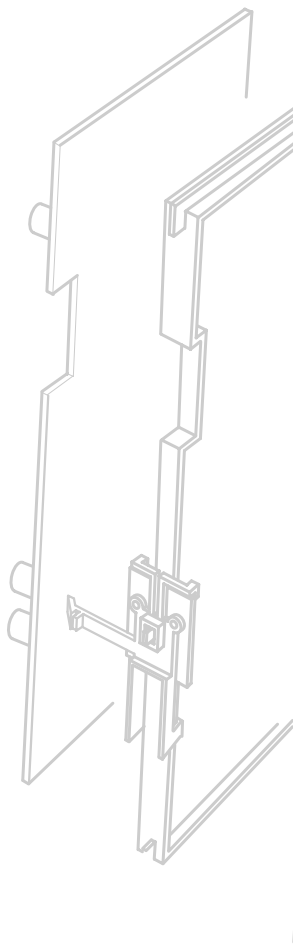
2-46 Maintenance overview





3-1

3 PCP assembly components



This chapter describes the procedures for working with the main printed-circuit packs (PCPs) inside the terminal. These two boards — the telephony and control PCPs — are mounted in a plastic frame (PCP assembly) which is removable for better access to components at the front of the terminal.

This chapter includes procedures for:

- removing the PCP assembly
- removing the telephony or control PCP from the PCP assembly
- replacing firmware chips on the control PCP
- installing the smart card alert (SCA) daughter board and connecting it





3-2 PCP assembly components

Removing the PCP assembly

The PCP assembly must be removed to replace a telephony or control PCP and to uncover some components.

The PCP assembly refers to the telephony and control PCPs and the plastic frame holding them.


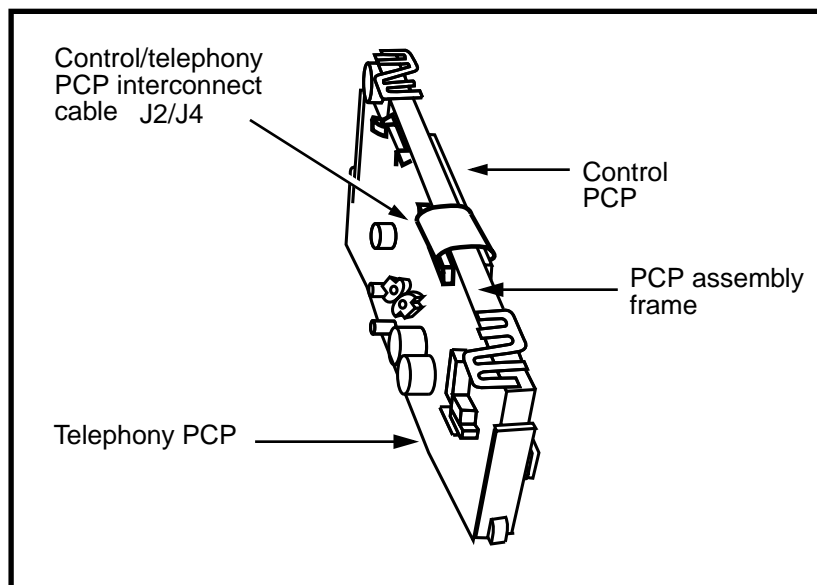
ESD and power precautions 	Before you touch these boards: It is critical that you attach your ESD strap to an ESD point inside the terminal, and that the power is disconnected from the terminal before you start removing cables from these boards.
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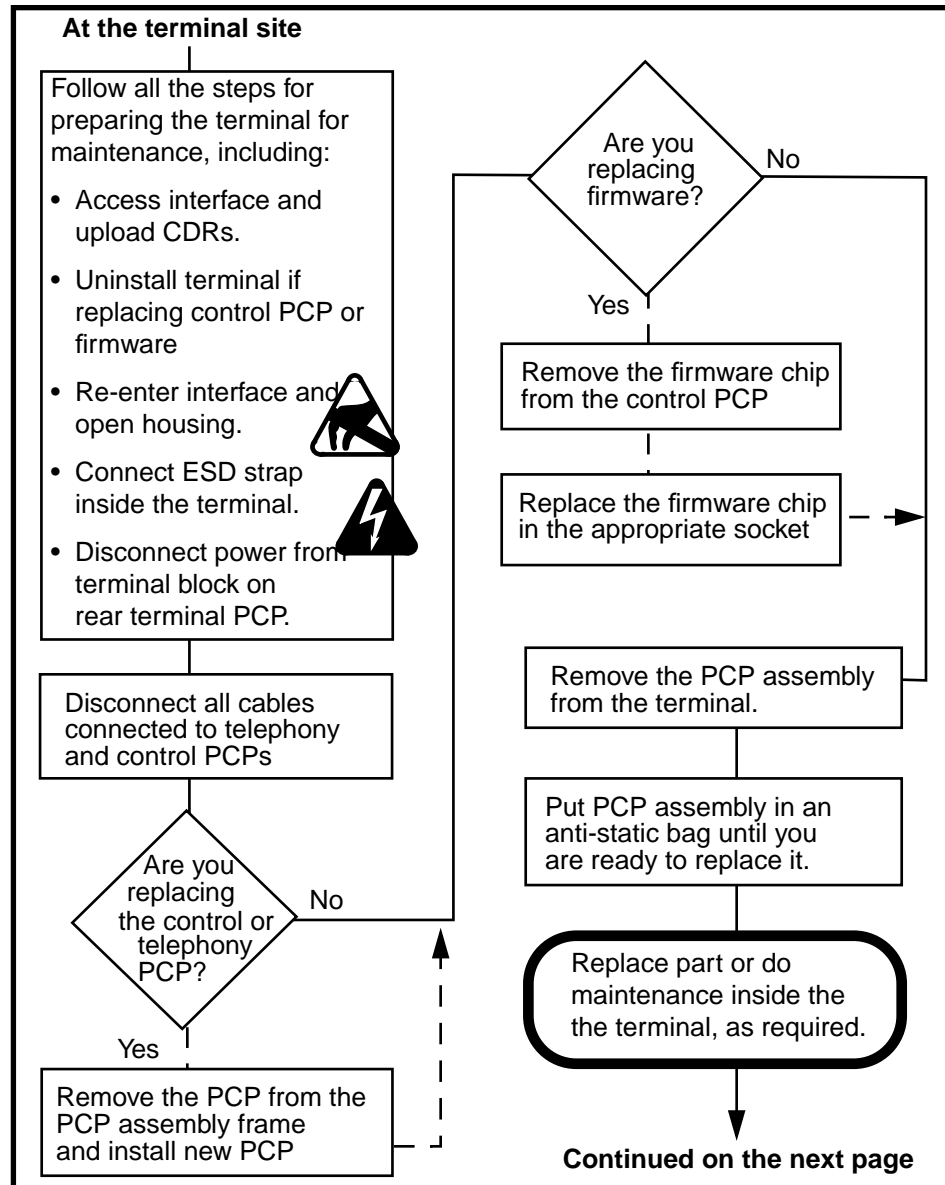
Figure 3-1: PCP assembly components



Flowchart

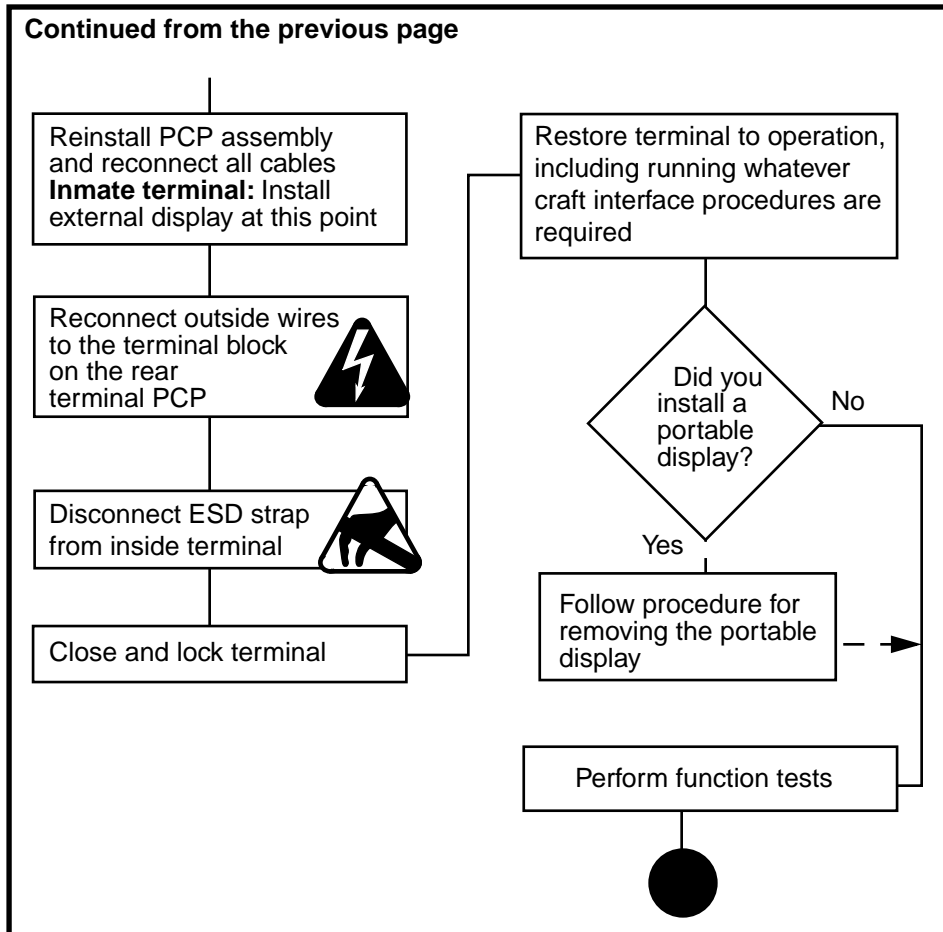
The flowchart shown in Figure 3-2 describes the key points to removing and replacing the PCP assembly.

Figure 3-2: Flowchart — working with the PCP assembly, page 1



3-4 PCP assembly components

Flowchart — working with the PCP assembly, page 2





Working with the PCP assembly

To perform an orderly removal of the PCP assembly, follow these procedures:

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6.

Upload CDRs before you start!	<ul style="list-style-type: none">• Upload the CDRs to the Millennium Manager before you start. This is especially important if you are going to replace the control PCP, firmware, the validator, the escrow, or remove the cash box.• In some cases it will not be possible to do this step because of problems on the control PCP. In these cases, notify the operating company that the CDRs could not be uploaded.
Do you need to uninstall the terminal?	<p>If you need to replace the control PCP or the firmware, uninstall the terminal before disconnecting the power.</p> <p>This means you will have to run the INSTALL routine when you are finished.</p>

- connected ESD strap inside the terminal
 - disconnected the power from the rear terminal PCP.
2. Disconnect the component cables from the control PCP. These connections are listed in Table 3-1.





3-6 PCP assembly components


ESD warning 	<ul style="list-style-type: none">• Before working with the PCP assembly, put on your ESD wrist strap and connect it to the ESD connection point in the terminal.• Before replacing any component, disconnect the power.• DO NOT RECONNECT the power until you are ready to close the terminal.• Place any components you remove from the terminal into an anti-static bag.
---	--

Table 3-1: Control PCP connections

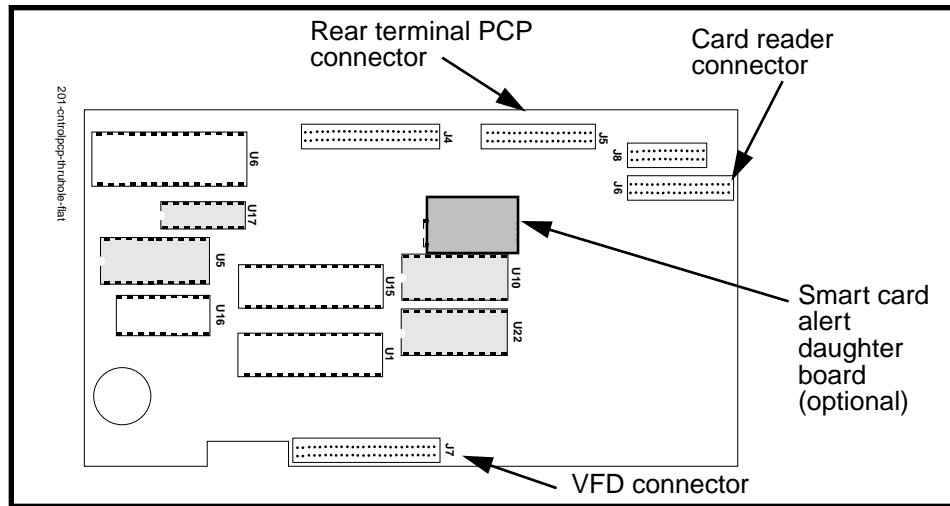
Disconnected these components	from:
Remove this cable first. Reconnect this cable last. J18, rear terminal PCP	J5 on the control PCP
If an IAS module is present, the ISWs are connected to it and an interconnect cable connects the IAS module to the rear terminal PCP.	
J19, card reader PCP	J6 on the control PCP
J20, display PCP	J7 on the control PCP
If the terminal is equipped with the smart card alert feature:	
J14, alerter module	J37 on the daughter board
J38 smart card alert keypad cable	J36 on the daughter board

Look for the name of the connection printed on the PCP.

Figure 3-3 shows the cable connectors on the control PCP.

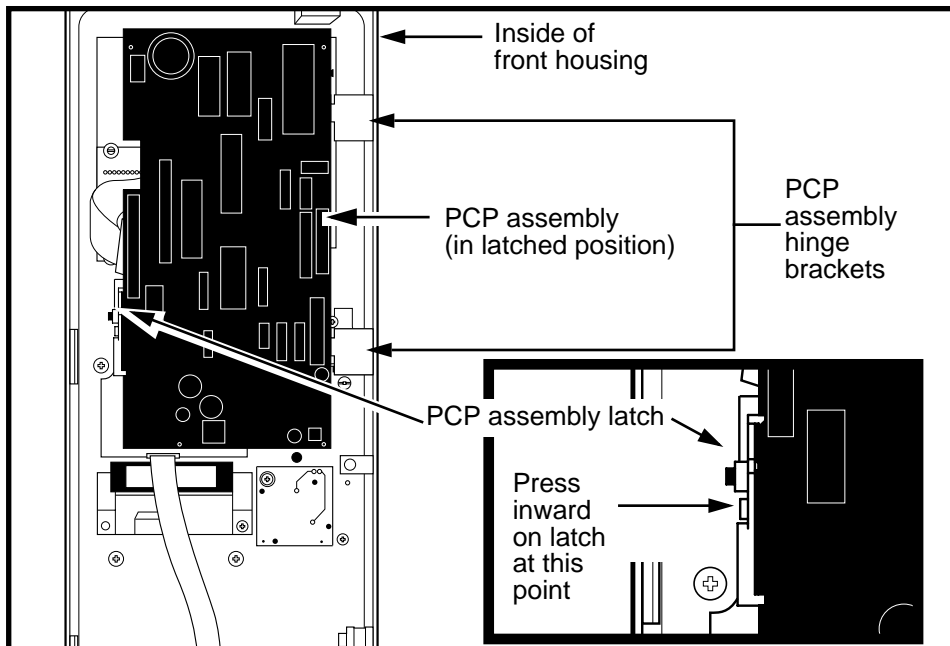


Figure 3-3: Control PCP cable connections



3. Refer to Figure 3-4 and disengage the latch from the housing assembly to allow the PCP assembly to swing out.

Figure 3-4: PCP assembly in position





3-8 PCP assembly components

4. Grasp the plastic frame of the PCP assembly and swing it away from the front housing at about a 45-degree angle.
5. Disconnect the component cables from the telephony PCP. These connections are listed in Table 3-2.

Table 3-2: Telephony PCP and internal components connections

Disconnected these components	from:
J15, handset	J10B on the telephony PCP
J53, keypad PCP J53, alerter module *	J1A on the telephony PCP
If the terminal is equipped with a datajack module:	
J35, datajack module	J34 on the telephony PCP
* upgraded upper bezel assembly keypad connects to the new external interface hookswitch.	



Look for the name of the connection printed on the PCP.



Figure 3-5 shows what the inside of the front housing looks like without the PCP assembly.

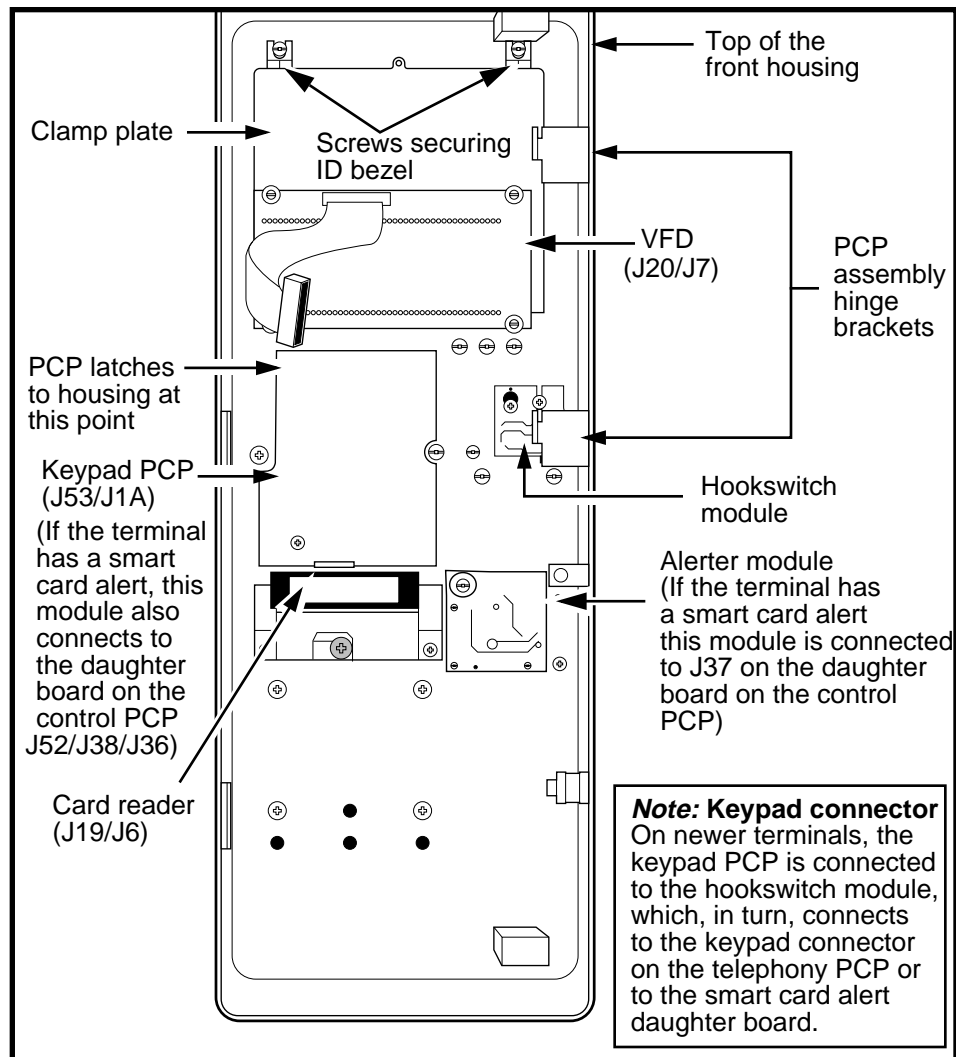
This figure also shows more clearly the two brackets on which the PCP assembly swings into and out of the housing.

Electrostatic discharge (ESD)



- Take anti-static precautions when removing PCPs. Wear your ESD wrist strap.
- If you put a PCP assembly down, put it on an anti-static surface.
- To send a PCP to be repaired, ship in an anti-static bag.

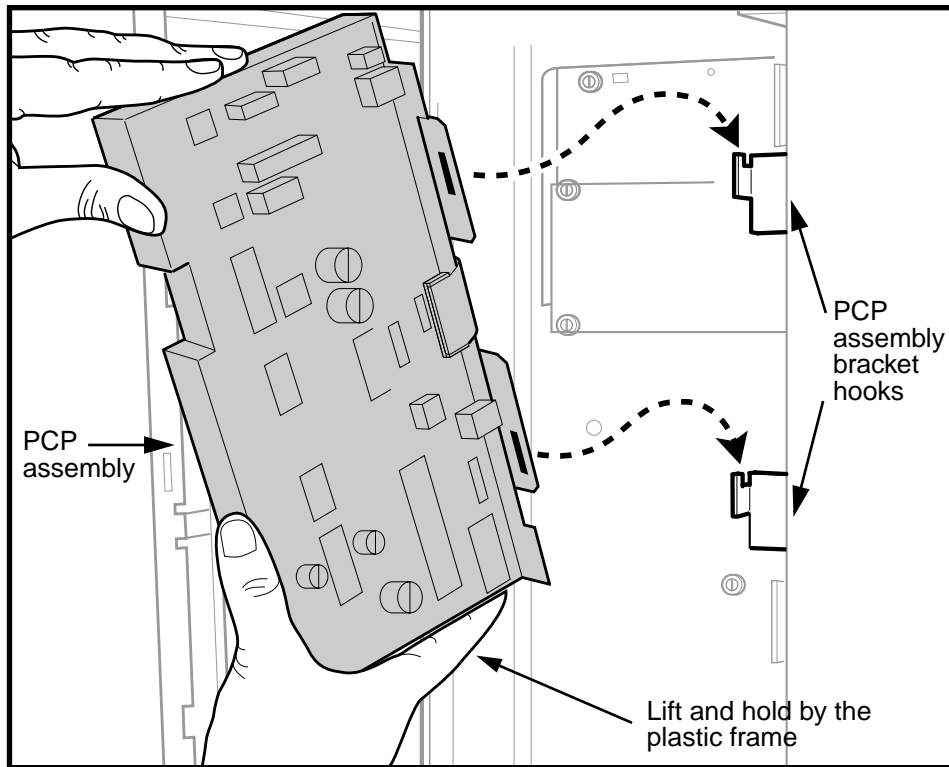


Figure 3-5: PCP assembly removed

6. Hold the PCP assembly as shown in Figure 3-6, then lift the assembly straight up, and when it is free of the bracket hooks, move it away from the terminal.

3-10 PCP assembly components

Figure 3-6: Removing/replacing PCP assembly



7. Refer to **Removing the telephony or control PCP** on page 3-11, if you need to replace either PCP.

If you are removing the PCP assembly in order to access other components, put the PCP assembly in a static-free bag until you need to re-install it.

8. Replace the PCP assembly by reversing the previous steps.
9. Close and lock the terminal and return it to operation by following the final steps in **Opening and closing the terminal** on page 2-6.



Removing the telephony or control PCP

The telephony and control PCPs are the main control boards in the terminal. They are packaged together in the PCP assembly frame.

These boards may need to be removed for replacement, or to have firmware or the smart card alert daughter board installed or changed.

To perform an orderly removal and replacement of either of these boards, follow this procedure:

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6

Upload CDRs before you start!	<ul style="list-style-type: none">• Upload the CDRs to the Millennium Manager before you start internal maintenance procedures.• In some cases it will not be possible to upload CDRs because of problems on the control PCP, such as a modem failure. In these cases, notify the operating company that the CDRs could not be uploaded.
Uninstall the terminal	<ul style="list-style-type: none">• Uninstall the terminal through the craft interface before replacing this part.• This means you need to run the INSTALL routine when you are finished.

- confirmed that your ESD wrist strap is connected to an ESD point inside the terminal
- confirmed that the power is disconnected from the rear terminal PCP



3-12 PCP assembly components

- removed the PCP assembly from the terminal. Refer to **Removing the PCP assembly** on page 3-2.


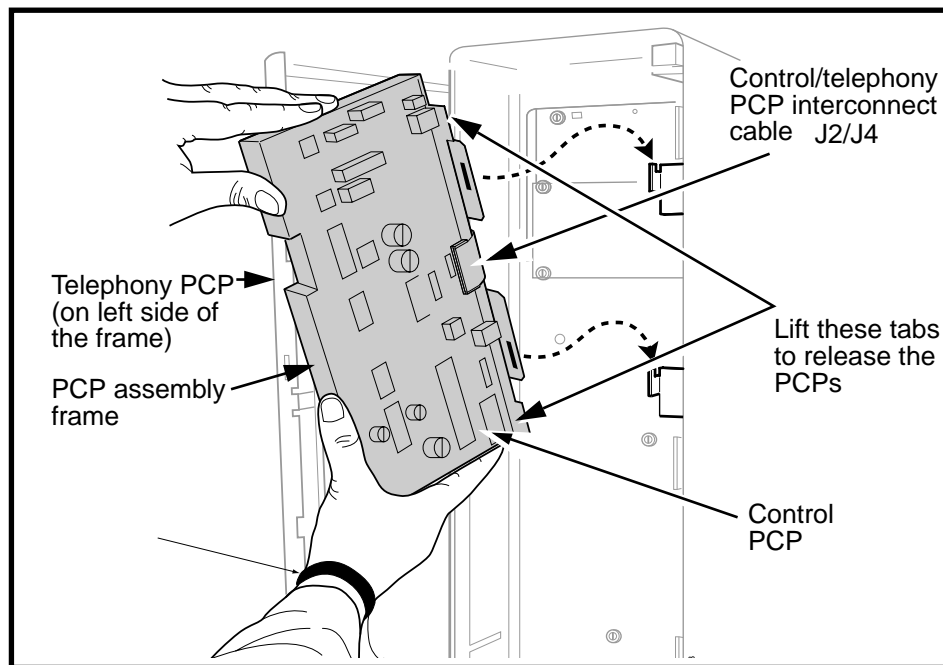
<p>Electrostatic discharge (ESD)</p>  <p>Failure to follow these precautions may damage ESD-sensitive components.</p>	<ul style="list-style-type: none"> • Before working with the PCP assembly, put on your ESD wrist strap and connect it to the ESD connection points. • Disconnect the power supply from the rear terminal PCP. • Do not reconnect the power until you are ready to close the terminal. • Place any components you remove from the terminal into an anti-static bag.
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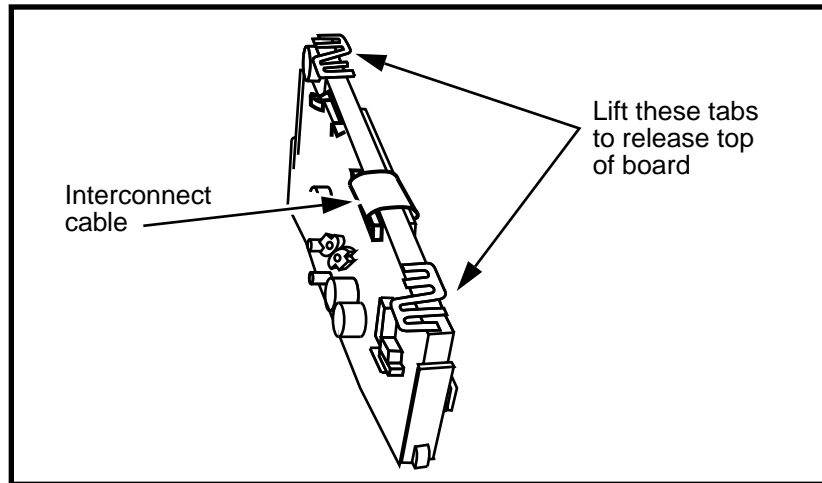
Figure 3-7: Control/telephony PCP connection



PCP assembly components 3-13

2. Remove the interconnect cable between the telephony and control PCPs from the connector on the control PCP connector (J4). Refer to Figure 3-8.
3. Release the tabs on the PCP assembly which hold the boards to the PCP assembly. Refer to Figure 3-8.

Figure 3-8: Locating the PCP assembly frame tabs



4. Grasp the board by the edge and lift it free of the tabs on the bottom of the PCP assembly.
5. Put the PCP assembly into an anti-static bag.

Note: When shipping PCPs for repair, always ship in an anti-static bag.
6. To replace a PCP, reverse the preceeding steps.
7. To replace the PCP assembly, reverse the steps in **Removing the PCP assembly** on page 3-2.
 - Table 3-1 on page 6 and Table 3-2 on page 8 list the cable connections between the components and the telephony and control PCPs.
 - Ensure that the cable connectors are seated securely in the appropriate board connectors.



3-14 PCP assembly components

- Ensure that the cables are folded away from the edges of the terminal.

See this



Inmate terminal

If you are working on an Inmate terminal, install the portable display now.

Refer to **Attaching a portable display** on page 6-4 for detailed instructions.

- When all the cables are properly reconnected, re-connect the wires to the terminal block on the rear terminal PCP to restore power to the terminal.

If the terminal has an IAS module, reconnect the terminal block on that module to restore power to the terminal.

8. Close and lock the terminal by referring to the last steps in **Restoring the terminal to operation** on page 2-11.

See this



Inmate terminal

Simulate locking the terminal by pulling up the left vertical tiebar.

Refer to **Attaching a portable display** on page 6-4 for detailed instructions.

9. Return the terminal to operation with the appropriate procedure listed below, if required.
 - After replacing the control PCP or firmware on the PCP, perform the INSTALL routine to store data in the memory.
 - After replacing a telephony PCP, perform a forced download to repopulate the telephony PCP with the power-fail telephone numbers.





These procedures are described in *Millennium terminals: using the craft interface*.

See this



Inmate terminal

After performing the appropriate routine, remove the portable display

Refer to **Removing the portable display** on page 6-10 for detailed instructions.

10. Perform operation tests to ensure that the terminal works properly.

Replacing firmware on the control PCP

As terminal firmware gets updated, you can replace chips on the control PCP rather than replacing the entire board.

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6

Upload CDRs before you start

- Upload terminal records to the Millennium Manager.
- This is imperative for this procedure.

Uninstall the terminal

- **Uninstall** the terminal through the craft interface.
- You will need to run the **IN-STALL** routine when you finish.

- connected your ESD strap inside the terminal
- disconnected the power from the terminal block on the rear terminal PCP or the IAS module, if there is one.





3-16 PCP assembly components

Electrostatic discharge (ESD)



- Connect your ESD wrist strap to an ESD connection point in the terminal.
- Disconnect the power at the rear terminal PCP.
- DO NOT RECONNECT power until you are ready to close the terminal.
- Put removed PCPs on an anti-static surface.

Failure to follow these procedures may damage ESD-sensitive components.

2. Disconnect all the cables from the PCP assembly boards
3. Unlatch the PCP assembly. Refer to **Removing the PCP assembly** on page 3-2, if necessary.
4. You can either swing out the PCP assembly on its hinges, or you can remove the assembly, then remove the control PCP.

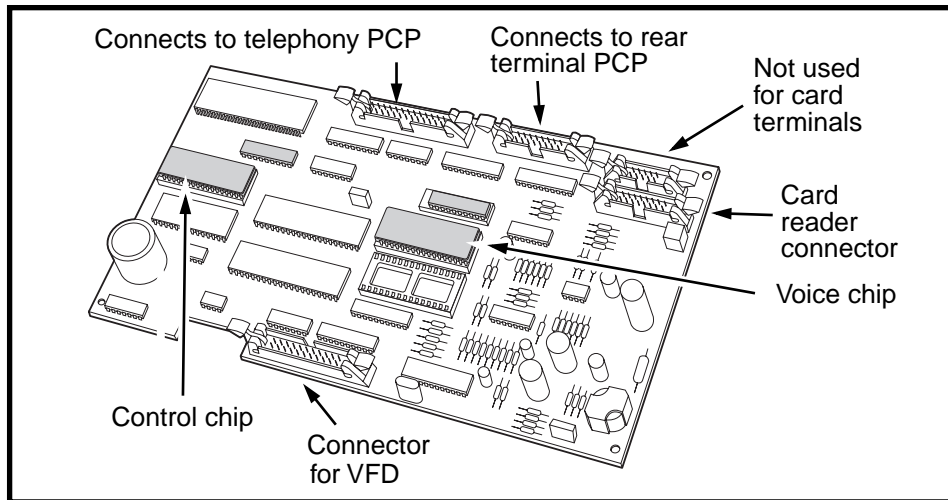
If you remove the assembly, put it in an anti-static bag until you are ready to re-install the control PCP.

5. Refer to Figure 3-9 for firmware chip locations.
 - a) Use a chip puller to grasp the appropriate chip.
 - b) Pull it straight up, out of the board socket.
 - c) Line the new chip up in the socket on the board and press down firmly to seat the chip.

Note: There is a notch or tab on the socket that matches a notch or tab on the chip. Match these up to ensure the chip is orientated properly in the socket.



Figure 3-9: Replacing firmware on the through-hole control PCP



6. If you removed them, replace the control PCP in the PCP assembly, and the PCP assembly in the terminal by reversing the steps in **Removing the telephony or control PCP** on page 3-11 and **Removing the PCP assembly** on page 3-2.

Note: Ensure power is disconnected from the rear terminal PCP before reconnecting cables to the PCP assembly boards.

7. Reconnect power at the rear terminal PCP.
8. Close and lock the terminal.

Refer to **Restoring the terminal to operation** on page 2-11, if necessary.

9. Run the INSTALL routine.
10. Perform operation tests to ensure that the terminal works as expected.

The tests performed will depend on the version of the firmware. Contact your Technical Assistance Manager (TAM) for the correct testing procedure.

3-18 PCP assembly components

Installing smart card alert (SCA)

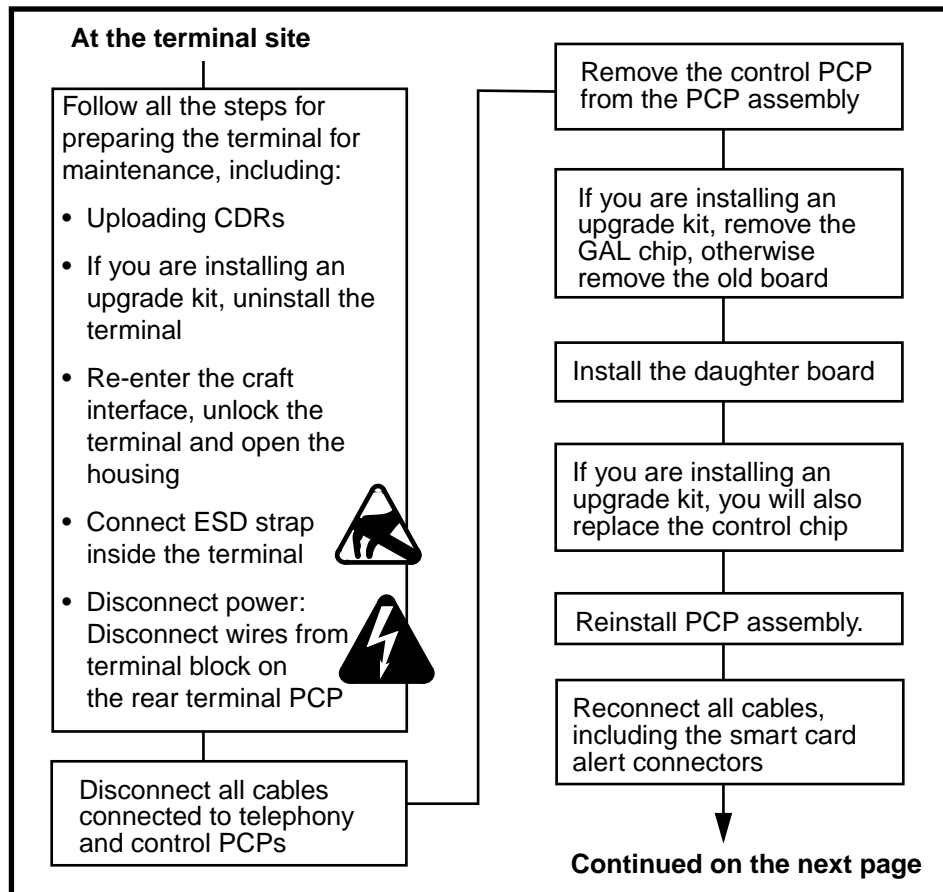
This procedure describes how to install a **smart card alert daughter board kit** into an existing terminal or replace an installed daughter board.

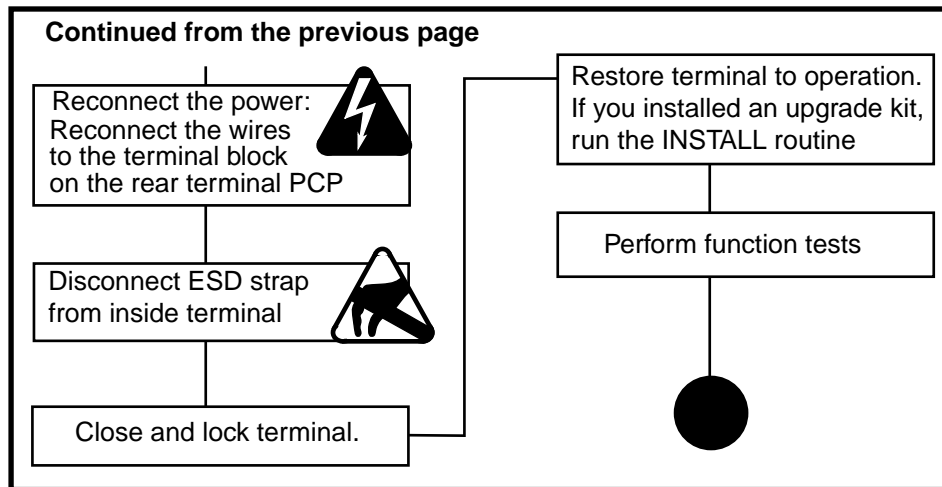
Note: This daughter board can only be used on smart card through-hole smart card control PCPs.

Flowchart

The following flowchart describes the key points to replacing the smart card alert daughter board.

Figure 3-10: Flowchart — replacing SCA daughter board, page 1



Flowchart — Replacing SCA daughter board, page 2**Replacing the SCA daughter board**

The procedure given below describes the how to install a smart card alert daughter board.

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6, including:

Upload CDRs!	<ul style="list-style-type: none">• Upload CDRs to the Millennium Manager.• This is imperative for this procedure.
Uninstall the terminal	<ul style="list-style-type: none">• Uninstall the terminal through the craft interface.• You will need to run the INSTALL routine when you finish.

- connected your ESD strap inside the terminal
- disconnected the power from the rear terminal PCP



3-20 PCP assembly components

Electrostatic discharge (ESD)



Failure to follow these procedures may damage ESD-sensitive components.

- Connect your ESD wrist strap to an ESD connection point in the terminal.
- Disconnect the power at the rear terminal PCP.
- DO NOT RECONNECT the power until you are ready to close the terminal.
- Put removed PCPs on an anti-static surface.

- removed the PCP assembly, as described in **Removing the PCP assembly** on page 3-2
- removed the alerter and keypad two-wire cable connectors from whichever PCP they are currently connected to — keypad PCP or external interface hookswitch
- removed the control PCP as described in **Removing the telephony or control PCP** on page 3-11 and put the PCP assembly in an anti-static bag and set it aside

- a) Replace firmware, if any was included in the kit

Refer to **Replacing firmware on the control PCP** on page 3-15 for directions for installing any new firmware.

- b) Remove the GAL chip currently in U25 socket.

Refer to Figure 3-11 to locate this socket on the control PCP.

Warning:



Ensure the **POWER IS DISCONNECTED** before installing or removing the GAL or the board.

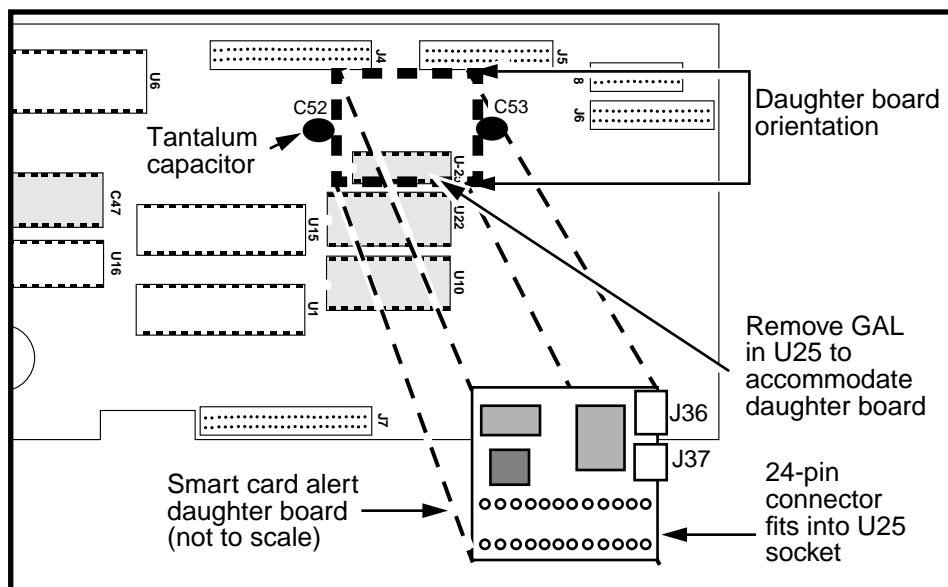
Failure to do so will result in damage to the daughter board and the control PCP.



Use a chip puller and pull the GAL straight up until it comes free of the socket.

- c) Disconnect the alerter cable from wherever it is connected — keypad PCP or external interface hookswitch module.
 - d) **Go to step 3.**
2. If you are replacing a daughter board:
 - a) Locate the smart card alert daughter board on the control PCP. Refer to Figure 3-11.
 - b) Grasp the board by the side edges and pull straight up, off the control PCP.

Figure 3-11: Positioning the SCA daughter board



3. Install the daughter board:
 - a) Line up the connector on the bottom of the daughter board with the U25 socket on the control PCP. Refer to Figure 3-11.

Be very careful to keep the connectors straight when fitting them into the socket.



3-22 PCP assembly components

- b) Press straight down to seat the board in the socket.

See this



Installation note

There are two small bead tantalum capacitors (C52 and C53) just above the U25 socket.

Very gently press them sideways, to allow the board to be properly seated.

Refer to Figure 3-11.

4. Replace the control PCP in the PCP assembly frame if you removed it.
5. Replace the PCP assembly into the terminal, if you removed it.
6. Reconnect all the cables, including:
 - a) Connect the J39 end of the smart card alert interconnect cable (Figure 3-12) to J52 on the keypad PCP (Figure 3-13) or to J52 on the external interface module (Figure 3-14).

Note: This connection depends on what version of the upper bezel assembly is in the terminal.
 - b) Route the cable so it reaches the control-PCP side of the terminal.
 - c) Connect the J38 end of the interconnect cable, shown in Figure 3-12, to the connector on the smart card alert daughter board (J36).



Figure 3-12: Keypad PCP smart card alert cable

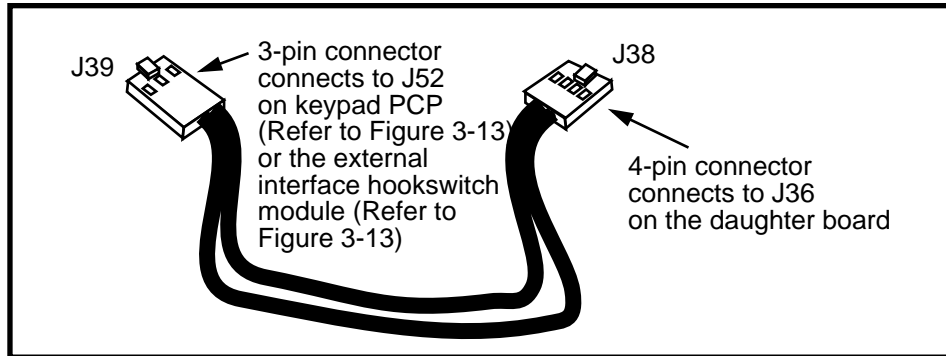
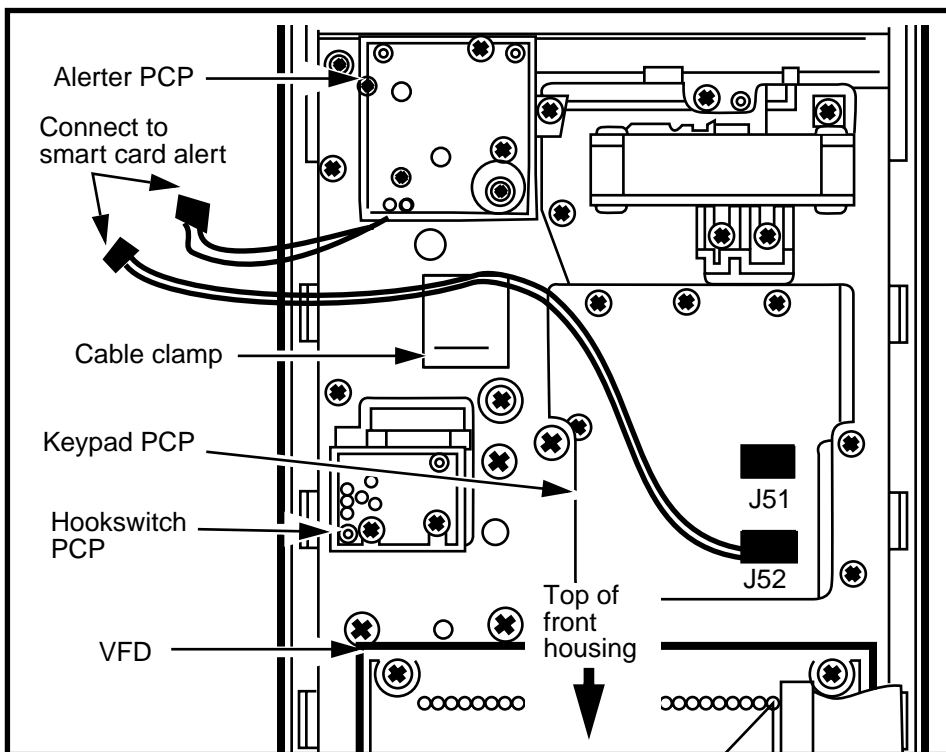
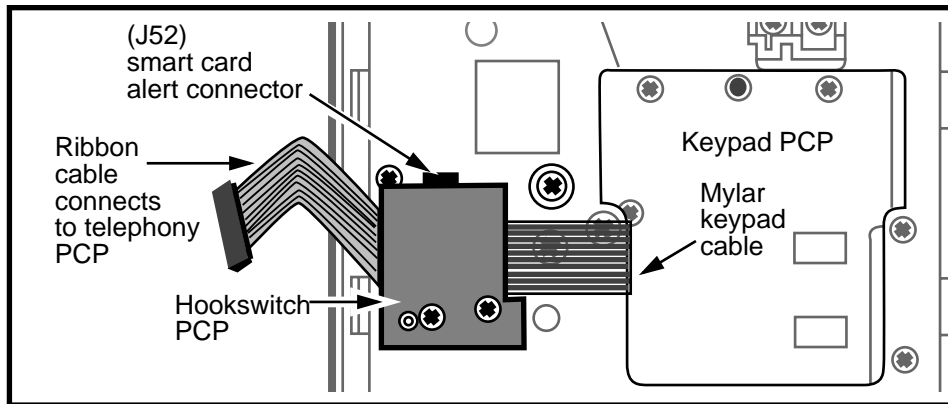


Figure 3-13: Alerter/keypad SCA connections



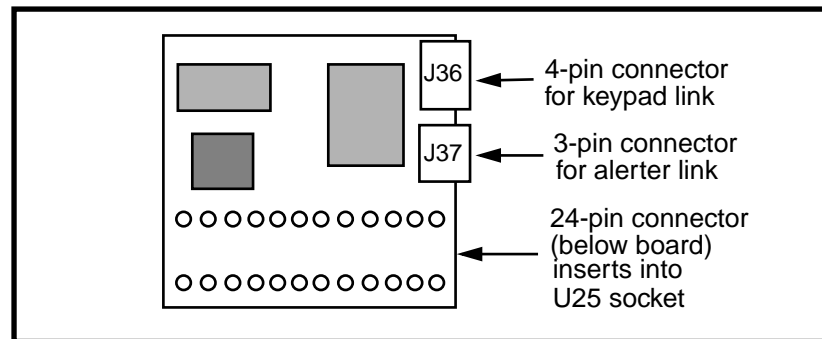
3-24 PCP assembly components

Figure 3-14: External interface hookswitch connections



7. Connect the cable from the alerter module to connector J37 on the smart card alert daughter board.
8. Connect the J38 end of the keypad two-wire cable to connector J36 on the smart card alert daughter board. Refer to Figure 3-15 for daughter board connectors.

Figure 3-15: Smart card alert board connections (overhead view)



9. Ensure that all the connectors are properly seated.
10. Reconnect the power: Connect the wires to the terminal block on the rear terminal cable. This procedure is described in **Restoring the terminal to operation** on page 2-11.
11. If you changed the firmware, run the INSTALL routine.



PCP assembly components **3-25**

12. Test the alarm:

- a) Take the handset off-hook.
- b) Insert a smart card into the card reader.
- c) Place the handset back on hook.
- d) Wait for the alarm to sound.
- e) Remove the smart card.



Millennium Card-based terminals: replacing parts





3-26 PCP assembly components





4-1

4 Upper bezel components

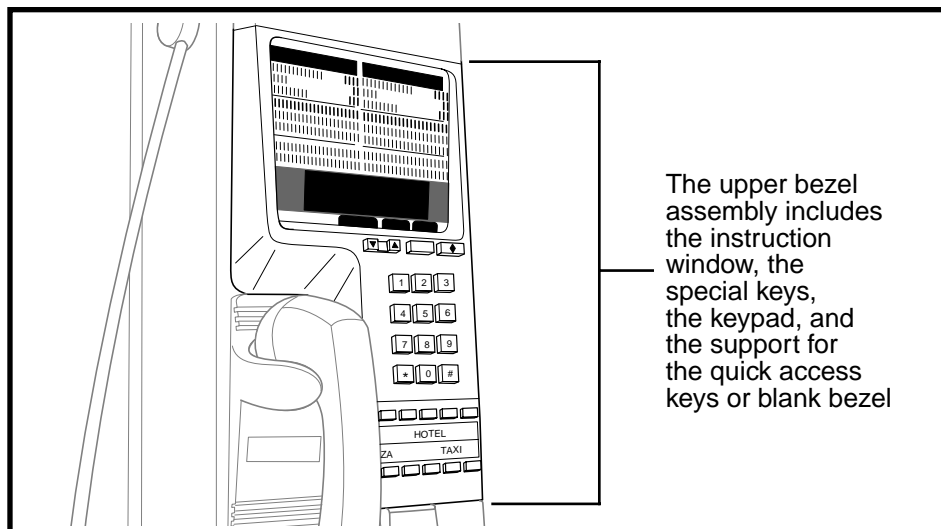
This section describes the replacement of the various parts which make up the upper bezel assembly.

These parts include the:

- vacuum fluorescent display (VFD), which is attached to the clamp plate
- upper bezel itself, which includes the keypad PCP
Note: There are two types of bezels.
- display window and gasket or instruction plate (Inmate terminals)
- quick access keys or blank bezel



Figure 4-1: Upper bezel assembly outside view



Millennium Card-based terminals: replacing parts





4-2 Upper bezel components

Replacing the display (VFD)

The vacuum fluorescent display (VFD) is located behind the PCP assembly.

It is attached to the clamp plate, which provides protection from the display being damaged through the display window.

See this

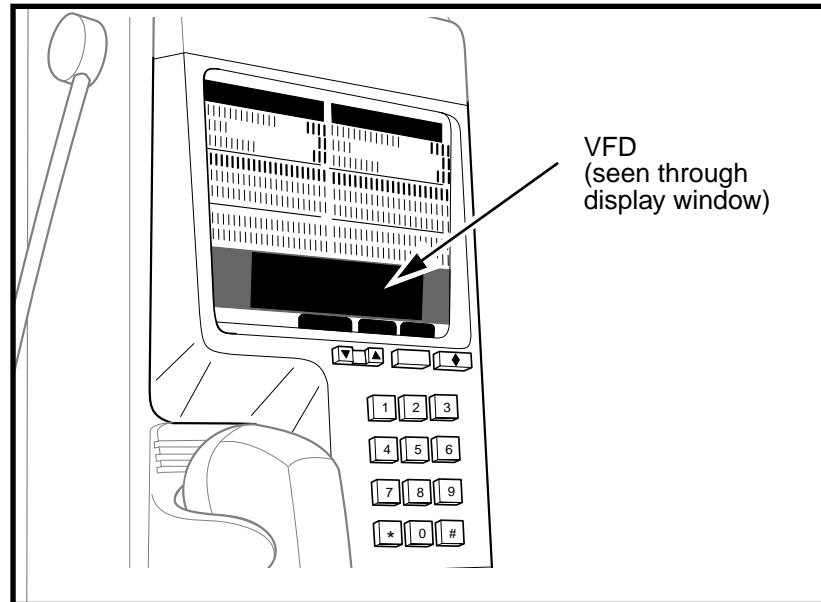


Inmate terminal

This terminal has no VFD or display window. Instead, a metal plate is installed in the display window opening. Operation instructions are silk-screened onto this plate.

For maintenance purposes, a portable display must be installed in the terminal. Refer to Chapter 6.

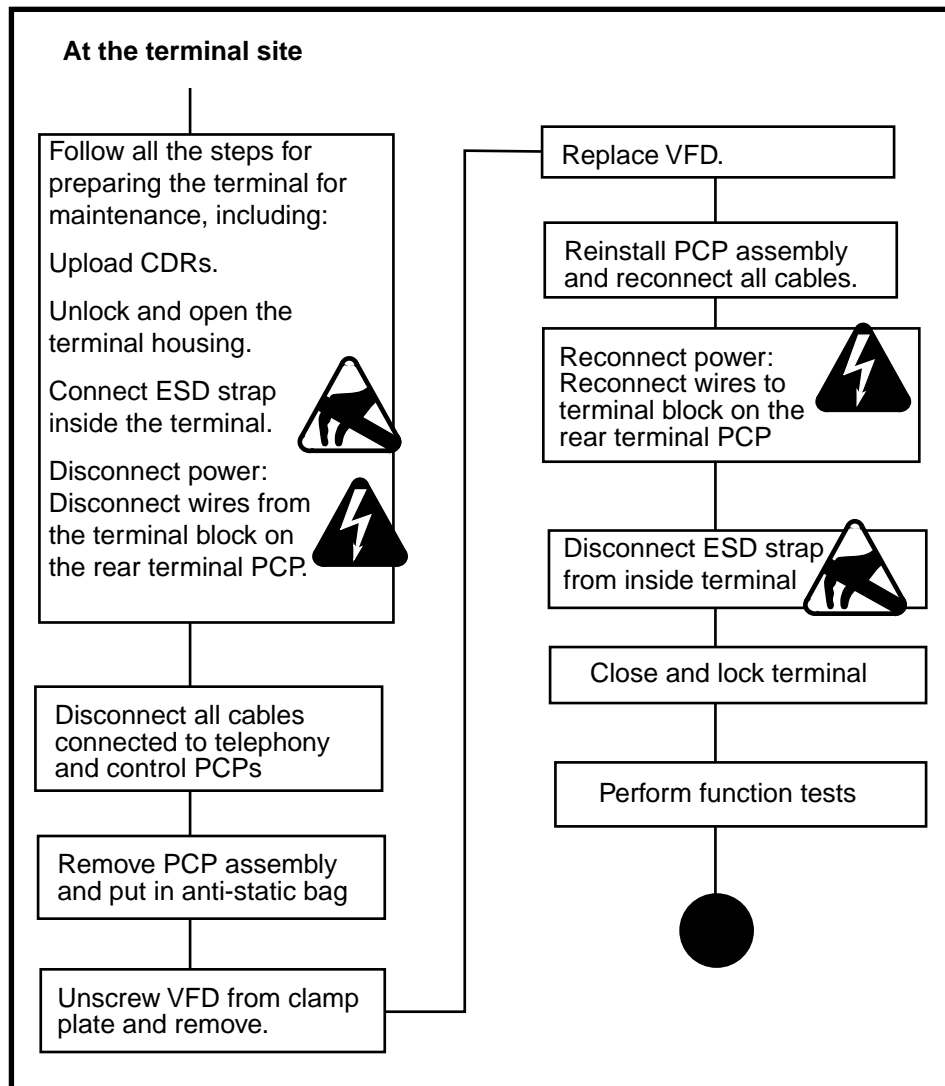
Figure 4-2: Exterior view of VFD on Card-based terminals



Flowchart

The following flowchart describes the key points to replacing the VFD.

Figure 4-3: Flowchart — Replacing the display





4-4 Upper bezel components

Replacing the two-line VFD

To replace the VFD in a Card terminal, follow these procedures:

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6
 - connected your ESD wrist strap inside the terminal
 - disconnected the power at the rear terminal PCP

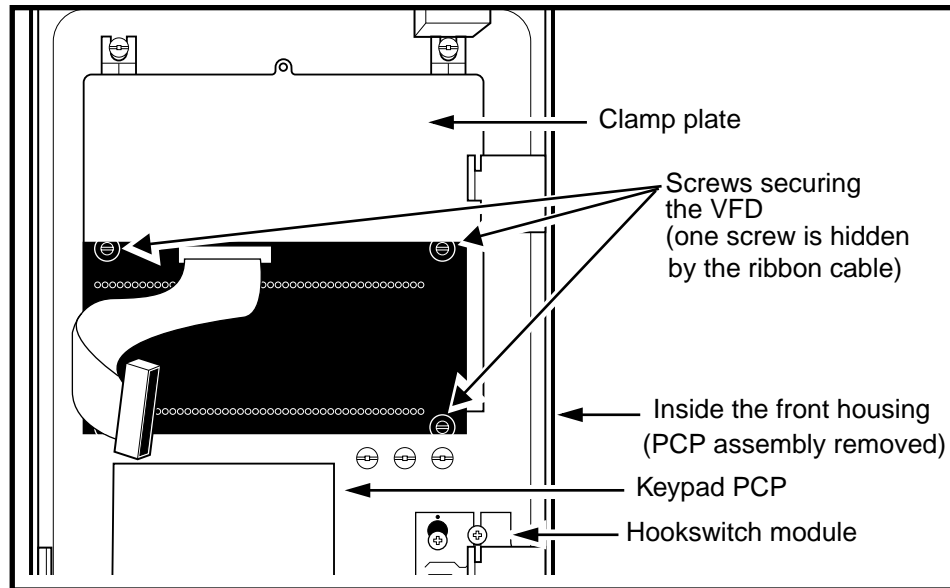
ESD warning



- Before working inside the terminal, put on your ESD wrist strap and connect it to the ESD connection point in the terminal.
- DISCONNECT power to the terminal before disconnecting any component.
- **Do not reconnect the power until you are ready to close the terminal.**
- Place any components you remove from the terminal into an anti-static bag.

- removed the PCP assembly as explained in **Removing the PCP assembly** on page 3-2
2. Remove the four M3 screws attaching the display to the clamp plate. Use a #1 type 1A cross-recess screwdriver. Refer to Figure 4-4.
 3. Lift the display in its plastic envelope away from the clamp plate.



Figure 4-4: Locating the display screws

4. To replace the display, ensure that the ESD plastic shield is in place and the four plain grommets are in place on the display PCP, then reattach the display to the clamp plate. Refer to Figure 4-5.

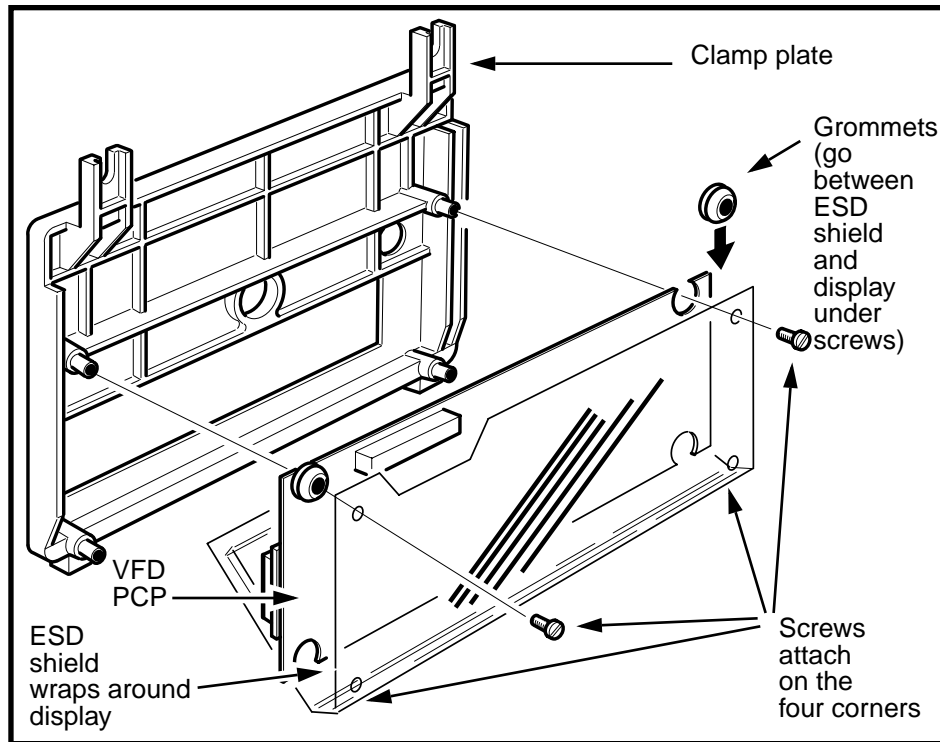
Figure 4-5 shows an exploded view of how the display fits to the clamp plate.

5. Reinstall the PCP assembly as explained in **Removing the PCP assembly** on page 3-2.
6. Restore the terminal to operation.
Refer to **Restoring the terminal to operation** on page 2-11, if necessary.
 - a) Reconnect the power to the terminal by reconnecting the terminal block to the rear terminal PCP.
 - b) Remove your ESD strap connection.
 - c) Close and lock the terminal.
7. Perform operations tests to make sure the VFD and terminal are working.



4-6 Upper bezel components

Figure 4-5: Exploded view of clamp plate/display

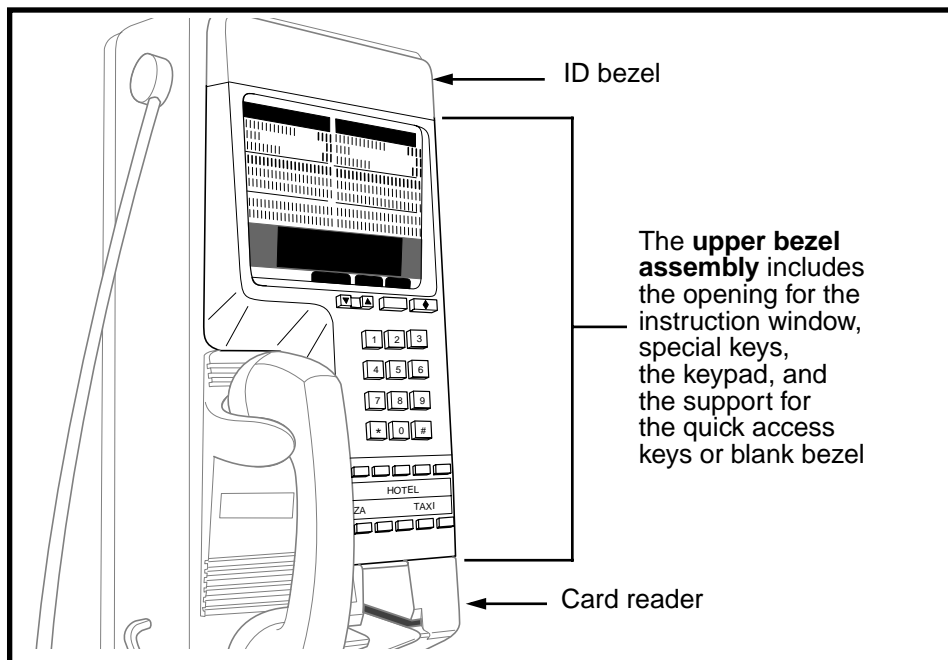


Replacing the upper bezel assembly

The upper bezel assembly attaches to the front housing.

It contains the keypad assembly and the frame for the display window. The keypad assembly is sealed into the upper bezel assembly, so if there is a keypad problem, you usually replace the whole assembly.

Figure 4-6: Upper bezel assembly outside view



Note: There are two types of upper bezel assemblies, based on a keypad PCP upgrade. For the purposes of this procedure, they will be described as bezel A and bezel B.

The two assemblies can be distinguished by how the alert-cable connects.

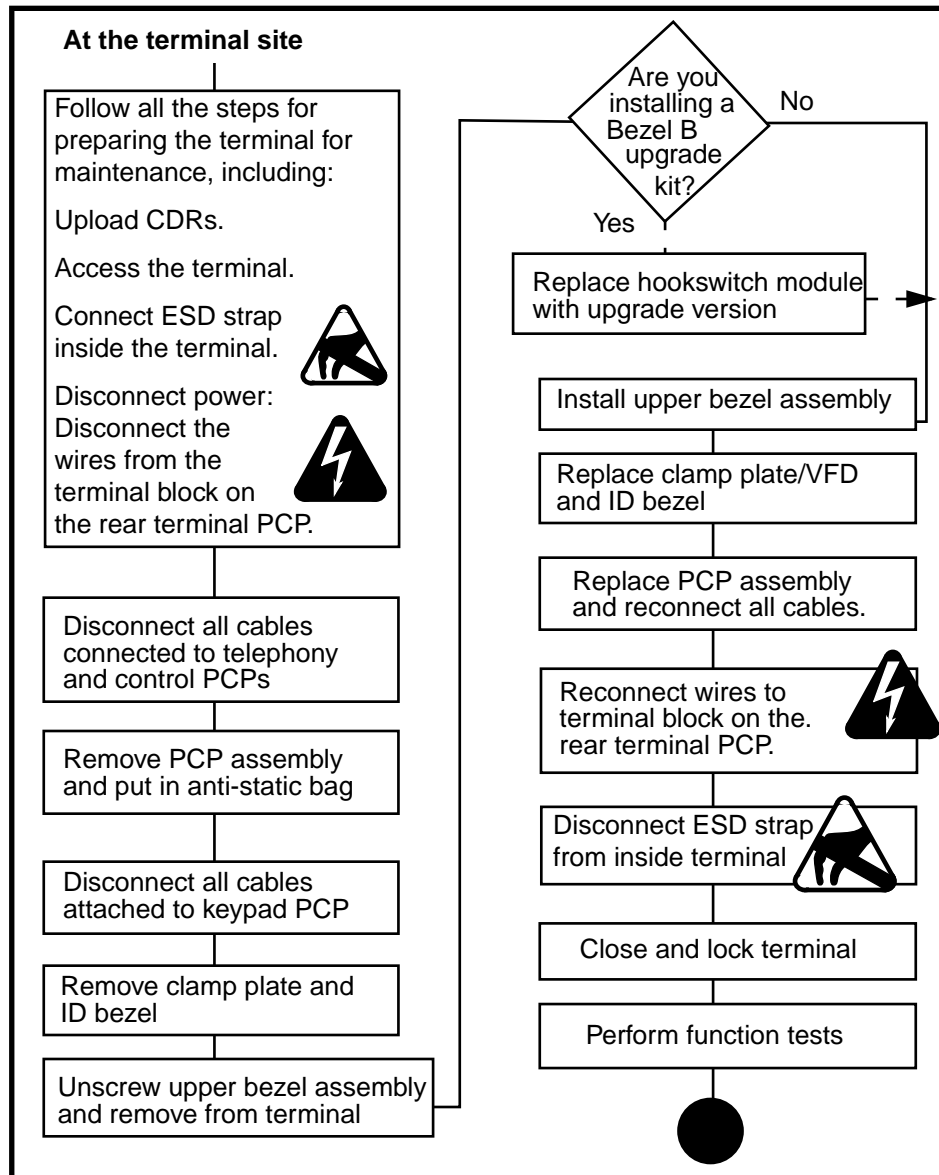
- **Bezel A:** the alerter cable connects to the keypad PCP.
- **Bezel B:** the alerter cable connects to the external interface hookswitch PCP.

4-8 Upper bezel components

Flowchart

The following flow chart describes the key points to replacing the upper bezel assembly.

Figure 4-7: Flowchart — Replacing upper bezel assembly





Replacing the upper bezel assembly

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6

Upload CDRs before you start!

- Upload the CDRs to the Millennium Manager before you start internal maintenance procedures.

- connected ESD strap inside the terminal
- disconnected the power at the rear terminal PCP

ESD/power warning



- Before working inside the terminal, put on your ESD wrist strap and connect it to the ESD connection point in the terminal.
- Before disconnecting any component, disconnect the power.
- **Do not reconnect the power until you are ready to close the terminal.**
- Place any components you remove from the terminal into an anti-static bag.

- removed the PCP assembly, placing it in an anti-static bag and setting it aside, as explained in **Removing the PCP assembly** on page 3-2.
- **Bezel A:** the keypad connector is disconnected from the telephony PCP

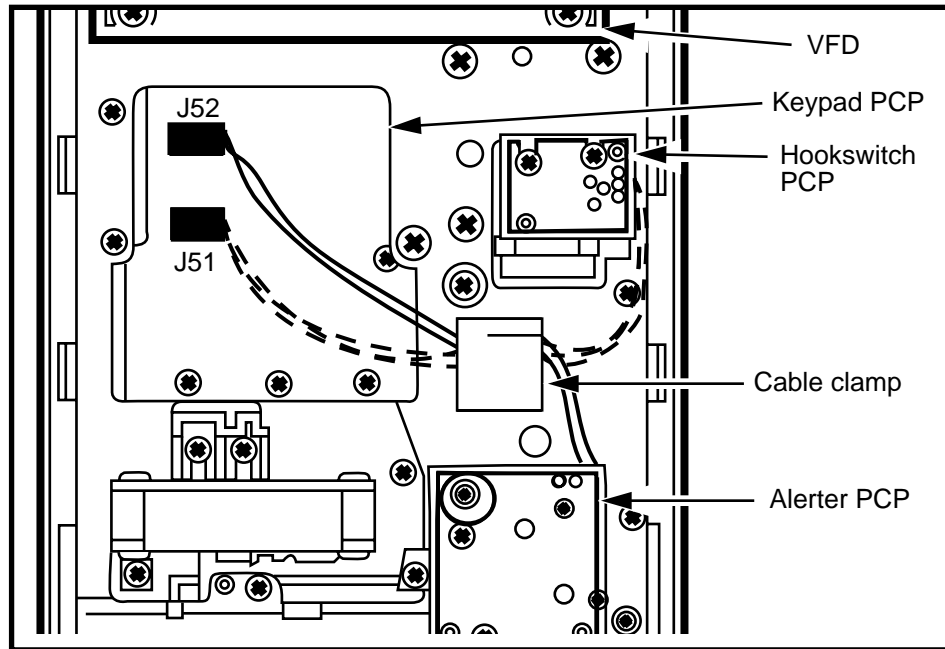
Bezel B: the keypad connector is disconnected from the Hookswitch PCP



4-10 Upper bezel components

2. **Bezel A:** Disconnect the hookswitch cable (J13) from the connector on the keypad PCP (J51). Refer to Figure 4-8.

Figure 4-8: Bezel A alerter/hookswitch connectors



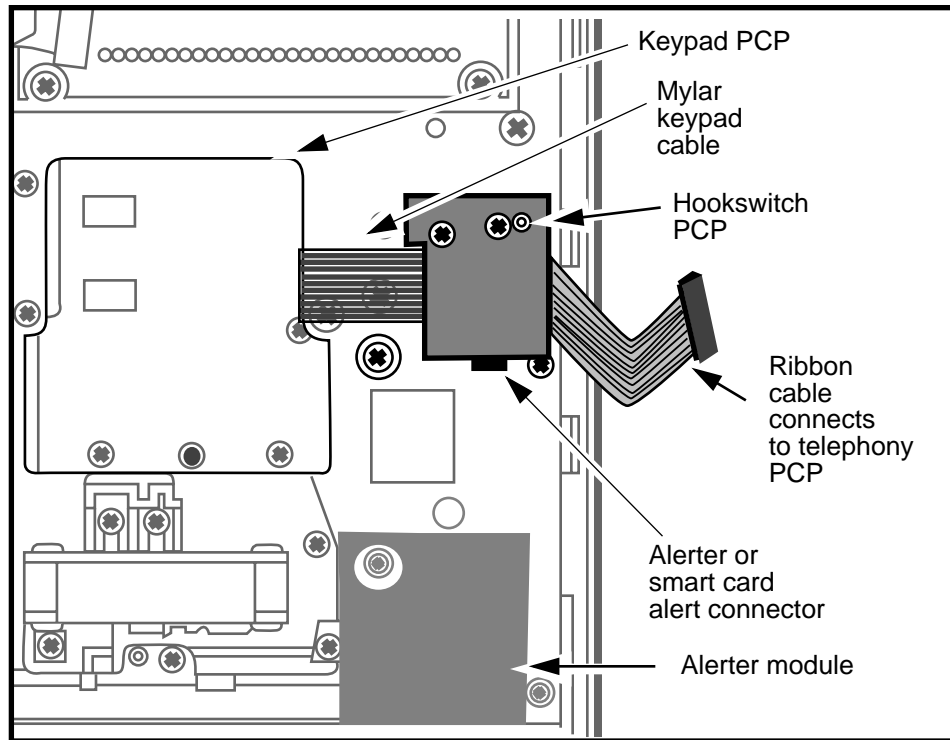
Bezel B: No connections.

3. **Bezel A:** Disconnect the alerter cable (J14) from the connector on the keypad PCP (J52). Refer to Figure 4-8.

If there is a smart card alert, the cable is connected to the smart card alert connector instead and should have been disconnected when the control PCP was removed.

Bezel B: No connections. Refer to Figure 4-9.

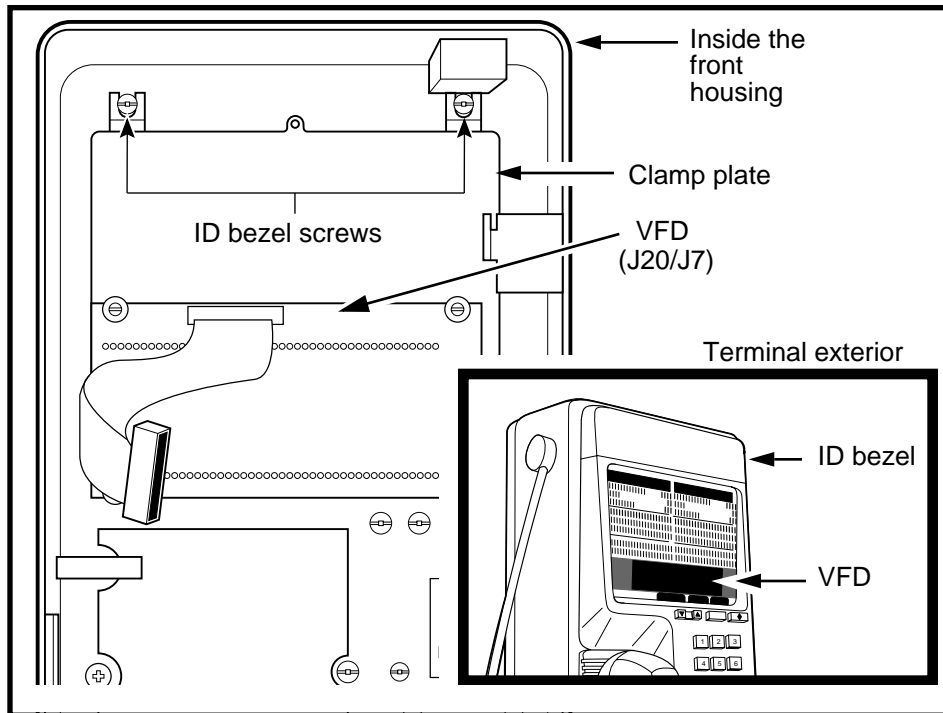
Figure 4-9: Hookswitch — Bezel B keypad/alerter connections



4. Remove the ID bezel.
 - a) With one hand, support the ID bezel on the outside of the terminal.
 - b) With the other hand, remove the two screws from inside the terminal which hold the ID bezel and clamp plate in place. Refer to Figure 4-10.
 - c) Remove the ID bezel from the front of the terminal.

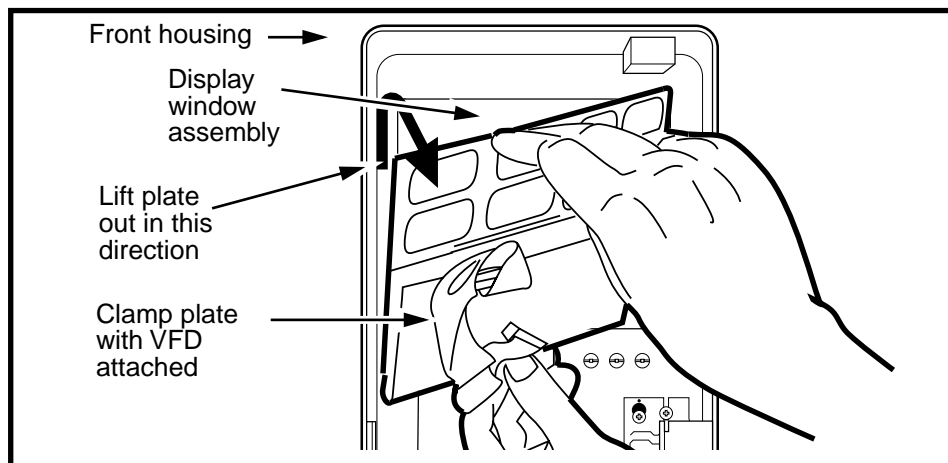
4-12 Upper bezel components

Figure 4-10: Locating the ID bezel and screws



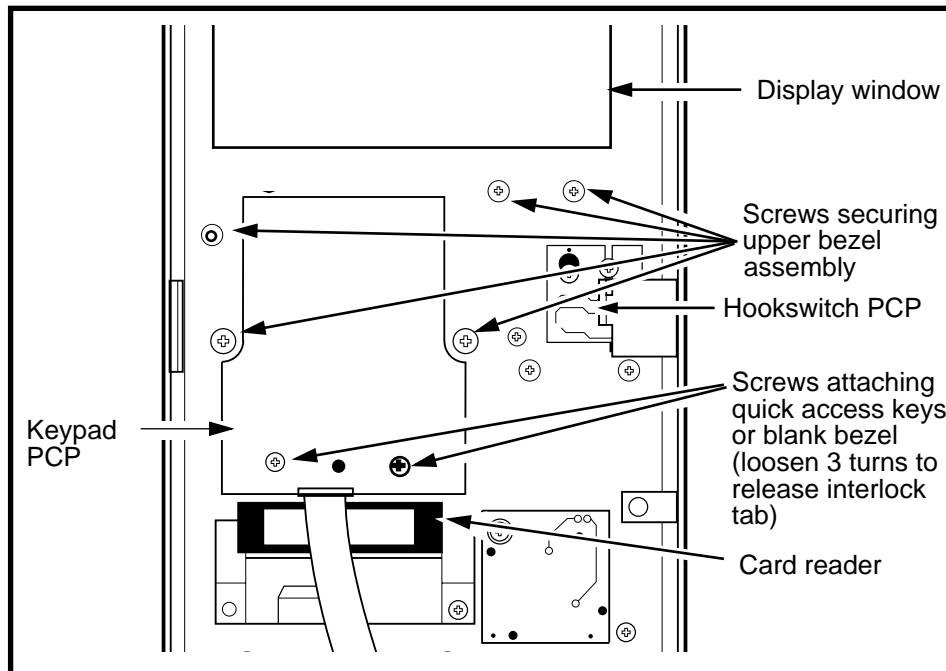
5. On the inside of the terminal, lift out the clamp plate with the VFD attached, as shown in Figure 4-11.

Figure 4-11: Removing the clamp plate



Upper bezel components 4-13

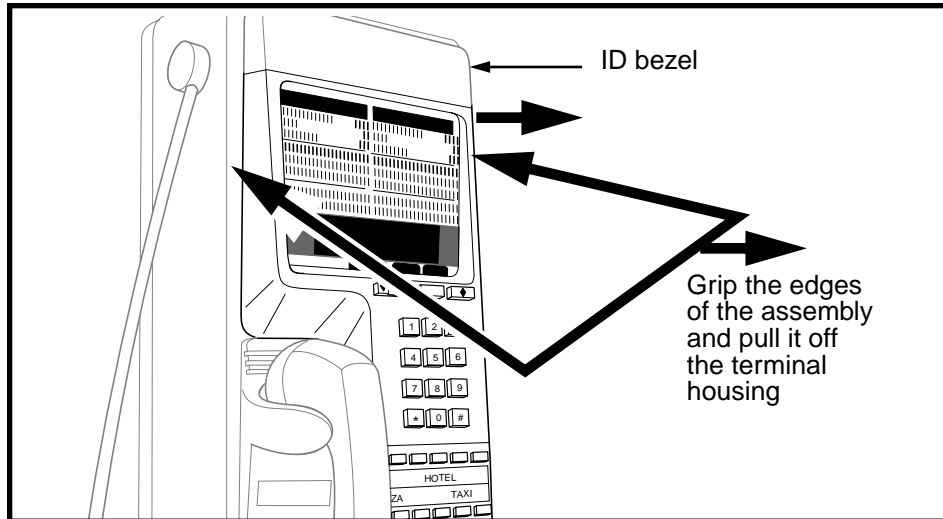
6. Use Figure 4-12 to locate the five M5 tapping screws which secure the upper bezel assembly.

Figure 4-12: Screws securing the upper bezel

7. Remove four of the five screws. Use a #2 type 1A cross-recess screwdriver.
8. With one hand, support the upper bezel assembly, shown in Figure 4-13, from the outside of the terminal. Do the following to completely release the bezel from the terminal housing:
 - a) Remove the last M5 screw.
 - b) Loosen three turns the bottom two screws on the keypad PCP. This releases the dialer bezel interlock. These screws are indicated in Figure 4-12.
 - c) Grip the upper bezel assembly and pull it from the front of the terminal.

4-14 Upper bezel components

Figure 4-13: Removing the assembly



9. Remove the quick access keys or blank bezel from the upper bezel assembly you removed and install it on the new assembly.

Refer to **Replacing the quick access keys bezel** on page 4-21. Figure 4-12 shows the screw locations.

See this



All the keys are loose, so take care when removing the bezel.

Hint: Grip the bezel by the sides and remove it from the terminal at an angle from the top.

Multi-card reader: Remember not to tighten the screws completely until the upper bezel assembly is reinstalled on the terminal.

10. To replace the upper bezel assembly, reverse the preceding steps.
 - Ensure the upper bezel assembly and ID bezel gaskets are properly seated in the channels around the assemblies.
 - Ensure the cables are connected to the correct connectors.

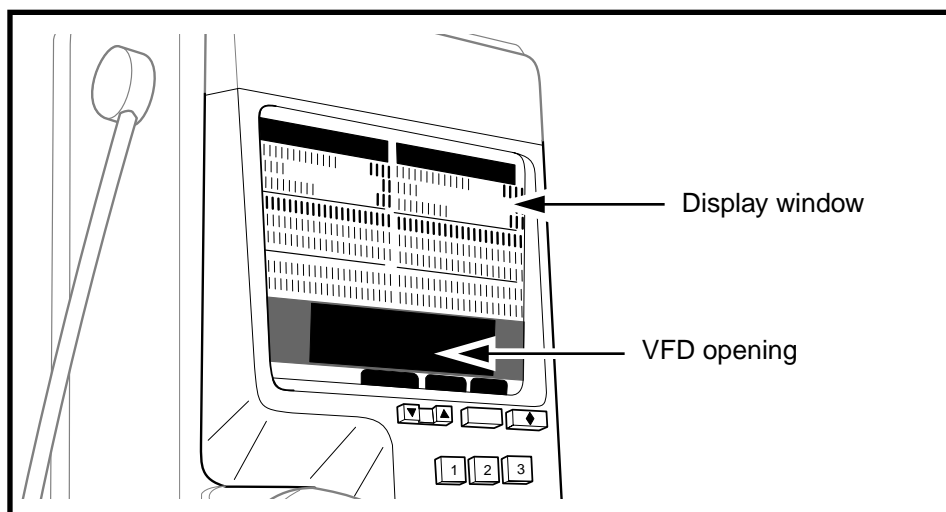
- Ensure any excess cable is folded so it does not touch the terminal housing
11. Restore the terminal to operation.
Refer to **Restoring the terminal to operation** on page 2-11, if necessary.
 - a) Reconnect the power to the terminal by reconnecting the terminal block to the rear terminal PCP.
 - b) Remove your ESD strap connection.
 - c) Close and lock the terminal.
 12. Perform keypad craft interface tests.
 13. Perform function tests to ensure the terminal is working as expected.

Replacing the display window

The display window is the clear, high-impact plastic covering that sits in front of the clamp plate and under the upper bezel assembly. Refer to Figure 4-14.

Note: The Inmate terminal does not use a display window assembly.

Figure 4-14: Display window external view

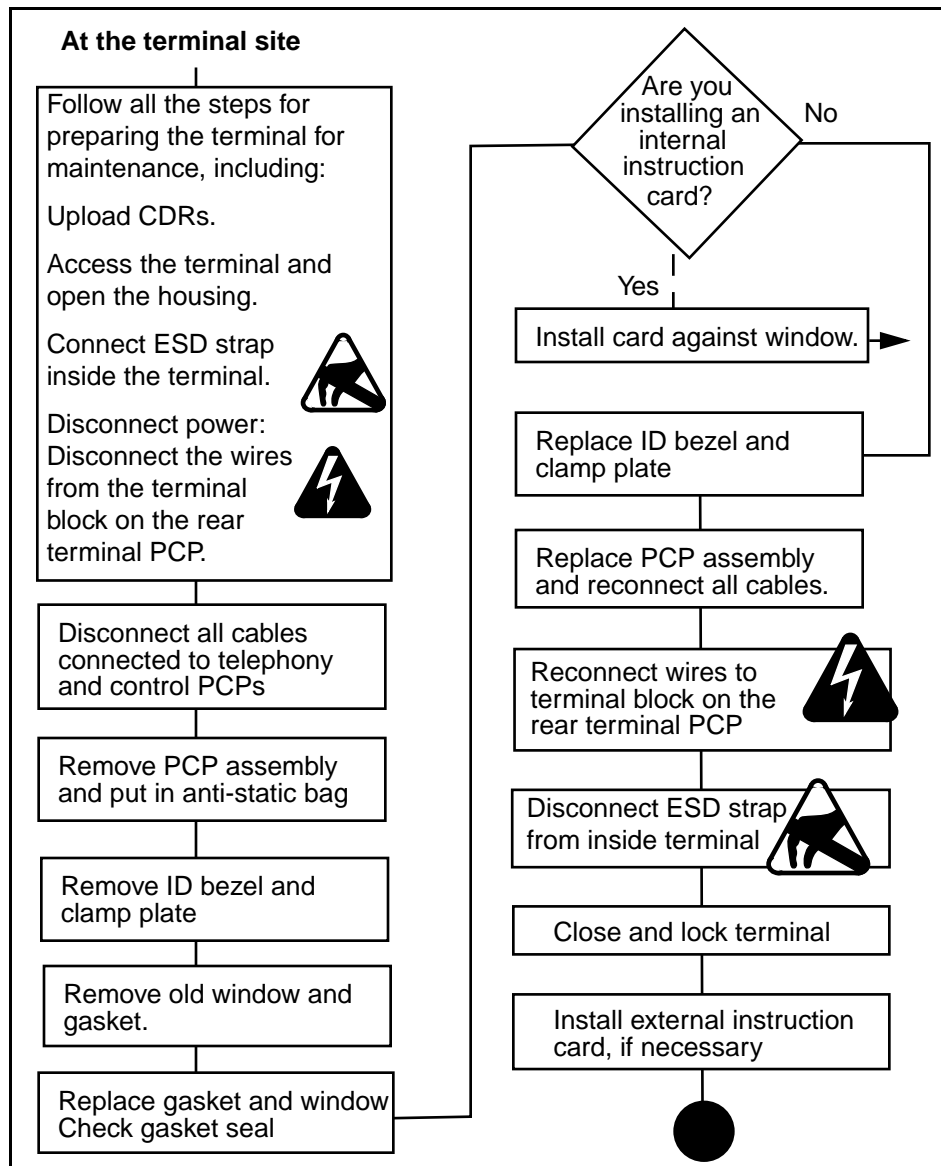


4-16 Upper bezel components

Flowchart

The following flowchart describes the key points to replacing the display window.

Figure 4-15: Flowchart — Replacing the window assembly





Replacing the window

The display window is replaced from inside the terminal, as described below.

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6

Upload CDRs before you start!

- Upload the CDRs to the Millennium Manager.

- connected ESD strap inside the terminal
- disconnected the power at the rear terminal PCP
- removed the PCP assembly as explained in **Removing the PCP assembly** on page 3-2

ESD/power warning



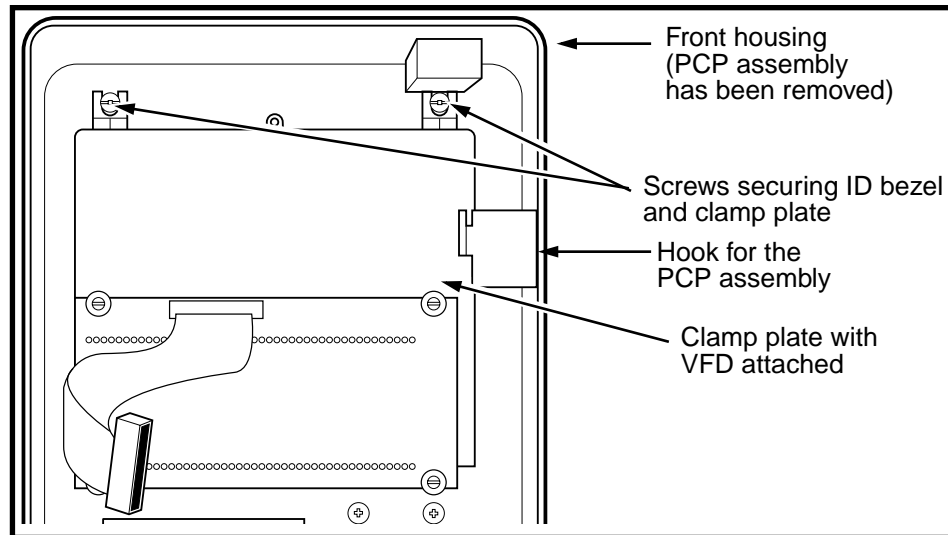
- Before working inside the terminal, put on your ESD wrist strap and connect it to the ESD connection point in the terminal.
- Before disconnecting any component, disconnect the power.
- **Do not reconnect the power until you are ready to close the terminal.**
- Place any components you remove from the terminal into an anti-static bag.

2. On the outside of the terminal, hold your hand over the ID bezel, located at the top on the face of the terminal.
3. On the inside of the terminal, remove the two screws holding the ID bezel in place. Refer to Figure 4-16.



4-18 Upper bezel components

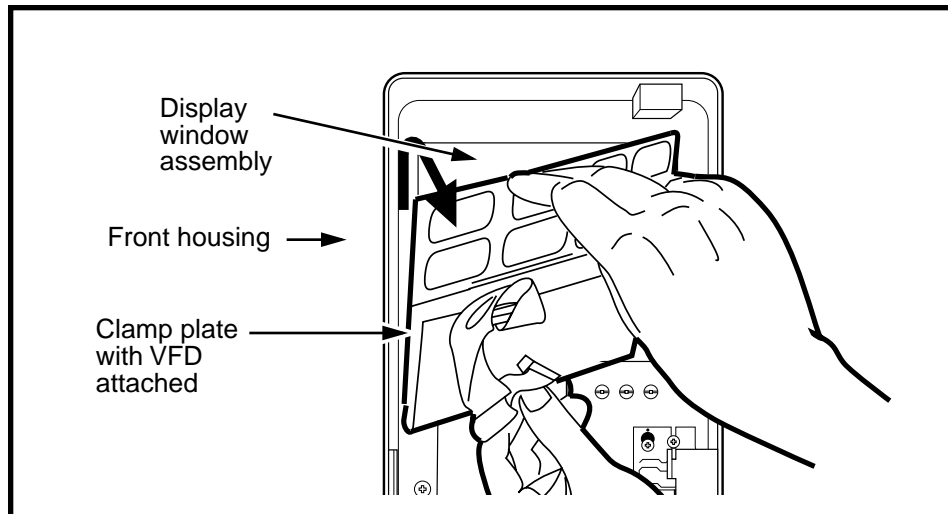
Figure 4-16: ID bezel screws hold clamp plate



4. Pull the ID bezel from the front of the housing.
5. On the inside of the terminal, remove the clamp plate with the VFD attached as shown in Figure 4-17.
6. Push the window inward from the outside and remove it from the housing.
7. Seat the new window into the opening in the housing.
The tab on the window gasket should be on the top right side, the handset side.
8. If there is an internal instruction card, insert it now.
If you are working with an Inmate terminal, install the instruction plate now. These procedures are described below.



Figure 4-17: Removing the clamp plate



Installing an internal instruction card

Instructions cards are supplied by the operating company. They should fit tightly behind the plastic window.

- Position the internal instruction card on the window.
- Ensure that the notch in the lower edge of the card and the hole in the tab at the top of the card are properly located over the corresponding pins.

Installing the Inmate instruction plate

The Inmate terminal, has a steel plate with instructions and a gasket to fit around the window opening, but no plastic window.

- Seat the gasket around the window opening.
- Install the metal plate as you would the internal instruction card, ensuring that the plate is tightly sealed against the gasket.



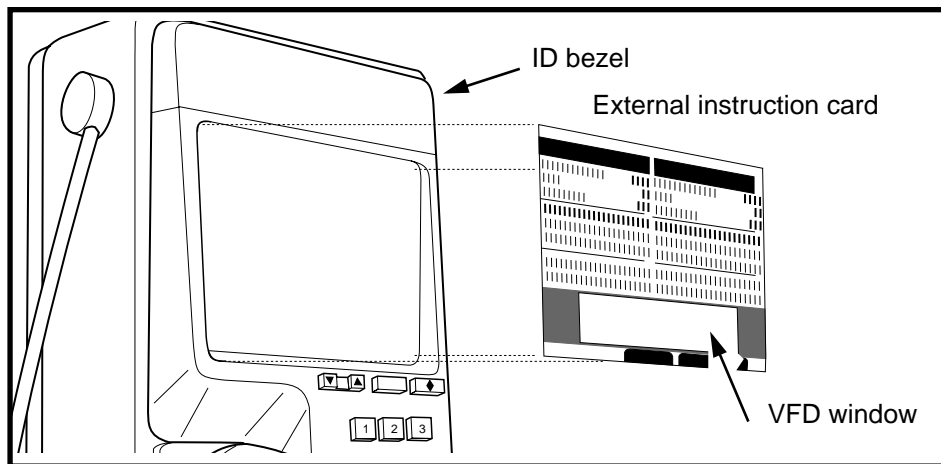
4-20 Upper bezel components

9. Reassemble the components by reversing **Steps 1 to 5**.
Note: Ensure the gasket around the ID bezel is fitted properly when reinstalling the bezel.
10. Reinstall the PCP assembly as explained in **Removing the PCP assembly** on page 3-2.
11. Restore the terminal to operation.
Refer to **Restoring the terminal to operation** on page 2-11, if necessary.
 - a) Reconnect the power to the terminal by reconnecting the terminal block to the rear terminal PCP.
 - b) Remove your ESD strap connection.
 - c) Close and lock the terminal.

Replacing the external instruction card

The operating company provides instruction cards, and may choose to use external cards. Refer to Figure 4-18.

Figure 4-18: Replacing the external instruction card



To install an external instruction card, ensure that the terminal is closed and follow this procedure:

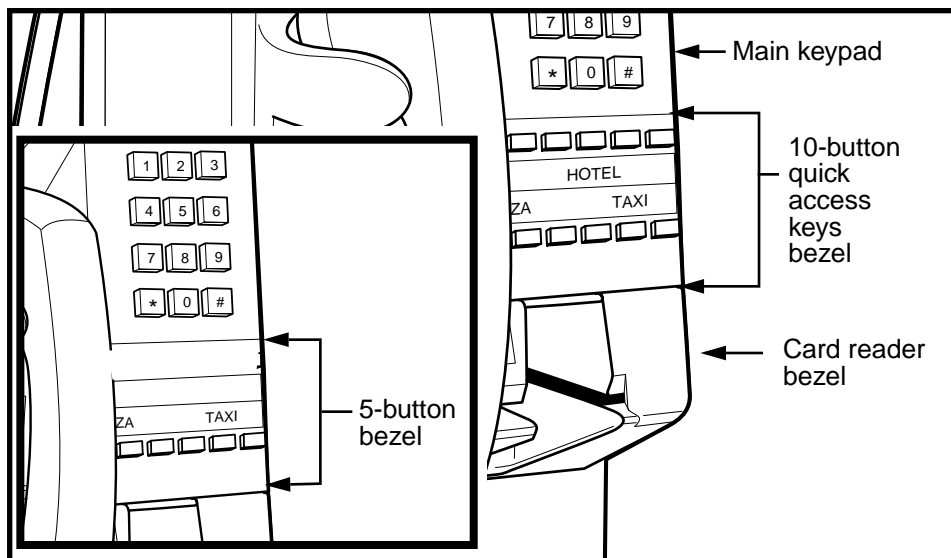
1. Press the knuckle saver suction cup firmly on to the center of the external instruction card on the front of the terminal.
2. Pull on the knuckle saver until the card bends enough to pop out of the housing assembly.
3. To replace the card, bend it and insert the corners under the lip between the window and upper bezel.
4. Slide your fingers along the edges of the card, pressing the edges under the lip until it snaps into place.
5. Position the new card so all its edges are covered.

Replacing the quick access keys bezel

Each Millennium Card terminal has a ten-button quick access key array, a five-button quick access key array, or a blank dialer bezel located under the main keypad.

Figure 4-19 shows what the bezels with keys look like.

Figure 4-19: Quick access keys bezels



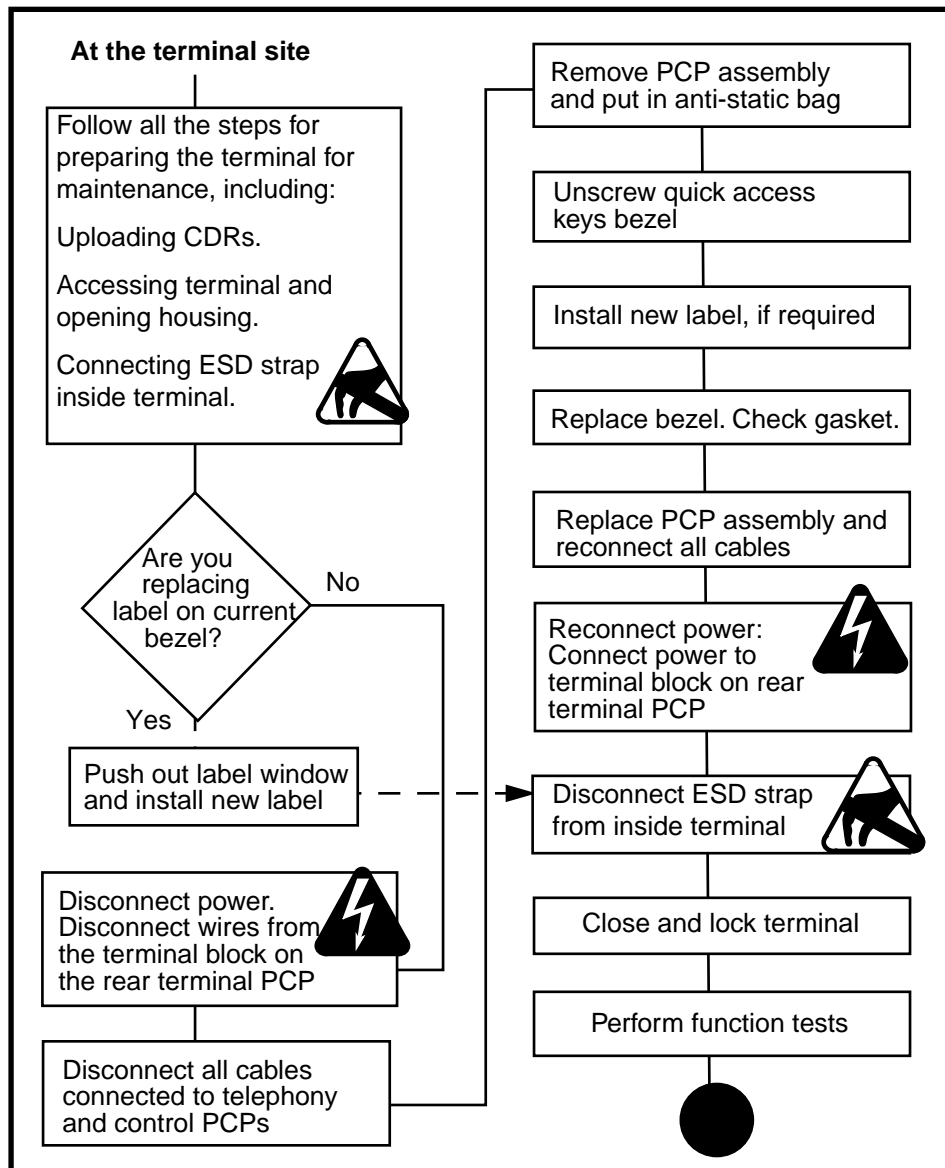
Millennium Card-based terminals: replacing parts

4-22 Upper bezel components

Flowchart

The flowchart shown in Figure 4-20 describes the key points to replacing the quick access keys bezel.

Figure 4-20: Flowchart — Replacing the quick access keys bezel





Replacing quick access keys

The following procedure explains how to interchange or replace the quick access keys bezel.

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6

Upload CDRs before you start!

- Upload the CDRs to the Millennium Manager before you start internal maintenance procedures.

- connected ESD strap inside the terminal
- disconnected the power at the rear terminal PCP
- removed the PCP assembly bracket as explained in **Removing the PCP assembly** on page 3-2 and put it in an anti-static bag and set it aside

ESD/power warning



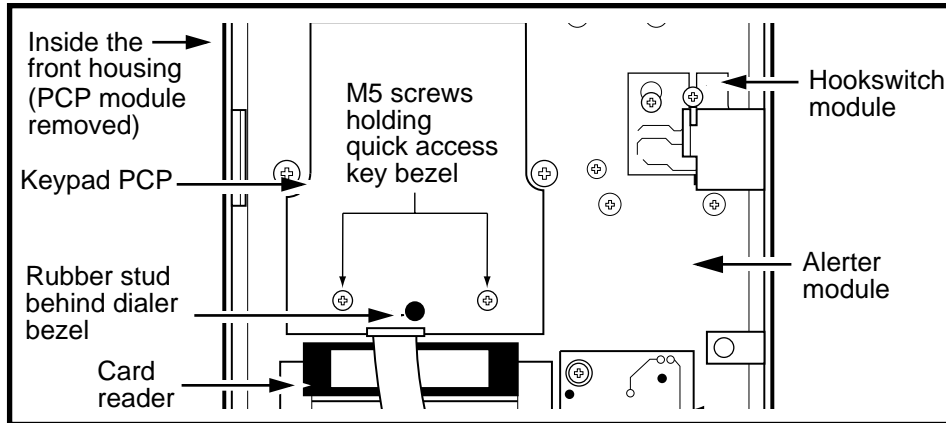
- Before touching internal components, put on your ESD wrist strap and connect it to the ESD connection point in the terminal.
- DISCONNECT power from the rear terminal PCP before disconnecting any component.
- Do not reconnect the power until you are ready to close the terminal.
- Place any components you remove from the terminal into an anti-static bag.

2. Remove the two M5 tapping screws securing the dialer bezel above the card reader on the inside of the upper housing. Use a #2 type 1A cross-recess screwdriver. These screws are labelled in Figure 4-21.



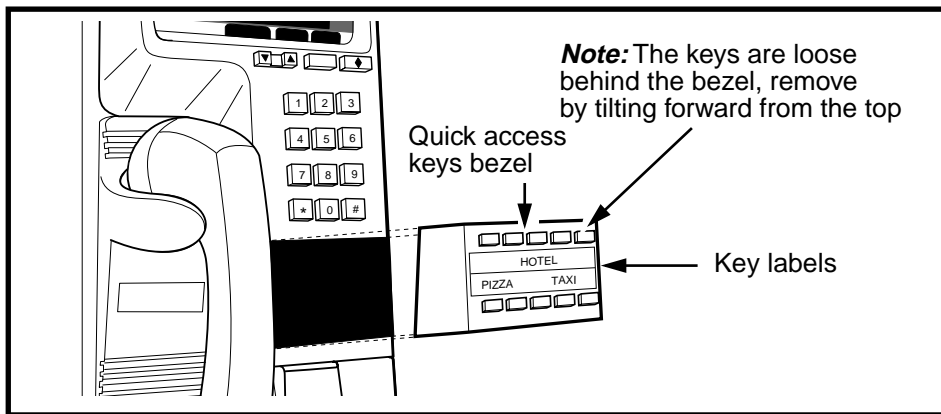
4-24 Upper bezel components

Figure 4-21: Screws securing the bezel



3. Pull the bezel from the front of the terminal, keeping the bezel slightly angled down to prevent the keys from falling out. Refer to Figure 4-22.

Figure 4-22: Removing the quick access keys bezel



4. Install the quick access keys or the blank bezel by pushing the bezel into position on the terminal.
- Note:** Ensure the gasket is seated properly under the bezel.
5. Secure the quick access keys set from inside the front housing using the two M5 tapping screws. Refer to Figure 4-21.



6. If this is a new bezel, remove the button retainer from the quick access keys and discard.
7. Insert the keys label card under the quick access keys bezel window as described in the procedure below.

Replacing the quick access keys label card

- a. From inside the front housing, push on the round rubber stud between the two screws securing the dialer bezel. This stud is labeled in Figure 4-21.
 - b. Bend the window outward until the center of the window is high enough to grasp.
 - c. Pull the window out of its slot.
 - d. Insert the label card behind the place where the window was.
 - e. Insert one end of the window in the opening in the dialer bezel. Bend the window outward and insert the opposite end into position, then release it.
8. Reinstall the PCP assembly as explained in **Removing the PCP assembly** on page 3-2.
 9. When complete, reconnect the power at the terminal block on the rear terminal PCP.
 10. Restore the terminal to operation.
Refer to **Restoring the terminal to operation** on page 2-11, if necessary.
 - a) Reconnect the power to the terminal by reconnecting the terminal block to the rear terminal PCP.
 - b) Remove your ESD strap connection.
 - c) Close and lock the terminal.
 - d) Force a download to acquire the table which activates the buttons.
 11. Perform function tests.

Note: For a detailed description of the craft interface download option, refer to *Millennium terminals: using the craft interface*.





4-26 Upper bezel components



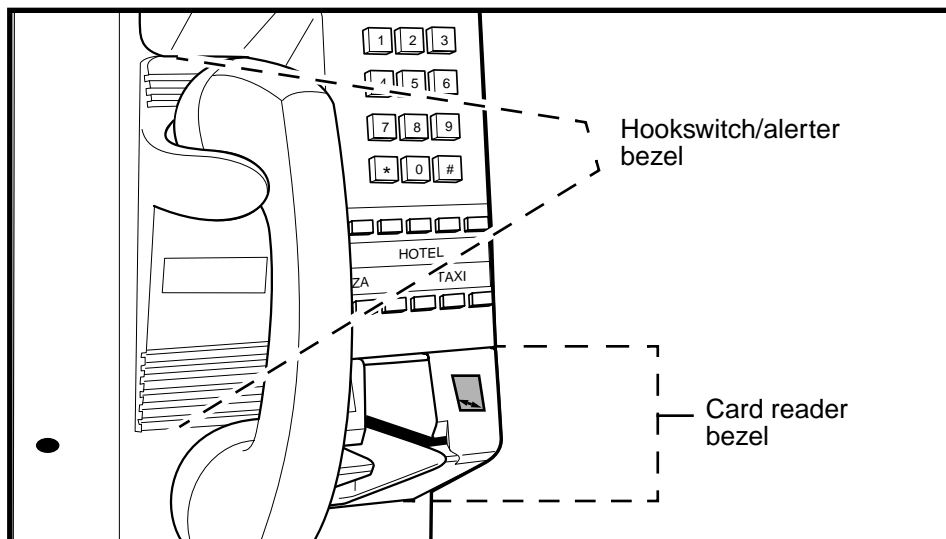
5 Card and hookswitch parts

This section completes the instructions for replacing parts on card and card-based terminals.

This section includes procedures for replacing:

- card reader and bezel (card reader assembly)
- alerter and hookswitch modules
- hookswitch/alerter bezel assembly
- datajack module/card reader connector: These two external connectors allow the terminal to send data information from portable communications equipment.

Figure 5-1: Hookswitch and card reader bezels



Millennium Card-based terminals: replacing parts

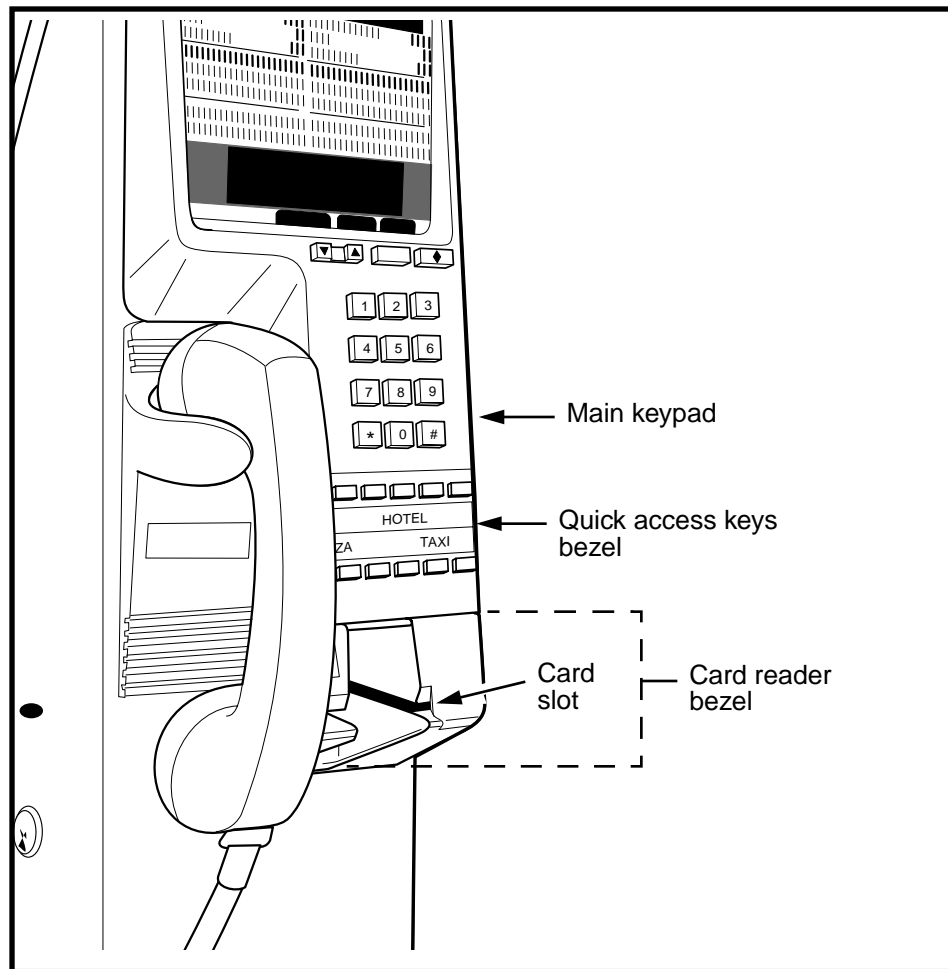
5-2 Card and hookswitch parts

Replacing the card reader

The card reader is attached to the exterior card reader bezel. As a unit, this is inserted into the housing and then secured to the housing.

Figure 5-2 shows the exterior view of the card reader bezel.

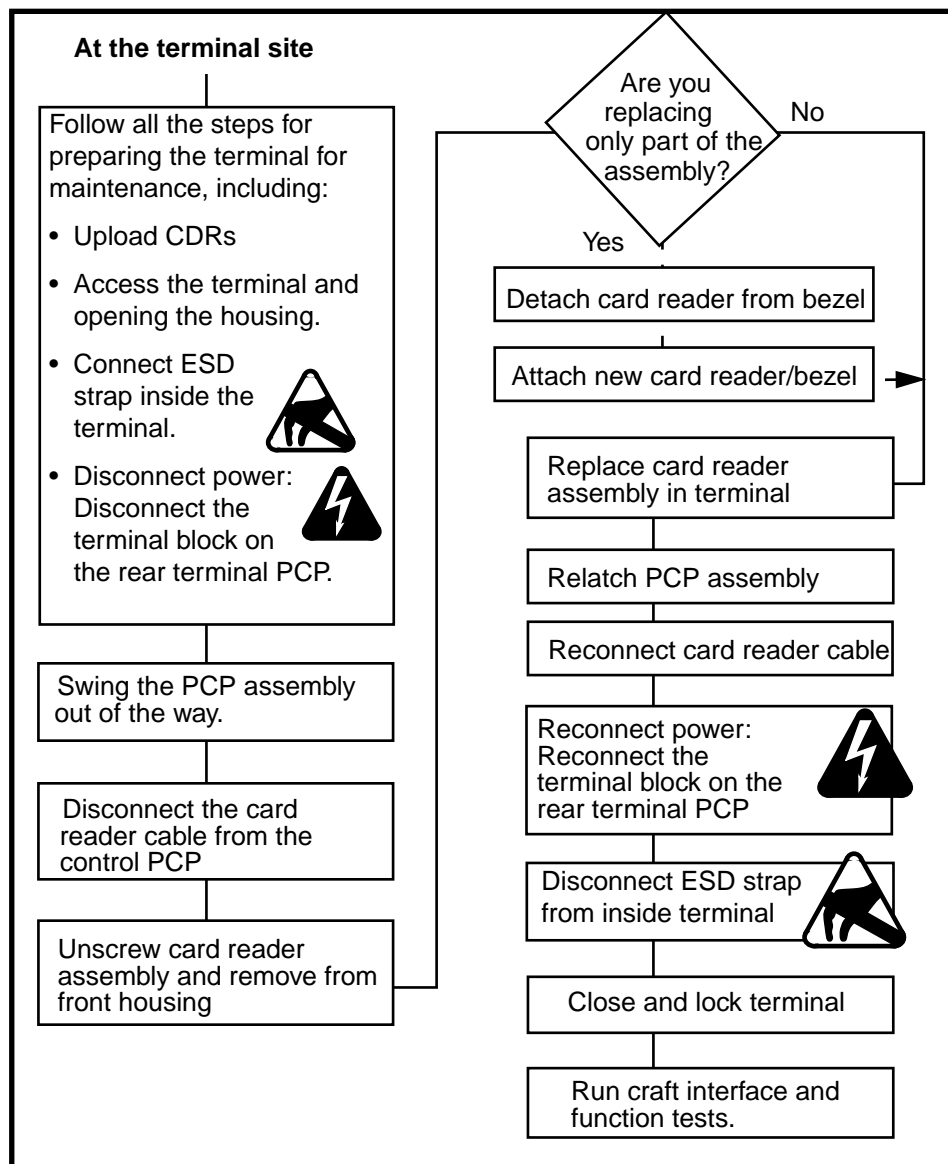
Figure 5-2: Exterior view of the card reader assembly



Flowchart

The following flowchart describes the key points to replacing the card reader assembly.

Figure 5-3: Flowchart — replacing the card reader assembly





5-4 Card and hookswitch parts

Replacing card reader assembly parts

The following section gives a detailed procedure for replacing the card reader assembly and the various accessories which can be attached to it.

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6, including:


Upload CDRs before you start!	<ul style="list-style-type: none">• Upload the CDRs to the Millennium Manager before you start internal maintenance procedures.
Uninstall the terminal: Changing card reader types	<ul style="list-style-type: none">• If you change the type of card reader, for example from a mag-stripe-only reader to a multi-card reader, uninstall the terminal before you start because you will need to replace the firmware.• In this case, when you are finished, run an INSTALL to activate the new card reader.• If you are replacing the card reader with the same type of reader, you do not need to do either procedure.

- connected ESD strap inside the terminal
- disconnected the power at the rear terminal PCP
- If you did not need to remove the PCP assembly bracket, disconnect the card reader cable (J19) from the control PCP connector (J6).



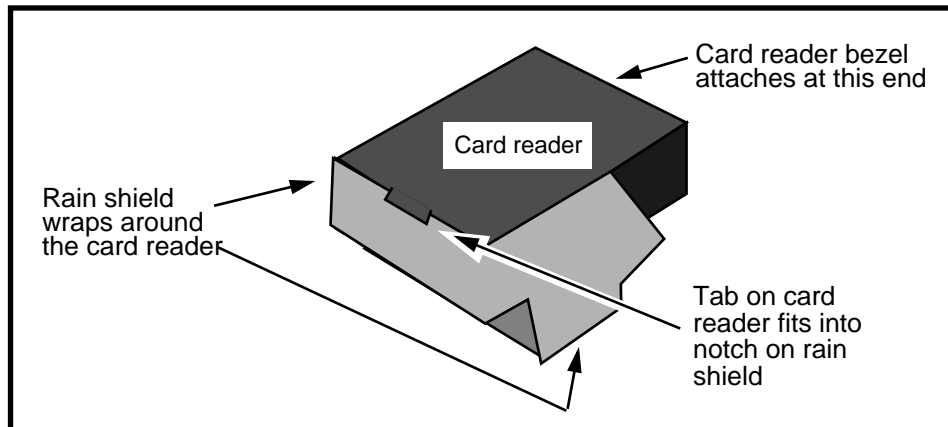


Card and hookswitch parts 5-5

<p>ESD/power warning</p> 	<ul style="list-style-type: none">• Before working inside the terminal, put on your ESD wrist strap and connect it to the ESD connection point in the terminal.• DISCONNECT POWER before disconnecting any component.• Do not reconnect the power until you are ready to close the terminal.• Place any components you remove from the terminal into an anti-static bag.
---	---

2. If the card reader has a rain shield on it, remove this now by rotating the top of the rain shield down and away from the card reader and gently pull it free.

Figure 5-4: Rain shield sits on back of card reader



3. Remove the M5 tapping screw located under the card reader, in the middle.

Use a #2 type 1A cross-recess screwdriver. Refer to Figure 5-5.



5-6 Card and hookswitch parts

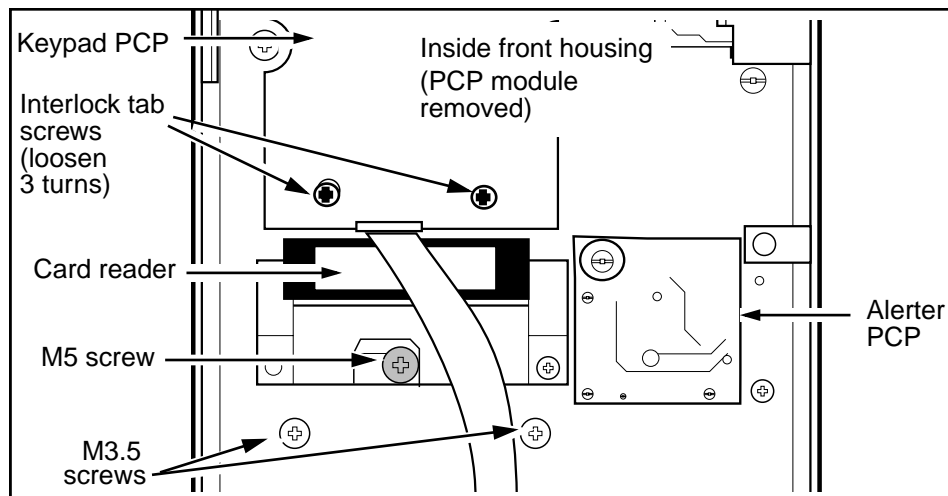
4. Remove the two M3.5 tapping screws located on either side of the M5 screw.

Use a #1 type 1A cross-recess screwdriver. These three screws attach the card reader bezel to the front housing assembly.

- If you are removing a **multi-card reader**, loosen three turns the bottom two screws on the keypad PCP, which hold the quick access keys bezel.

This releases the **interlock tab** at the top of the card reader bezel. Refer to Figure 5-5.

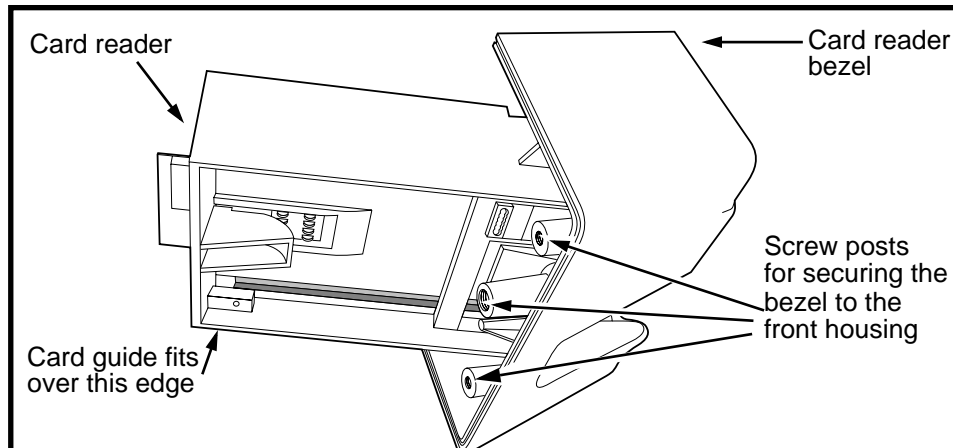
Figure 5-5: Accessing the card reader assembly



5. Remove the card reader bezel with the attached card reader from the front of the terminal:
 - a) Lift the front housing.
 - b) Pull the card reader assembly forward, out of the housing.

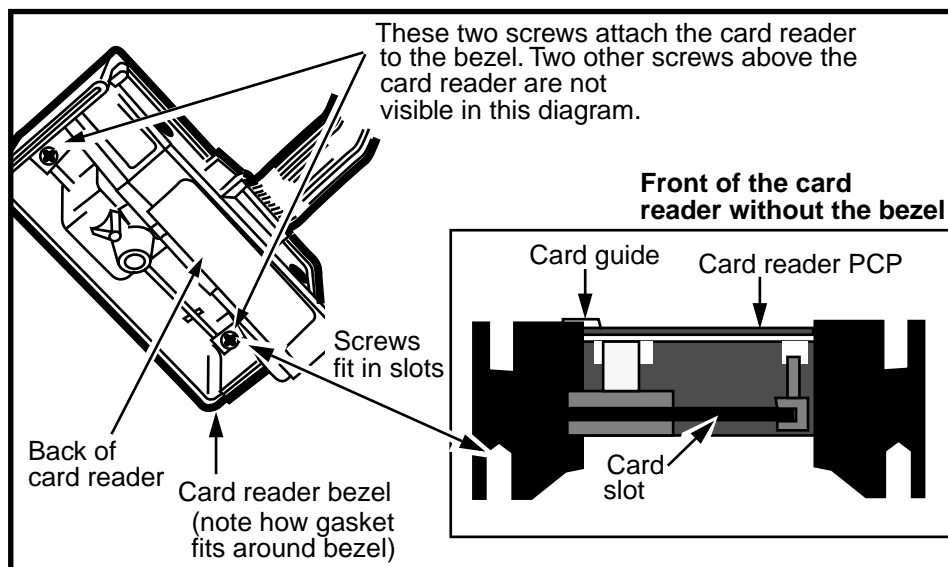
Figure 5-6 shows what the card reader assembly looks like with card reader and bezel attached.

Figure 5-6: Lower view of card reader assembly



6. Remove the four M3.5 screws which attach the card reader to its bezel. Refer to Figure 5-7.

Figure 5-7: Attaching the card reader to the bezel

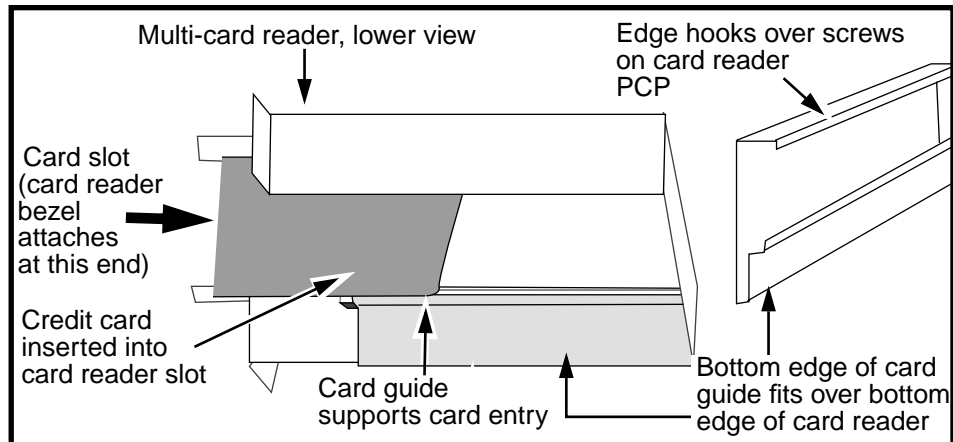


7. **Multi-card readers:** If the new card reader does not have a card guide, check the old reader for this piece and snap it on to the new card reader.

Refer to Figure 5-8 for positioning.

5-8 Card and hookswitch parts

Figure 5-8: Bent-card guide on the multi-card reader



8. Replace the card reader by reversing the preceding steps.
 - Ensure that the card reader slot on the card reader is centered with the card reader slot of the bezel. Refer to Figure 5-9.
 - Ensure the gasket is fitted properly around the card reader bezel and seals properly when the card reader is replaced on the terminal.

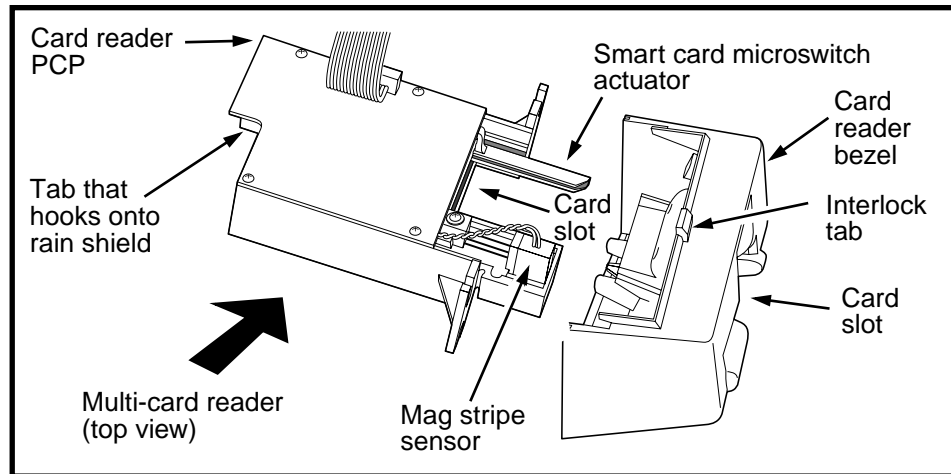
Multi-card reader:

- a) Ensure that the micro-switch actuator of the rail is operational.

To test: Insert a smart card part way into the reader. When the card first enters the slot and when it is removed, you should hear a click. Figure 5-9 shows this switch.

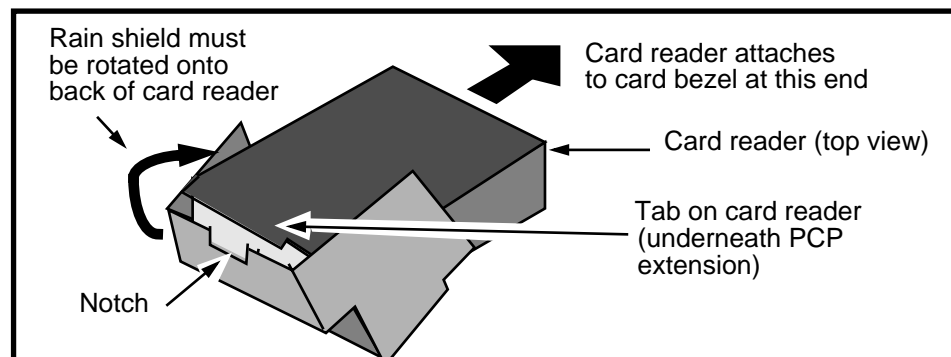
- b) Remember to re-tighten the two screws that hold the interlock tab in place. Refer to Figure 5-5 to locate this tab on the card reader bezel.

Figure 5-9: Upper view of multi-card reader and bezel



9. Once the card reader and bezel are reattached to the front housing, replace the rain shield if there is one:
 - a) Position the **card reader rain shield** around the back end of the card reader.
 - b) There is a shelf formed by the extension of the top half of the rain shield.
 - Fit this shelf onto the end of the card reader. Slip the card reader bottom edge over the two tabs on the shelf.
 - The rain shield will be at an angle from the card reader. Refer to Figure 5-10.

Figure 5-10: Setting the rain shield on the card reader

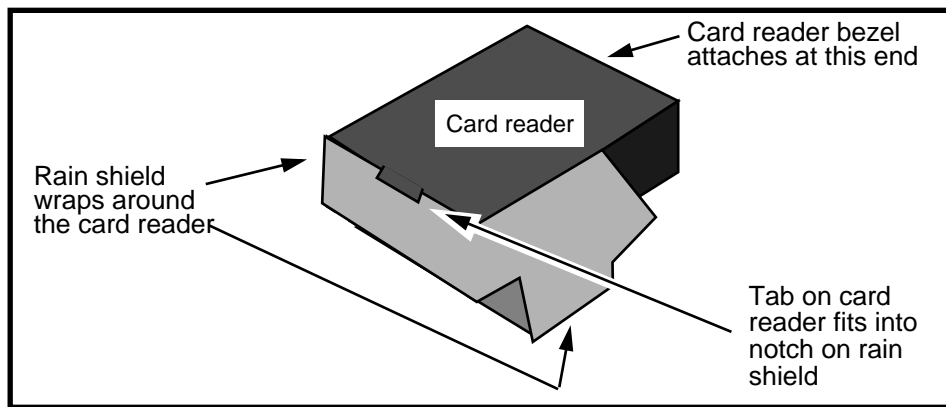


5-10 Card and hookswitch parts

- c) Align the notch in the top edge of the rain shield with the tab extending from below the card reader circuit board at the back end of the card reader.
- d) Rotate the top of the rain shield upwards, towards the card reader, until the notch in the rain shield clicks onto the tab on the card reader, as shown in Figure 5-11.

The rain shield should fit snugly against the back end of the card reader.

Figure 5-11: Rain shield in place



10. Reconnect the card reader cable (J19) to the connector on the control PCP (J6).
11. Restore the terminal to operation.
Refer to **Restoring the terminal to operation** on page 2-11, if necessary.
 - a) Reconnect the power to the terminal by reconnecting the terminal block or the wires to the rear terminal PCP.
 - b) Remove your ESD strap connection.
 - c) Close and lock the terminal.
 - d) If you upgraded the card reader from a mag-stripe only to a multi-card reader, do an INSTALL.
 - e) If you replaced the card reader with the same type of reader, run the craft interface card reader test.



12. Do functional tests to ensure the card reader and the terminal are working properly.

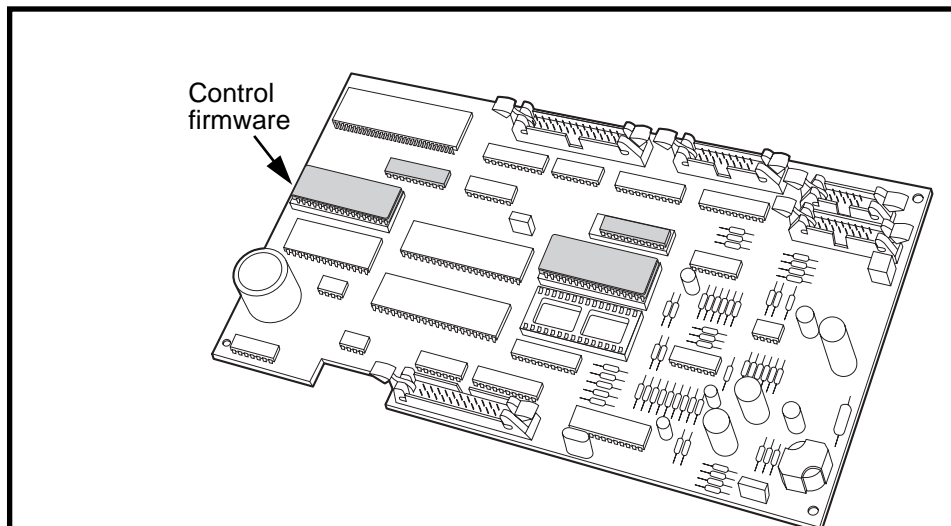
Explaining the datajack feature

There are two considerations in regards to using datajack connectors on card-based terminals.

- First, terminals with through-hole control PCPs, of MTR 1.7 or later vintage, can have either datajack functionality or the smart card alert feature.

To add the feature as an upgrade also requires a firmware upgrade and possibly a telephony PCP upgrade.

Figure 5-12: Locating the firmware on the through-hole control PCP



- Secondly, there are two types of datajack connectors.
 - The Nortel-supplied datajack is an external teladapt in the card reader bezel. Instructions for installing this bezel are in the section **Installing a card reader datajack bezel** on page 5-12
 - The terminal may also have an external, Telco-provided jack. In this case, refer to the documentation supplied by the Telco for servicing the jack.





5-12 Card and hookswitch parts

Installing a card reader datajack bezel

This bezel attaches in the same manner as a card reader bezel.

See this:



Upload CDRs and uninstall

Datajack upgrade

If you are installing the datajack bezel as an upgrade, you may need to replace the control PCP or the firmware.

If this is the case, it is important that you upload the CDRs and uninstall the terminal before you start your maintenance.

You will then need to run the INSTALL routine when you are finished to upload the proper datajack parameters.



Assembling an upgrade kit



The datajack bezel consists of two pieces:

- the bezel itself, which has a square hole in it, above the card slot
- the RJ11 teladapt connector with a two-wire cable, which is the datajack plug-in.



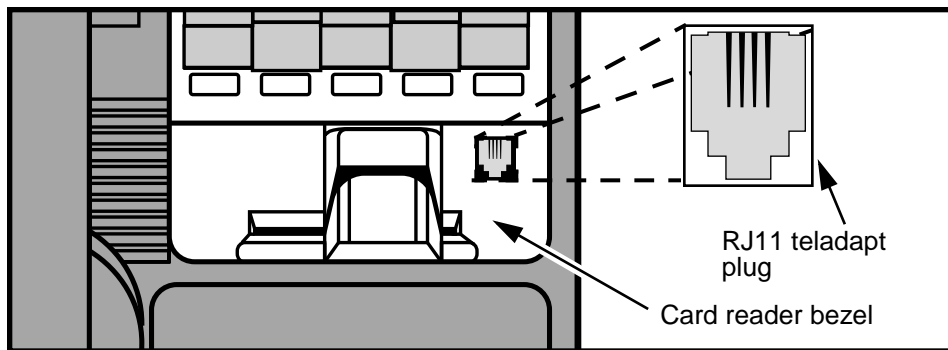
Card and hookswitch parts **5-13**

If the connector has not been installed into the bezel, install it before you open the terminal:

1. From the inside of the card reader bezel, insert the datajack connector into the hole.

Ensure that the opening of the connector faces the outside of the bezel, with the metal prongs of the connector at the top. Refer to Figure 5-13.

Figure 5-13: Datajack plug fits into card reader bezel



Installing the datajack bezel

When the bezel kit has been assembled, you are ready to access the terminal so you can remove the card reader bezel assembly and exchange card reader bezels.

Follow these steps to change the card reader bezel:

1. Follow the standard procedures for opening the terminal.

Refer to **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6, including:

- connected your ESD wrist strap inside the terminal
- disconnected the power at the rear terminal PCP

5-14 Card and hookswitch parts

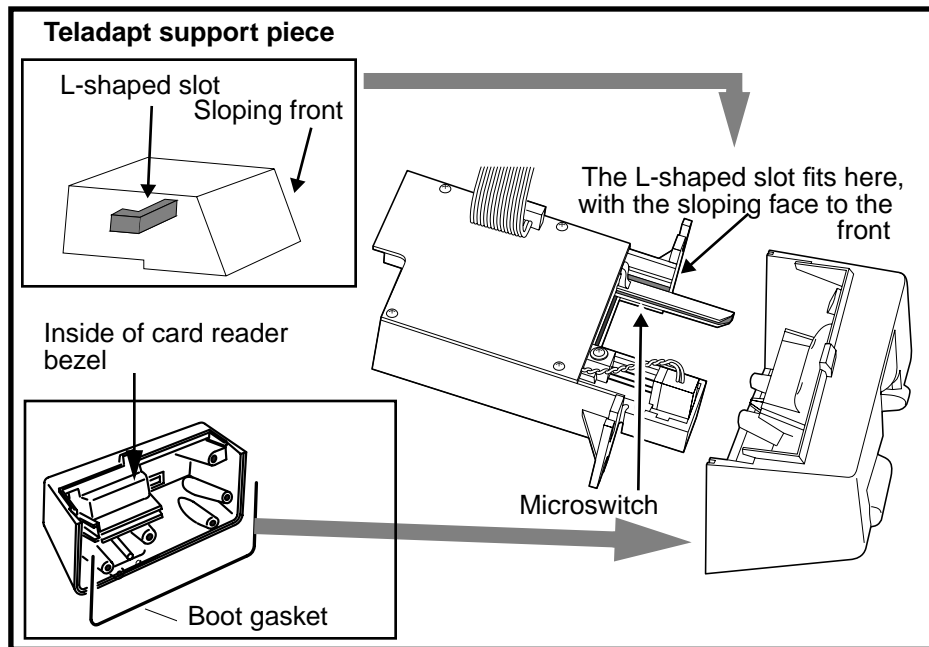
Warning



- Attach your ESD wrist strap inside the terminal.
- Disconnect the power before disconnecting any other cables.
- Do not reconnect power until you are ready to close the terminal.

2. Disconnect the card reader cable from the control PCP.
3. Remove the card reader assembly.
Refer to **Replacing the card reader** on page 5-2.
4. Unscrew the card reader from the bezel.
5. Attach the black rubber datajack support piece to the card reader so it sits behind the RJ11 teladap plug.
Refer to Figure 5-14.

Figure 5-14: Installing the teladap support inside the bezel





Card and hookswitch parts 5-15

6. Attach the new bezel to the card reader.

Ensure that you do not pinch the datajack cable.

7. Reinstall the card reader into the terminal.

Ensure the gasket around the card reader bezel is in place and in good condition. You may have to remove the gasket from the old bezel and install it on the new one.

Refer to Figure 5-14.

See this



Upgrade board changes

If this is an upgrade, at this point you need to:

1. Ensure power is disconnected at the rear terminal PCP.
2. Change the firmware or control PCP, as required.
3. Change the telephony PCP, if you received one in your kit.
4. Replace the PCP assembly in the terminal, connecting all cables.
5. **Do not reconnect the power yet.**

Refer to **Replacing firmware on the control PCP** on page 3-15, as necessary.

8. Once the bezel is installed, the datajack connector is plugged into connector J34 on the lower right corner of the telephony PCP.

Warning



Ensure the **power IS NOT CONNECTED** at this point.

Connecting cables to a live board can cause damage to the components or the boards.

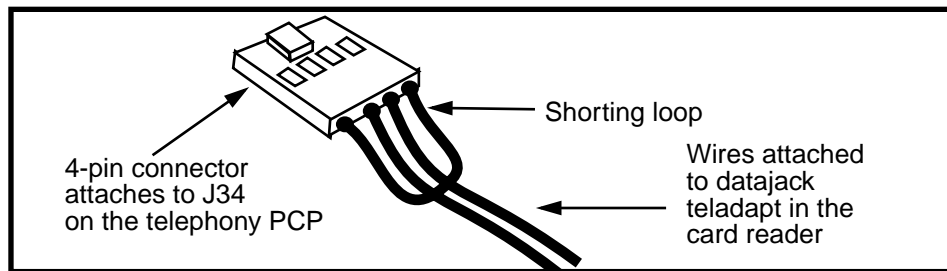


5-16 Card and hookswitch parts

The datajack connector cable is shown in Figure 5-15.

Note that there must be a loop between the two outside points. This shorting loop prevents the modem from drawing excess current off the line during datajack operation.

Figure 5-15: Datajack connector with shorting loop



9. Reconnect the card reader cable to the control PCP.
10. Restore the terminal to operation.
Refer to **Restoring the terminal to operation** on page 2-11, if necessary.
 - a) Reconnect the power to the terminal by reconnecting the terminal block or the wires to the rear terminal PCP.
 - b) Remove your ESD strap connection.
 - c) Close and lock the terminal.
11. Test the datajack. Refer to **Making a datajack call** on page 5-16.

Making a datajack call

Datajack calls are data calls made from such devices as portable computers or fax machines through the datajack teladapt.

1. Datajack calls are initially set up in the same manner as other calls: either dial a number or insert a card.

Credit, calling, and smart cards are validated and treated the same way as during a voice call.

Card and hookswitch parts 5-17

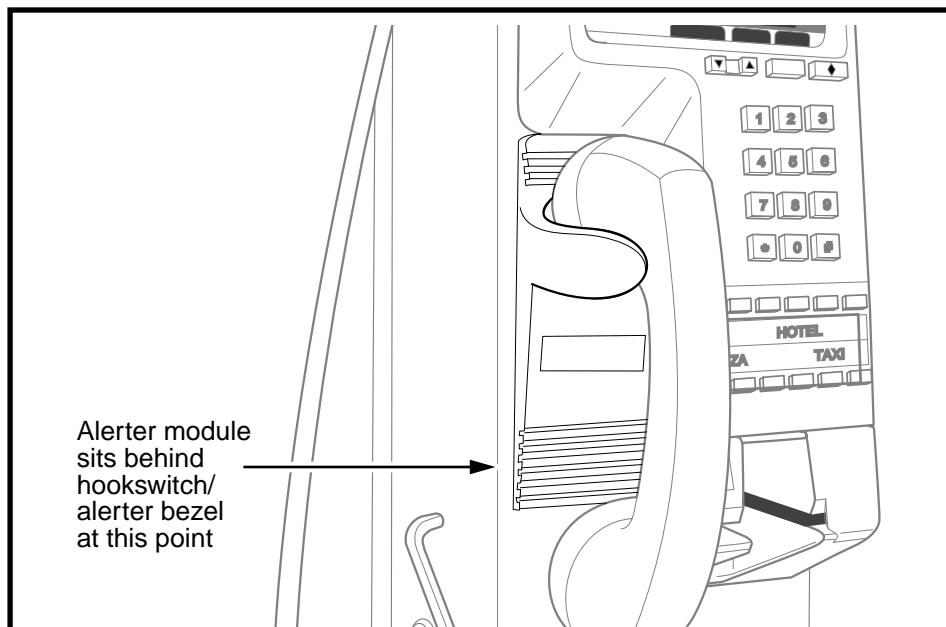
2. Press # twice (##) to initiate a data call.
3. The modem in the equipment dials the number and proceeds with the data call.
4. The terminal prompts you to return the handset on-hook after answer supervision is achieved.
This prevents the data from being interrupted by outside noise.
5. The call is complete when the modem hangs up.

Replacing the alerter module

The alerter module is located on the handset side of the terminal, beside the card reader. This module produces the alerter tones.

Figure 5-16 shows the external location of the alerter feature.

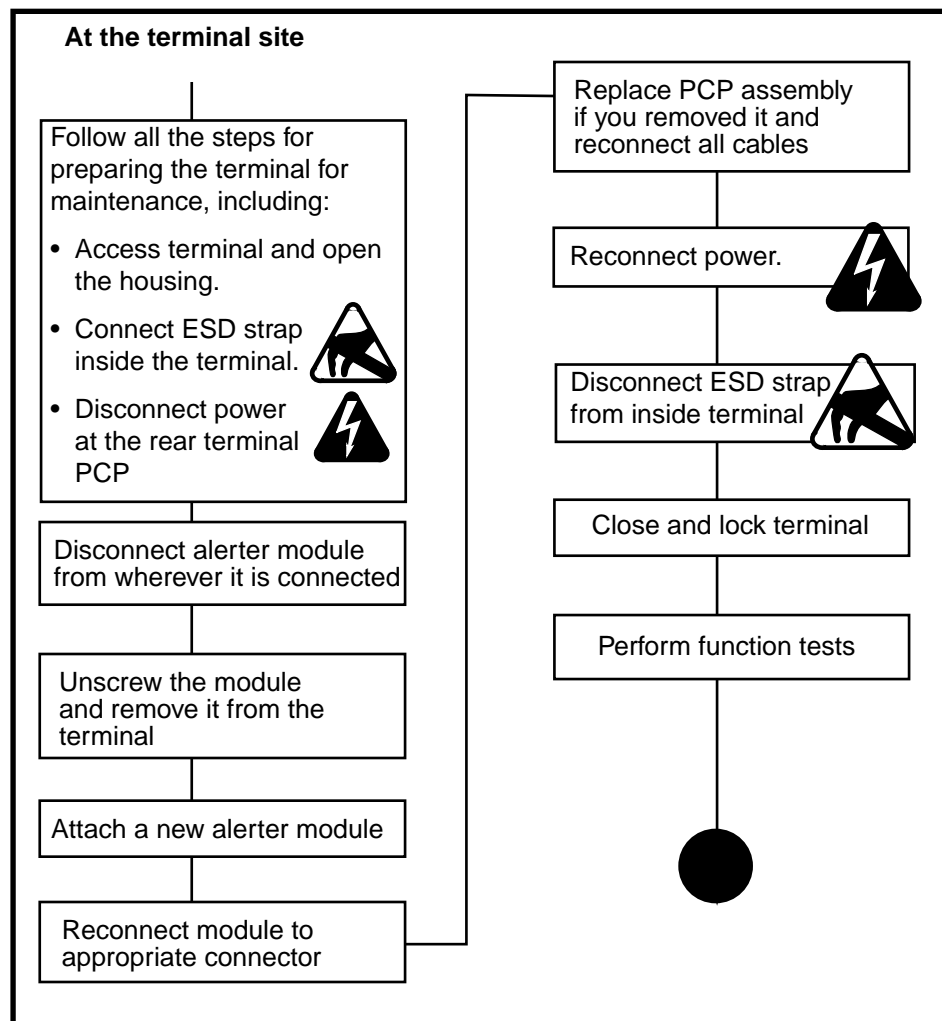
Figure 5-16: Locating the alerter in relation to external housing



5-18 Card and hookswitch parts**Flowchart**

The following flowchart describes the key points to replacing the alerter module.

Figure 5-17: Flowchart — replacing the alerter module





Steps for replacing the alerter module

To remove the alerter module from inside the terminal, follow these steps:

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6

Upload CDRs before you start!

- Upload the CDRs to the Millennium Manager before you start.

- connected ESD strap inside the terminal
- disconnected the power at the rear terminal PCP

ESD/power warning



- Before working inside the terminal, put on your ESD wrist strap and connect it to the ESD connection point in the terminal.
- Before disconnecting any component, disconnect the power.
- **Do not reconnect the power until you are ready to close the terminal.**
- Place any components you remove from the terminal into an anti-static bag.

- unlatched and opened the PCP assembly to sit at a 90-degree angle in the front housing
- **Note:** It is not necessary to remove the PCP assembly, this step gives access to the alerter cable connection.



5-20 Card and hookswitch parts

2. Disconnect the alerter cable (J14) from the connector on the keypad PCP (J52).

See this



Vintage alert

Updated upper bezel/ hookswitch hardware

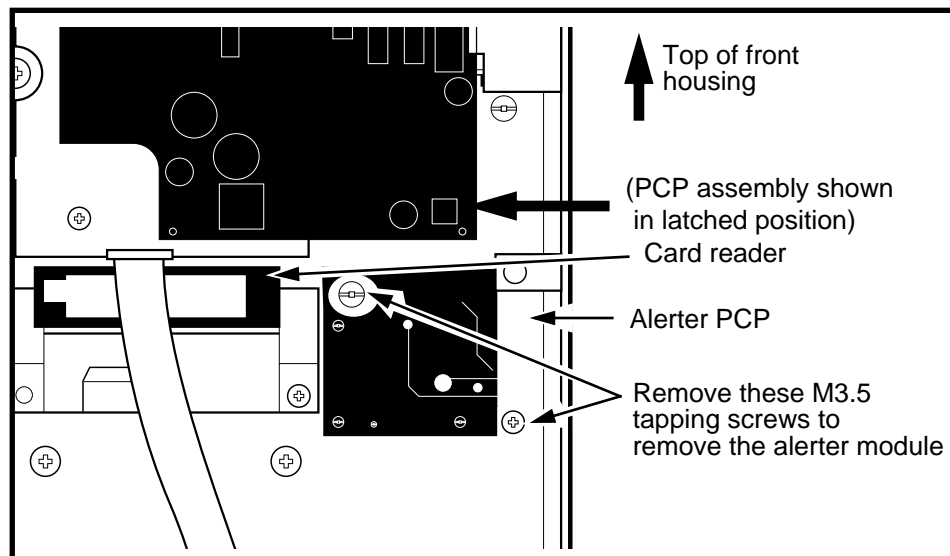
If the keypad PCP is attached to the hookswitch module with a mylar (clear) ribbon cable, then the alerter would be connected to the hookswitch module if there is no smart card alert.

Note: If the terminal has the smart card alert feature, J14 is connected to J37 on the daughter board on the control PCP.

3. Remove the two M3.5 tapping screws that secure the alerter module to the alerter bezel.

The screws are labelled in Figure 5-18. Use a #2 type 1A cross-recess screwdriver.

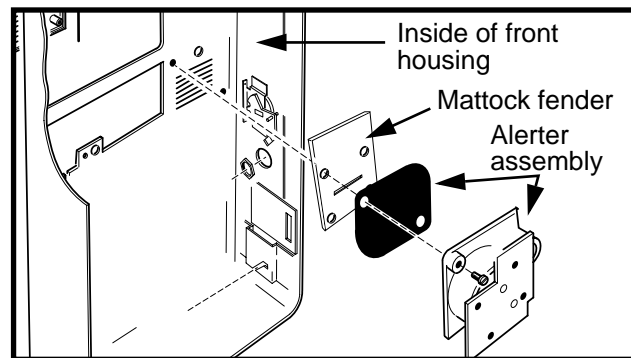
Figure 5-18: Accessing the alerter module



4. Ensure the black acoustic membrane held between the alerter module and the housing assembly remains in place when you remove the alerter module.

See this**Mattock fender**

Inmate terminals have metal plate fitted between the alerter and the housing. It covers the hole in the housing which is located behind the number card. This plate is designed as a vandal-resistant block for this area of the terminal.

Figure 5-19: Locating the mattock fender

5. To replace the alerter module, reverse the preceding steps.
6. Restore the terminal to operation.
Refer to **Restoring the terminal to operation** on page 2-11, if necessary.
 - a) Reconnect the power to the terminal by reconnecting the terminal block or the wires to the rear terminal PCP.
 - b) Remove your ESD strap connection.
 - c) Close and lock the terminal.

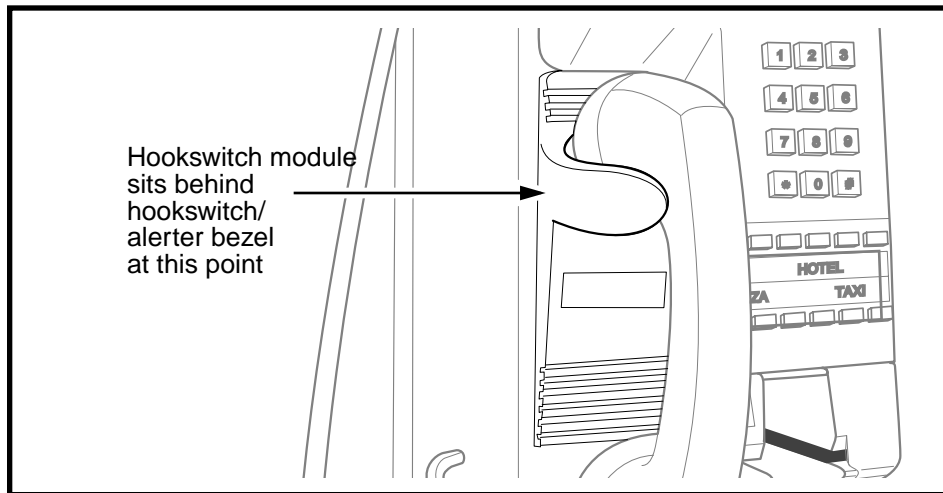
5-22 Card and hookswitch parts

Replacing the hookswitch module

The hookswitch PCP is located on the handset side of the terminal, beside the keypad PCP, which it connects to.

This module is also part of the hookswitch/alerter assembly. Figure 5-20 shows the positioning of the hookswitch behind the hookswitch/alerter bezel on the terminal exterior.

Figure 5-20: Position of the hookswitch on the external face



Note: There are two types of hookswitch modules. They can be identified by the connections they have to other components.

For the purposes of this procedure, they will be labelled Module A and Module B (new version).

Module A can be distinguished because it connects to the keypad PCP with a two-wire cable.

Module B must always be teamed with the upgraded keypad PCP.

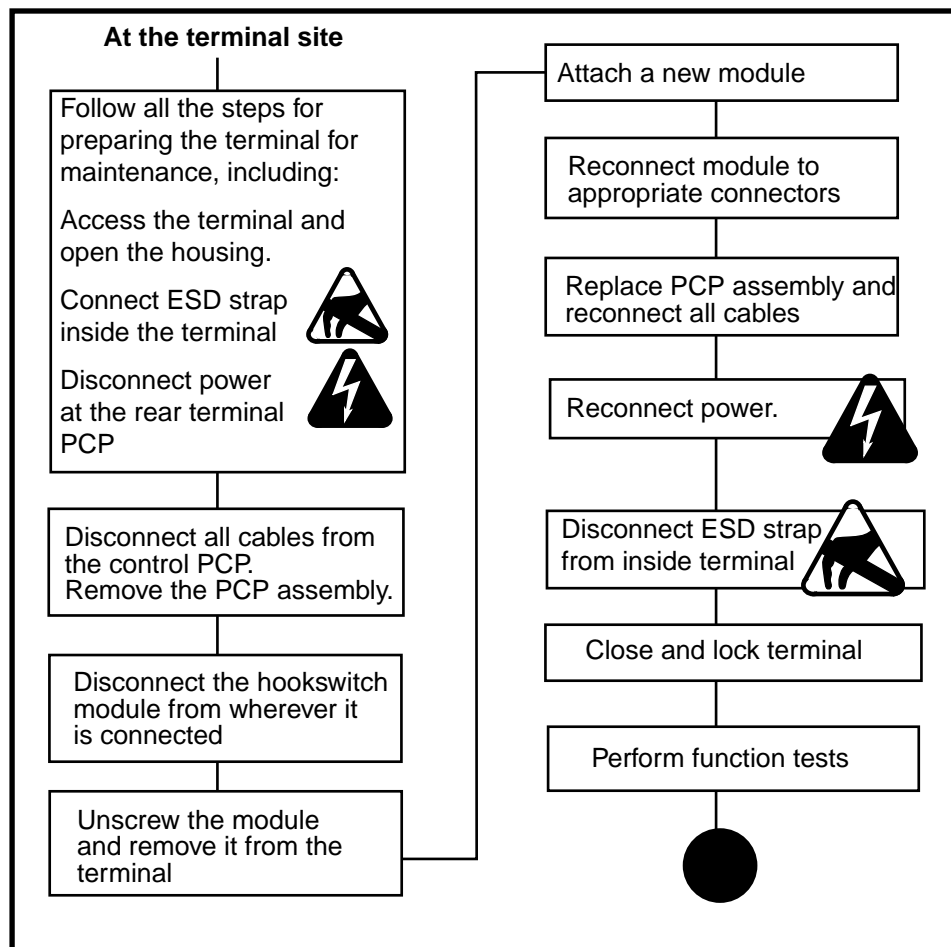
It is distinguishable because it has a ribbon connector which connects to the telephony PCP to complete the keypad circuit. This module also has a rain shield. The procedure for installing the rain shield is given after this section.

The position of the hookswitch — down when the handset is on-hook, up when the handset is off-hook — activates the telephony connection.

Flowchart

The following flowchart describes the key points to replacing the hookswitch module.

Figure 5-21: Flowchart — replacing the hookswitch module





5-24 Card and hookswitch parts

Replacing the hookswitch

To replace the hookswitch module, follow these steps:

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6, including:

Upload CDRs before you start!

- Upload the CDRs to the Millennium Manager before you start internal maintenance procedures.

- connected your ESD wrist strap inside the terminal
- disconnected the power at the rear terminal PCP
- removed the PCP assembly as explained in **Removing the PCP assembly** on page 3-2 and put it in an anti-static bag and set it aside

ESD/power warning



- Before working inside the terminal, put on your ESD wrist strap and connect it to the ESD connection point in the terminal.
- DISCONNECT POWER before disconnecting any component.
- **Do not reconnect the power until you are ready to close the terminal.**
- Place any components you remove from the terminal into an anti-static bag.

2. **Module A:** Disconnect the hookswitch cable (J13) from the connector on the keypad PCP (J51). If this module is connected to a smart card daughter board, this cable is disconnected when you remove the PCP assembly.



Card and hookswitch parts **5-25**

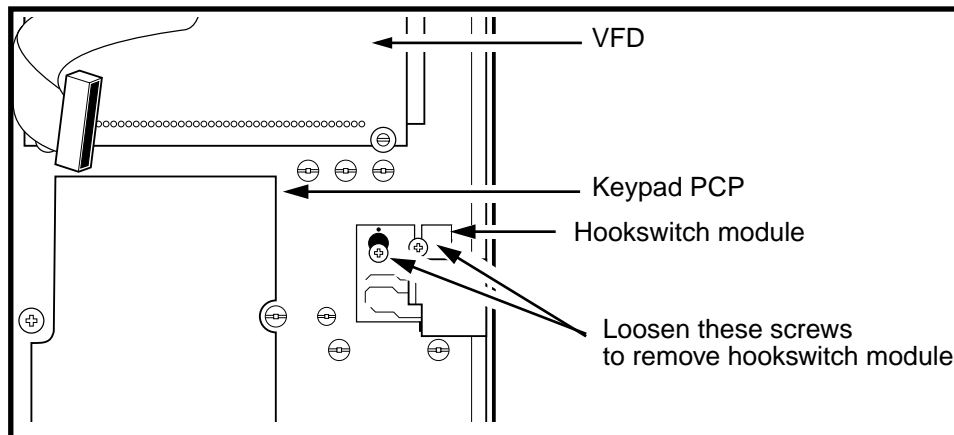
Module B: Disconnect the mylar cable connecting the hookswitch to the keypad PCP (J53).

Disconnect the cable from the alerter. If the terminal has a smart card alert, this cable will have been disconnected from the control PCP.

3. Loosen the two M3.5 tapping screws securing the hookswitch PCP assembly. Use a #2 type 1A cross-recess screwdriver.

Figure 5-22 shows these screws.

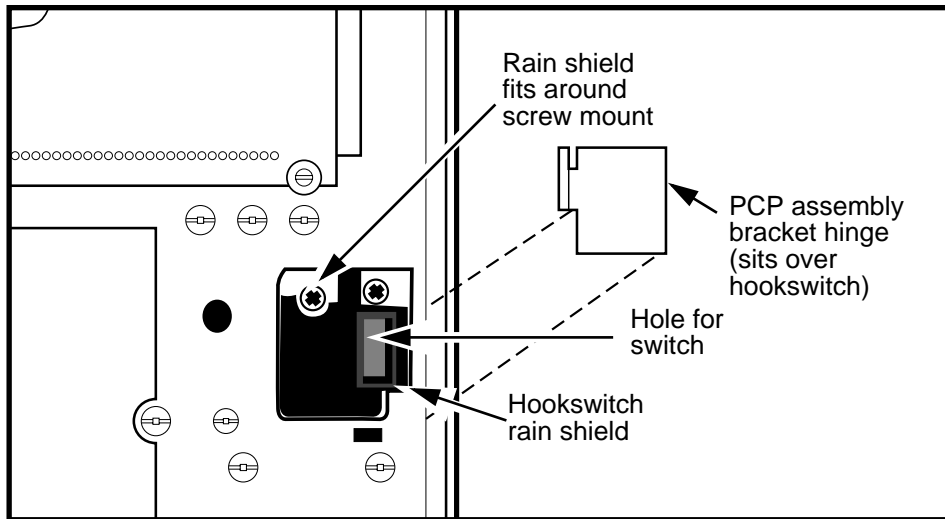
Figure 5-22: Accessing the hookswitch module



4. Remove the hookswitch module by sliding it downward until the screw heads clear the keyhole and slots in the hookswitch PCP.
5. Lift the hookswitch module away from the housing assembly.
6. **Module B:** Install the rain shield.
 - a) Set the hookswitch rain shield in the recess in the terminal housing located under the assembly, as shown in Figure 5-23.

5-26 Card and hookswitch parts

Figure 5-23: Positioning the hookswitch rain shield

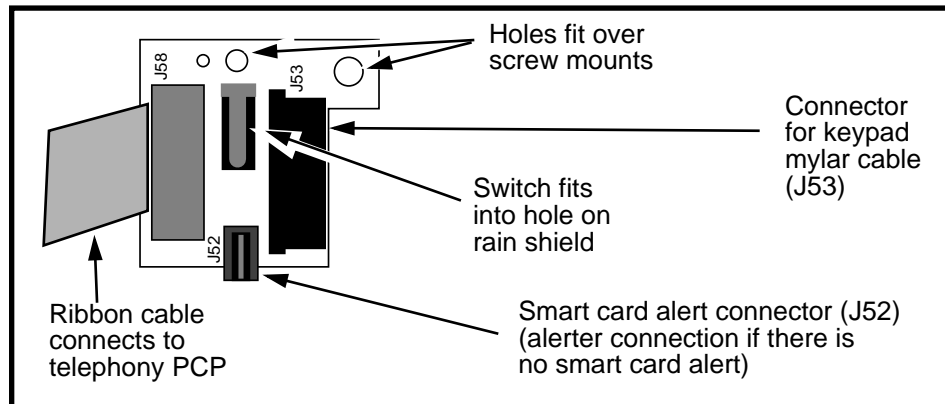


- b) Fit the hookswitch into the rectangular hole in the rain shield.

This switch is located on the underside of the hookswitch PCP, shown in Figure 5-24.

- c) Hold the new hookswitch PCP so the connectors are facing down.

Figure 5-24: Underside of Module B





Card and hookswitch parts **5-27**

7. Replace the hookswitch module by reversing the preceding steps.
 - Take care not to damage the switch actuator on the plunger cam.
 - To ensure the switch actuator is not damaged while you are installing it, depress the plunger while assembling the hookswitch module into position.
8. **Module A:** Route the two-wire cable from the hookswitch module through the cable clamp below the module and reconnect the module to the keypad connector.

Module B: Reconnect the mylar keypad PCP cable to the external interface hookswitch module (J53). Reconnect the alerter cable or the smart card alert cable to J52 on the hookswitch module.
9. Reinstall the PCP assembly, as explained in **Removing the PCP assembly** on page 3-2.
10. Restore the terminal to operation.
Refer to **Restoring the terminal to operation** on page 2-11, if necessary.
 - a) Reconnect the power to the terminal by reconnecting the terminal block or the wires to the rear terminal PCP.
 - b) Remove your ESD strap connection.
 - c) Close and lock the terminal.
11. Test the terminal function to ensure the new components work and the terminal does what is expected.



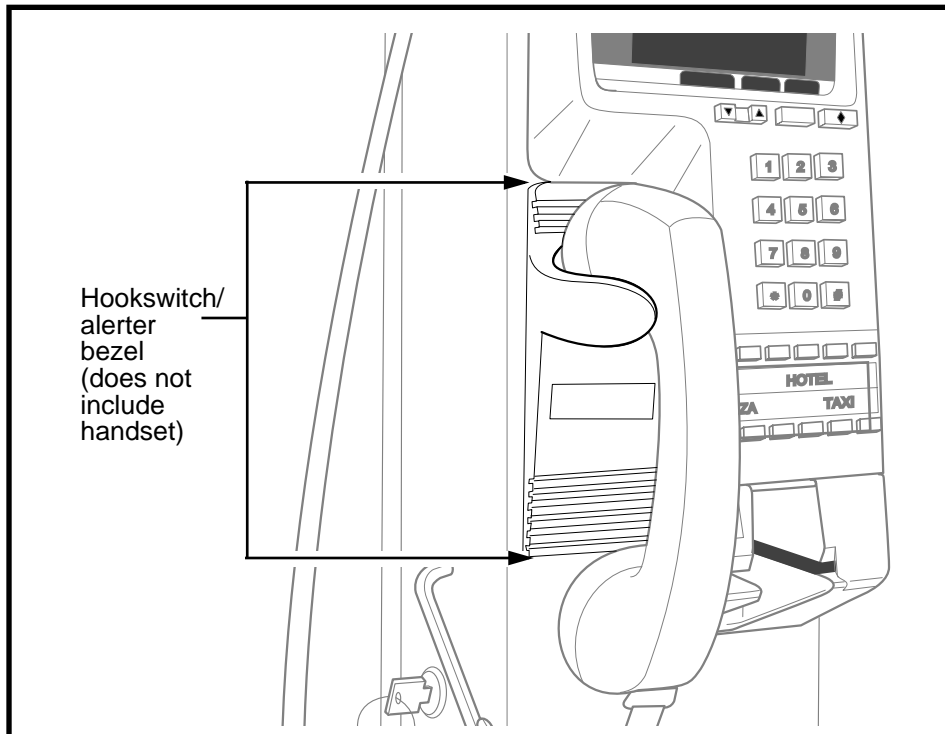
5-28 Card and hookswitch parts

Replacing the hookswitch/alerter bezel

The hookswitch/alerter bezel is attached to the left side of exterior of the terminal. It covers the alerter and hookswitch modules and contains the cradle that holds the handset.

Figure 5-25 shows the bezel, from the outside of the terminal.

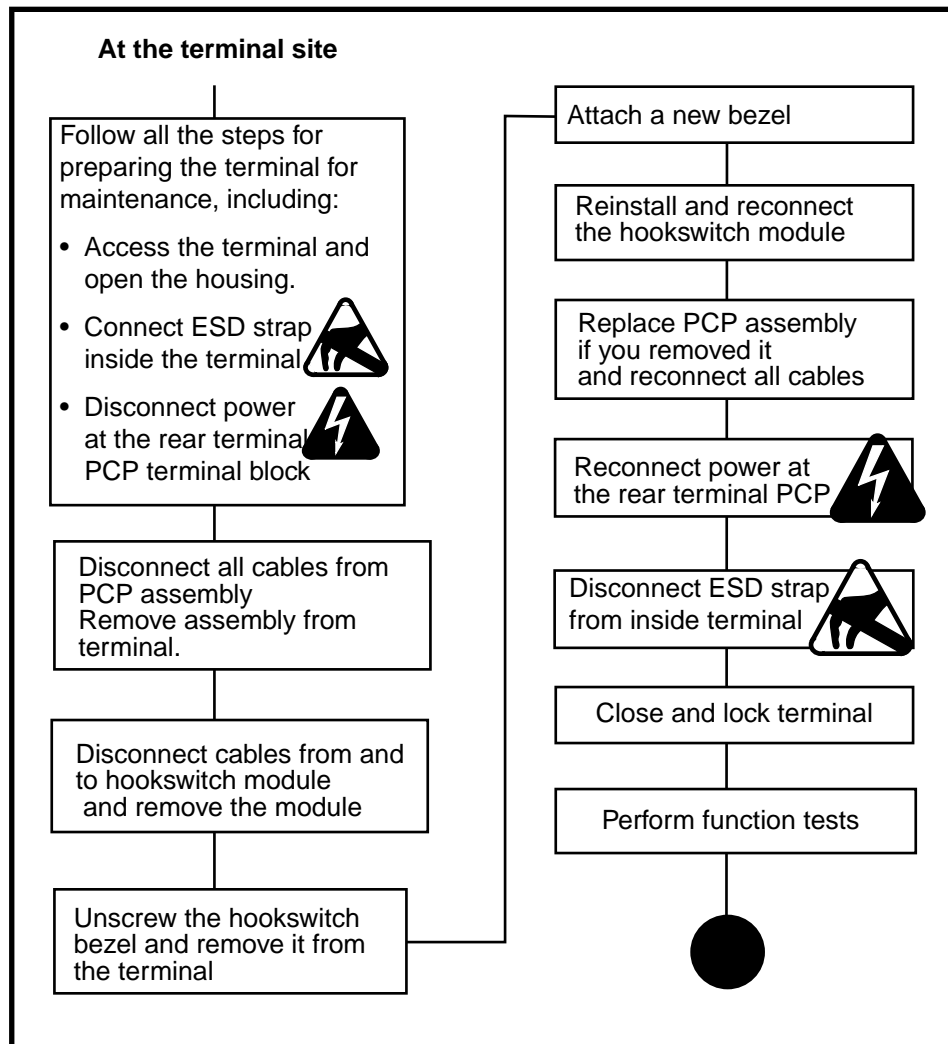
Figure 5-25: External view of the hookswitch/alerter bezel



Flowchart

The following flowchart describes the key points to replacing the hookswitch/alerter bezel.

Figure 5-26: Flowchart — replacing the hookswitch/alerter bezel





5-30 Card and hookswitch parts

Replacing the bezel

To replace the hookswitch/alerter bezel, follow these steps:

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6, including:

Upload CDRs before you start!

- Upload the CDRs to the Millennium Manager before you start internal maintenance procedures.

- connected your ESD wrist strap inside the terminal
- disconnected the power at the rear terminal PCP

ESD/power warning



- Before working inside the terminal, put on your ESD wrist strap and connect it to the ESD connection point in the terminal.
- **DISCONNECT POWER** before disconnecting any component.
- **Do not reconnect the power until you are ready to close the terminal.**
- Place any components you remove from the terminal into an anti-static bag.

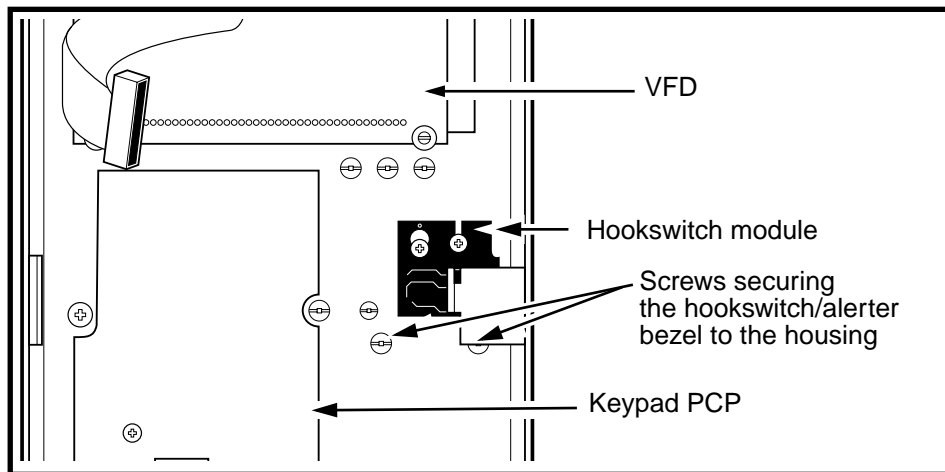
- removed the PCP assembly as explained in **Removing the PCP assembly** on page 3-2 and put it in an anti-static bag and set it aside
- removed the hookswitch module as explained in **Replacing the hookswitch module** on page 5-22.



2. Support the bezel from the outside with your hand, then remove the two M3.5 tapping screws securing the hookswitch/alserter bezel.

Use a #2 type 1A cross-recess screwdriver. Refer to Figure 5-27 to locate the screws.

Figure 5-27: Locating the bezel screws



3. Remove the hookswitch/alserter bezel by pulling it from the front of the terminal.
4. To replace the hookswitch/alserter bezel, reverse the preceding steps.
5. Reassemble and reconnect the hookswitch module.
6. Reinstall the PCP assembly as explained in **Removing the PCP assembly** on page 3-2.
7. Restore the terminal to operation.
Refer to **Restoring the terminal to operation** on page 2-11, if necessary.
 - a) Reconnect the power to the terminal by reconnecting the terminal block or the wires to the rear terminal PCP.
 - b) Remove your ESD strap connection.
 - c) Close and lock the terminal.



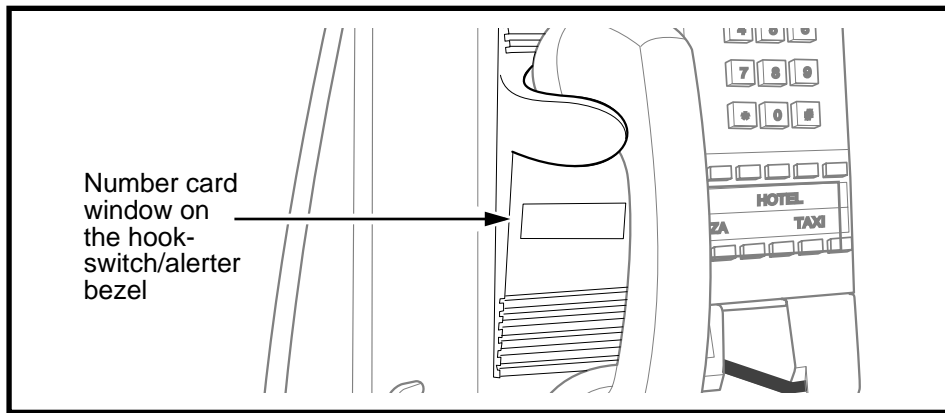
5-32 Card and hookswitch parts

8. Test the terminal by making a local call. Also make an incoming call to test alerter.

Replacing the number card

The number card is supplied by the operating company and is the terminal ID number. The number card holder is located in the hookswitch/alserter bezel, as indicated in Figure 5-28.

Figure 5-28: Locating the number plate window



To insert or replace the terminal number card, which is supplied by the operating company, follow these steps:

1. This procedure assumes you have followed the directions in **Preparing the terminal for maintenance** on page 2-2 and **Opening and closing the terminal** on page 2-6.

Note: It is not necessary to upload CDRs or disconnect the power for this procedure.

2. Remove the number card window.
 - a) From inside the terminal, push on the card window. Use a type 1A cross-recess screwdriver of less than 8 mm diameter or an equivalent instrument.

Refer to Figure 5-29 to locate the access hole inside the terminal.

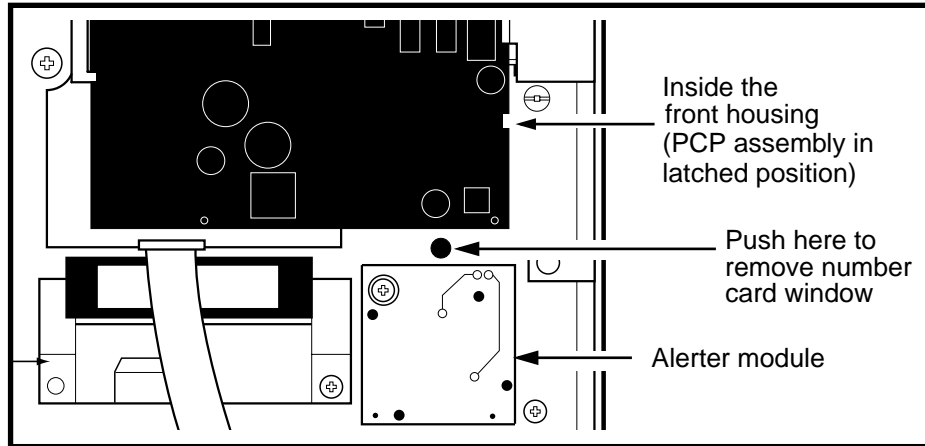




Card and hookswitch parts **5-33**

- b) As the window bows out on the exterior of the terminal, grasp it and remove it from the hook-switch/alerter bezel.

Figure 5-29: Accessing the number card from inside



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 alerter bezel.
 - b) Push on the other end to curve the window outward.
 - c) Insert the free end into position.
 - d) Release the window.
5. Close and lock the housing assembly.

See this



Mattock fender

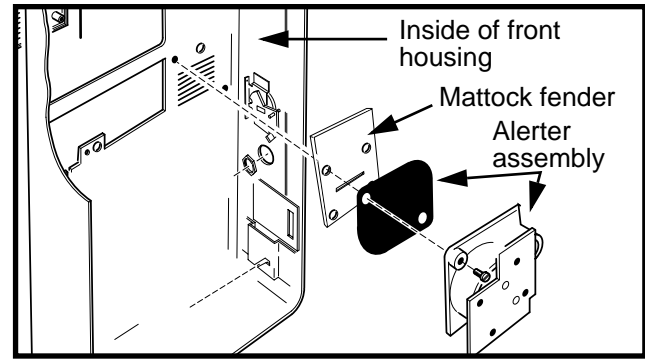
If the terminal has a Mattock fender installed in front of the alerter module, you will have to access the number card from the front of the terminal. Refer to Figure 5-30.

Use a penknife to pry the window off.



5-34 Card and hookswitch parts

Figure 5-30: Locating the mattock fender





6 Inmate terminal

The Millennium Inmate terminal is a Card-based terminal without a display.

The card reader is optional for this terminal.

For maintenance purposes, a portable display must be installed in the terminal so you can read the craft interface prompts.

This chapter describes the process of installing and removing a portable display.

The previous chapters describe the process of replacing parts inside the terminal.

Before you enter the terminal

To access the inside of the terminal you require craft interface maintenance-level privileges, an upper housing key, and a T- or L-tool.

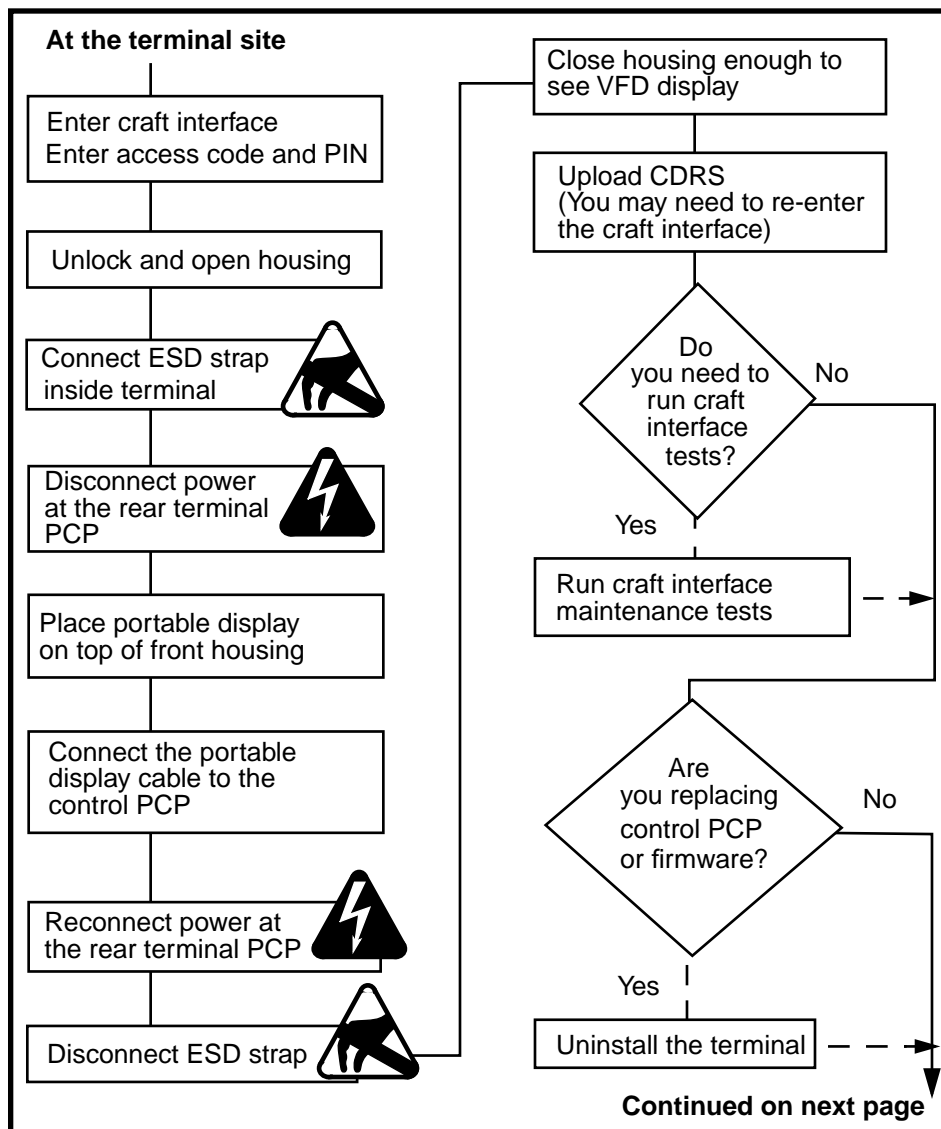
- If you replace the **control PCP** or the **firmware** on it, you need to **uninstall the terminal** before you start replacing parts. In this instance, it is imperative that you upload CDRs before you start your maintenance procedures.

This procedure is described in Chapter 2.

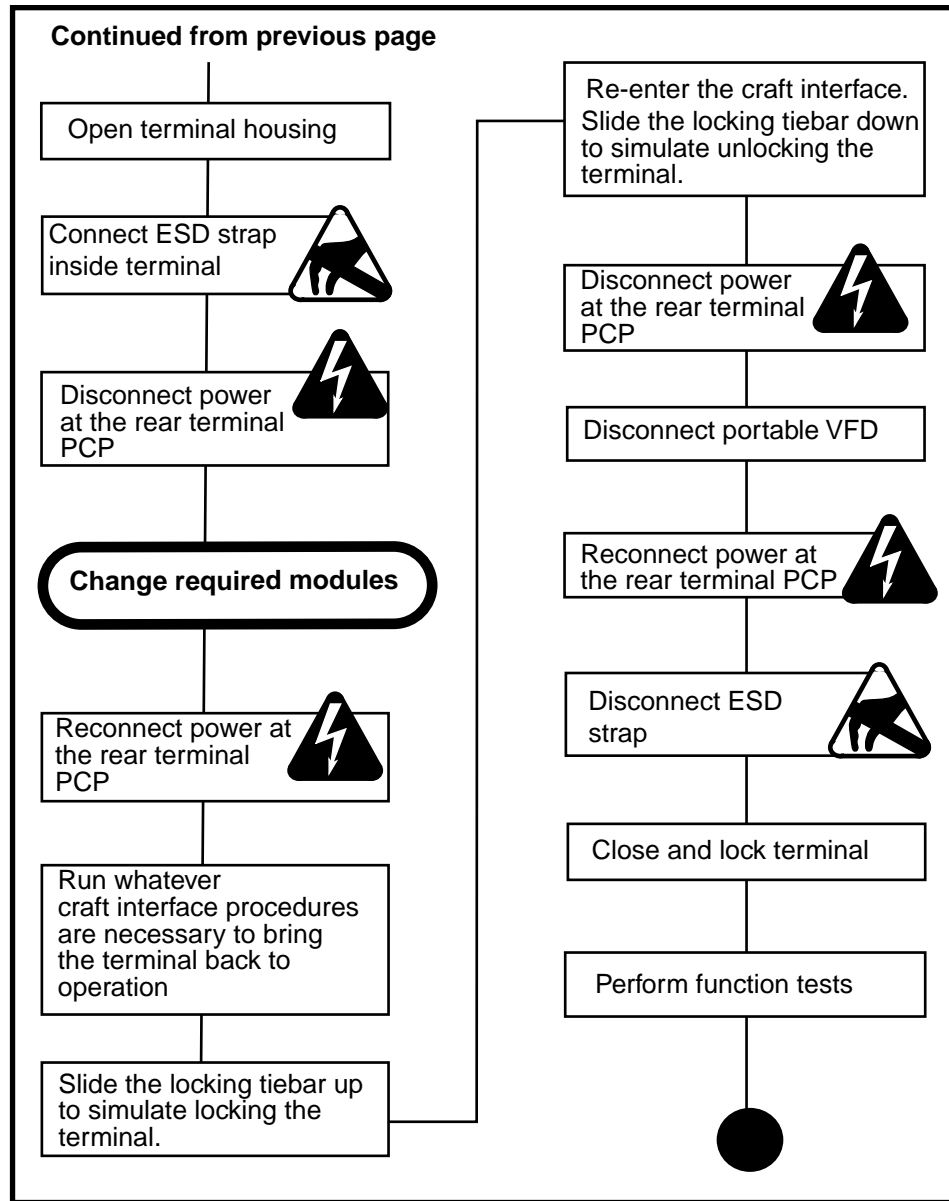
- In this case, you will need to run the INSTALL routine when you are finished to reinstall the terminal.
- If you replace the telephony PCP, you will need to force a download of terminal tables when you are finished.

**6-2 Inmate terminal****Flowchart**

The following flow chart describes the process of installing and uninstalling the external portable display on an Inmate terminal.

Figure 6-1: Flowchart — Installing/removing portable display, page 1

Flowchart — Installing and removing a portable display, page 2





6-4 Inmate terminal

Attaching a portable display

Since it is recommended that you upload the CDRs before doing maintenance on the terminal, you will need to attach the portable display immediately. The following procedure describes how to install the display.

If the maintenance you are doing is minor enough not to require uploading of CDRs you can work without installing a portable display, but you must still access the terminal in the correct manner, as described in Chapter 1.

To attach a portable VFD unit you need to enter the first level of the craft interface and unlock and open the terminal.

Warning



If you try opening and unlocking the terminal without going through these steps, the terminal will send an alarm message to the Millennium Manager and you will not be able to continue with the process until you close and lock the terminal again.

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.

2. Enter your personal identification number (PIN) code

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

3. Press *.

See this:

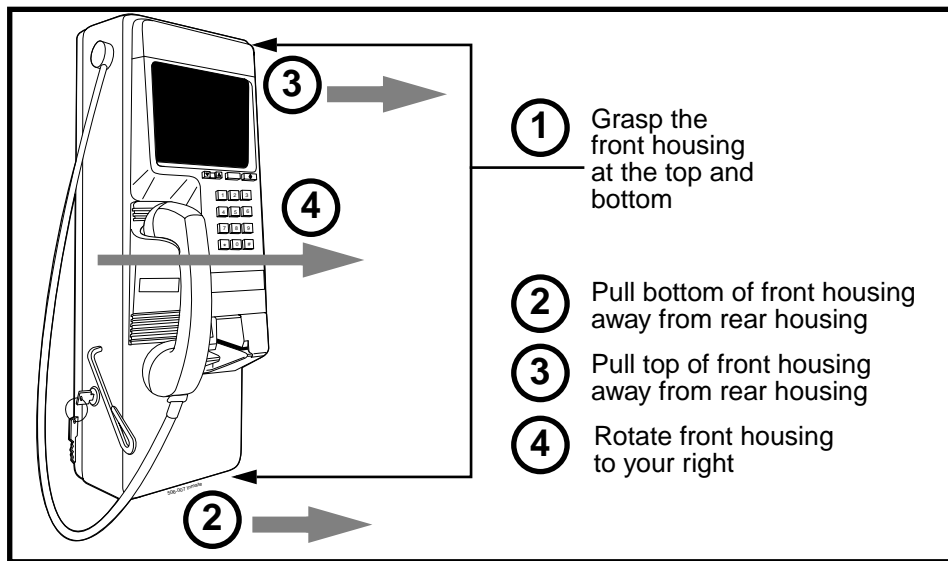


It is important to unlock and open the terminal quickly after entering your PIN. If you do not open the terminal within three minutes, the terminal times out.



4. Unlock the terminal with the key.
5. Release the housing locking mechanism with the T- or L-tool.
6. Follow these steps to open the housing:
 - a) Grasp the housing firmly by the top and bottom of the front housing.
 - b) Pull the bottom of the front housing away from the back housing.
 - c) Pull the top of the front housing away from the back of the housing and swing the front housing towards your right, rotated as shown in Figure 6-2.

Figure 6-2: Proper sequence to open housing

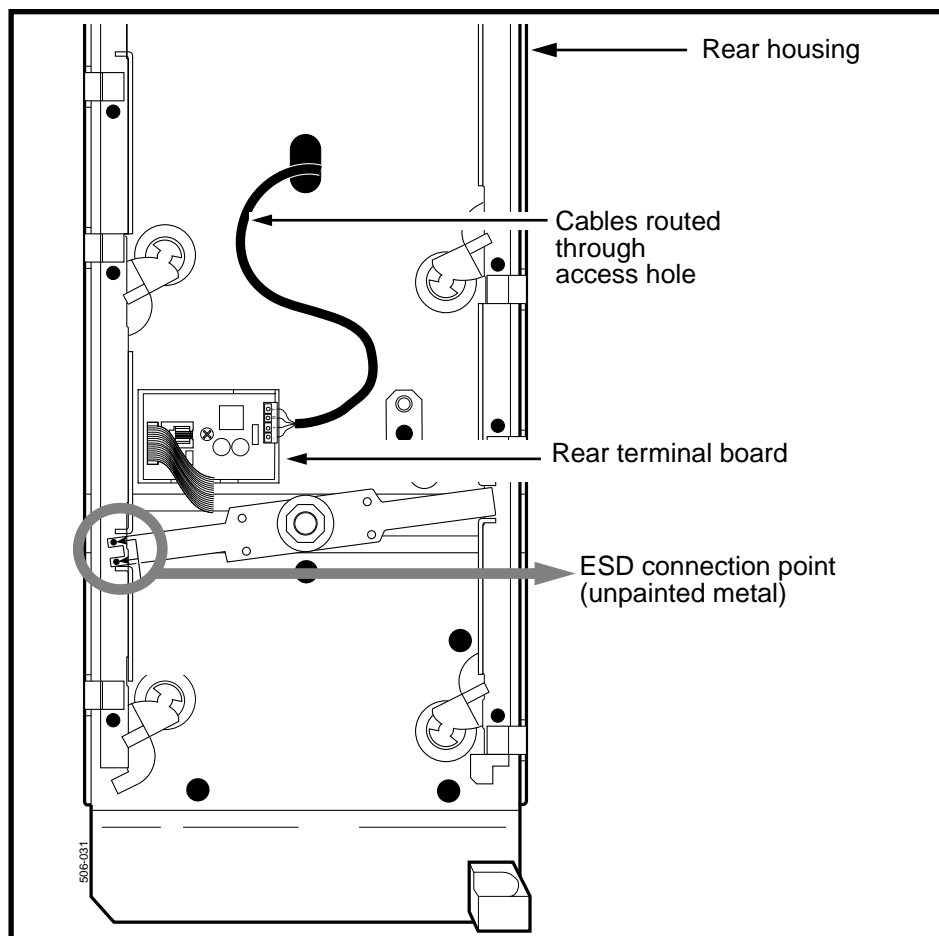


Check that the hinges are still connected inside the terminal.

- d) As you pull it forward, rotate the housing assembly on its pivot points so the front of the assembly faces your right.

6-6 Inmate terminal**ESD precautions**

1. Open the front housing wide enough so you can access the interior of the terminal.
2. Attach your ESD wrist strap to an ESD connection point on the rear housing. Figure 6-3 shows a connection point.
3. Disconnect the power at the rear terminal PCP.

Figure 6-3: ESD and power connections inside the terminal



ESD/power warning



- Before working with any internal components, put on your ESD wrist strap and connect it to an ESD connection point inside the terminal.
- Always disconnect the power before connecting the portable display or working with parts inside the terminal.
- **Do not reconnect the power until you are ready to close the terminal.**
- Place any electronic parts you remove from the terminal into an anti-static bag.
- Do not stack electronic parts on top of each other.
- Handle the boards by the edges.

Installing the portable display

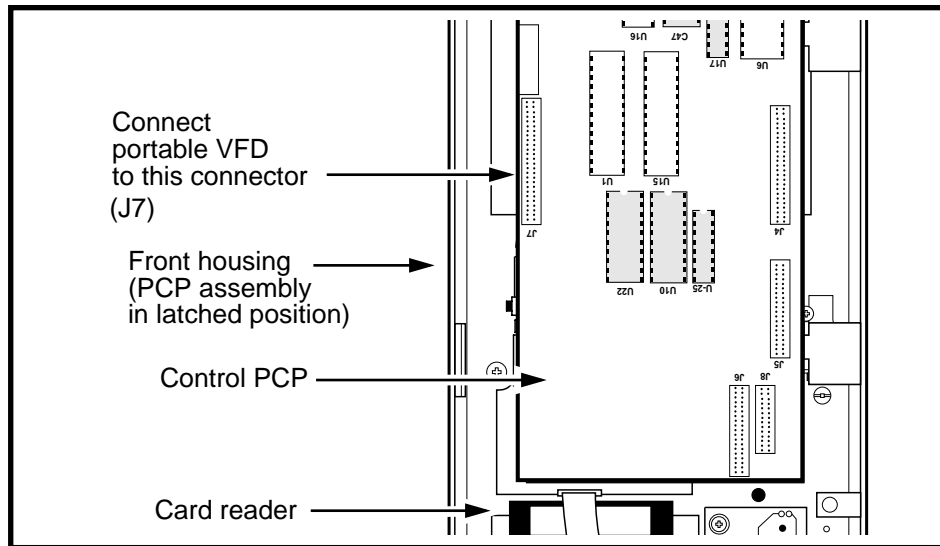
Once the terminal is properly open and you have disconnected the power, you are ready to attach the portable display, as described below:

1. Place the portable VFD unit on the top of the front housing of the terminal. The unit has a magnet on the bottom.
2. Connect the portable VFD ribbon cable to J7 connector on the control PCP.
3. Reconnect the power at the rear terminal PCP.
4. Partially close the housing so you have access to the keypad and can see the display clearly. Do not close it far enough to pinch the VFD ribbon cable.



6-8 Inmate terminal

Figure 6-4: Connecting the VFD to the control PCP



- If you are still in the craft interface, this message appears on the VFD:

Use *=MENU, #=INSTALL
or dial item number

See this:



If the terminal has timed out and the portable VFD is blank, refer to the **Re-entering the craft interface** at the end of this section.

- Press *.

This message appears on the VFD:

227. Check cardreader
Use 1=DO IT, *=NEXT

- Continue with your maintenance procedures.



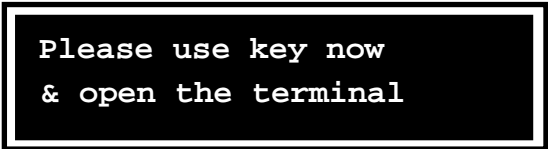
Re-entering the craft interface

Do the following if the craft interface timed out while you were attaching the portable VFD or if you need to uninstall the terminal.

You will be simulating locking the terminal and returning to the beginning of the craft interface process.

1. Open the housing and **pull up the locking tiebar** on the left side of the rear housing to simulate closing and locking the terminal. Refer to Figure 6-5.
2. Close the terminal enough to access the keypad.
3. Enter the access code on your instruction card.
4. Enter your personal identification number (PIN) code.
5. Press *.

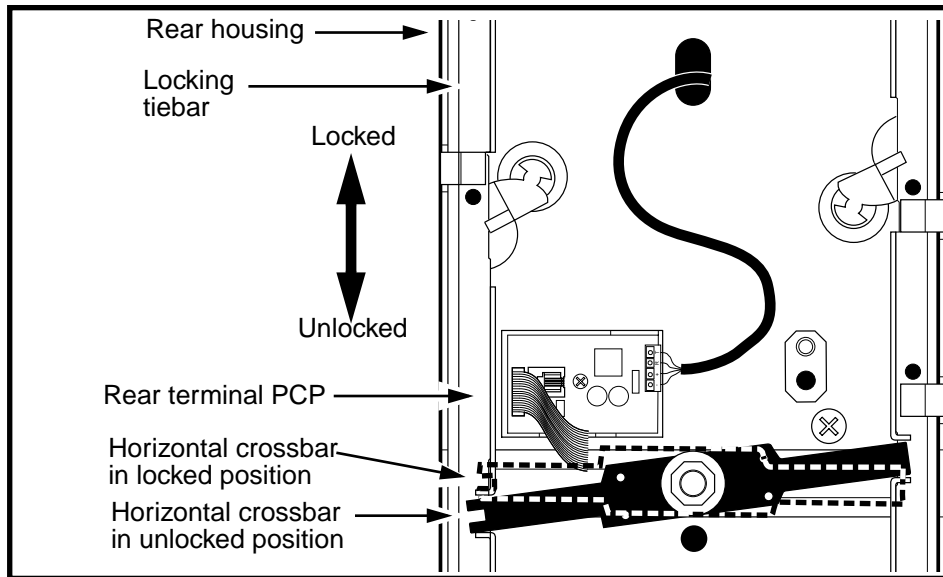
This message appears on the VFD:



Please use key now
& open the terminal

6. Open the terminal housing again and slide the locking tiebar down to simulate opening the terminal.
Refer to Figure 6-5.
7. Continue with your maintenance procedure.



6-10 Inmate terminal**Figure 6-5: Locking/unlocking the terminal with the tiebar****Removing the portable display**

At the end of your maintenance session, perform the following procedures to remove the portable display and return the terminal to operation.

1. When you are ready to close the terminal, reconnect the power to the terminal at the rear terminal PCP terminal block.

See this:

Do not disconnect the portable VFD yet, you will need it for the next section.

- a) Ensure that all the cables are fully seated in their connectors and excess cable is folded and tucked out of the way of the edges of the terminal.
 - b) Ensure that the handset is on-hook.
2. Move the locking tiebar on the left side of the rear housing up to simulate locking the terminal.

If you uninstalled the terminal, the display should show the **Out of Service** prompt, otherwise you should get the **Lift receiver** prompt.

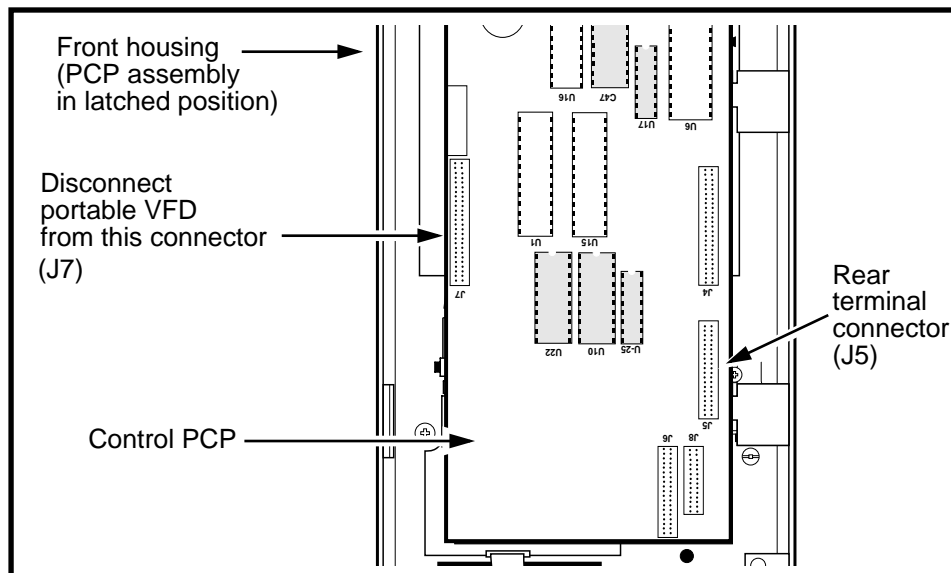
3. If you replaced a control PCP or firmware, enter the craft interface and do the INSTALL routine, then go to Step 4.

If you replaced the telephony PCP, enter the craft interface and do a forced download routine, then go to Step 4.

Otherwise, enter the craft interface and unlock the terminal by sliding the tie bar down and continue with Step 4.

4. Open the housing so you have access to the control PCP.
5. Disconnect the rear terminal connector from the control PCP (J5). Refer to Figure 6-6.
6. Disconnect the portable VFD cable from J7 on the control PCP.

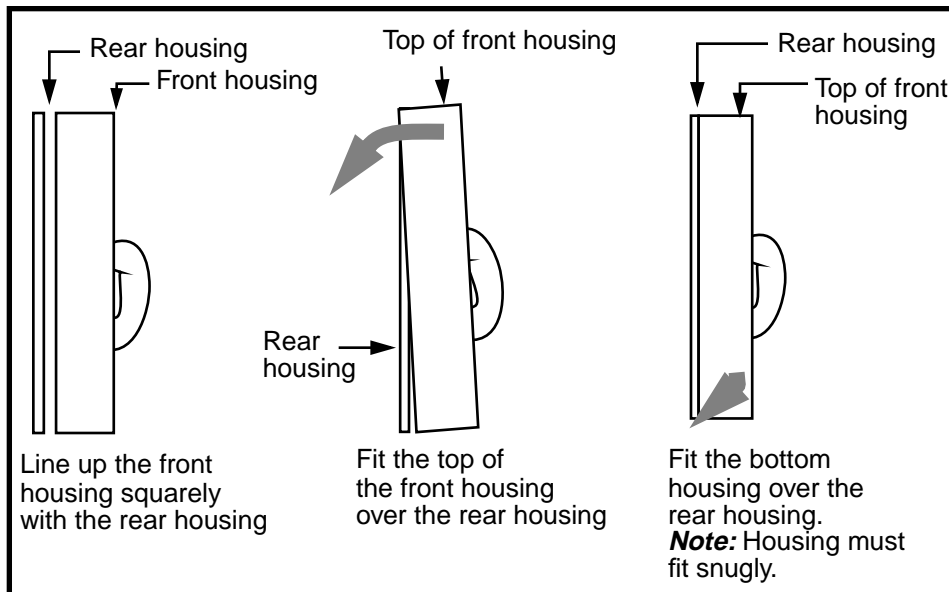
Figure 6-6: Reconnecting cables to the control PCP



6-12 Inmate terminal

7. Reconnect the rear terminal PCP cable (J18) to the connector on the control PCP (J5) to reconnect the power.
8. Follow these steps to properly close the terminal housing:
 - a) Ensure that:
 - the left tiebar is down; the terminal is in an unlocked state
 - the hinges are in place
 - all the cables are tucked away from the edges of the housing
 - b) Grasp the front housing at the top and bottom and turn it so the front of the housing faces you directly.

Figure 6-7: Following the proper closing sequence



- c) Lift the housing and position it squarely over the rear housing.
- d) Fit the top of the housing squarely onto the rear housing.



Inmate terminal **6-13**

- e) Fit the bottom of the housing squarely onto the rear housing.

The front housing should fit snugly against the edge of the back housing. If this is not the case, remove the housing and try again from Step 5c.

CAUTION



Failure to close the terminal housing properly, as described in this section, may allow forced entry into the terminal.

9. Lock the payphone by turning the T- or L-tool clockwise to secure the housing. Then turn the key counter-clockwise until it stops.





6-14 Inmate terminal





Index

A

access code, craft interface 2-3, 6-4, 6-9
accessing the inside of the terminal 2-6
acoustic membrane, alerter module 5-21
alerter module
 cable connections 4-10
 detailed replacement procedure 5-19
 mattock fender 5-21
 replacing 5-17
 two types of upper bezel assemblies 4-7
answer supervision, installing an IAS module 2-31
anti-static bag 1-8, 3-12

B

bent-card guide 5-7

C

cable connector numbers 3-5, 3-8
call detail records, *See* CDRs
cam, upper housing lock 2-22
card reader
 attaching the reader and bezel 5-7
 cable connections 5-4
 changing types 5-4

card reader (continued)
 detailed replacement procedure 5-4
 lower view 5-5
 releasing interlock tab 5-6
 replacing bent card guide 5-7
 replacing the assembly 5-2
card terminal
 disconnecting the power 2-9
 identifying the terminal 1-6
 installing an internal instruction card 4-19
 locking the terminal 2-12
 opening the housing 2-6
 opening the housing (diagram) 2-7
 opening the terminal housing 2-6
 preparing terminal for maintenance 2-2
 removing control/telephony PCPs 3-11
 removing PCP assembly 3-2
 removing the ID bezel 4-11
 replaceable parts 1-3
 replacing alerter module 5-17
 replacing firmware 3-15
 replacing front housing 2-14
 replacing handset, cord, and swivel 2-23
 replacing rear terminal PCP 2-28
 replacing the card reader assembly 5-2
 replacing the datajack card reader bezel 5-12



I-2 Index

card terminal (continued)
 replacing the display window 4-15
 replacing the external instruction card 4-20
 replacing the hookswitch module 5-22
 replacing the hookswitch/alerter bezel 5-28
 replacing the IAS module 2-31
 replacing the lock 2-20
 replacing the number card 5-32
 replacing the quick access keys bezel 4-21
 replacing the VFD 4-2
 replacing upper bezel assembly 4-7
 restoring to operation 2-11
 smart card alert 3-18
 upgrading tiebar pivots 2-39

CDRs

 before you enter the terminal 1-1
 control PCP problems 2-15, 3-5, 3-11
 upload before maintenance 2-1
 upload notice 2-15, 3-5, 4-9, 5-4

clamp plate, removing 4-12

components

 alerter module 5-17
 card reader assembly 5-2
 control and telephony PCPs 3-11
 firmware chips 3-15
 front housing assembly 2-15
 handset and cord or swivel 2-23
 hookswitch module 5-22
 hookswitch/alerter bezel 5-28
 instruction cards 4-20
 number card 5-32
 PCP assembly 3-2
 quick access keys 4-21
 rear terminal PCP 2-28
 replaceable parts list 1-3
 replacing the window 4-15
 smart card alert 3-18
 upper bezel assembly 4-7
 upper housing lock 2-21
 vacuum fluorescent display (VFD) 4-2

 connecting the IAS module 2-34
 control PCP
 labels 1-7
 removing from the PCP assembly 3-11
 replacing firmware chips 3-15
 uninstall if replacing 3-5
 cotton pin, cord swivel 2-25
 craft interface
 accessing the terminal 6-1
 entry privileges required 2-1

D

datajack

 cable connector wiring 3-8
 card validation 5-16
 firmware upgrade 5-11
 initiating a call 5-17
 installing the card reader bezel 5-12
 overview of the feature 5-11

default access code 2-3, 6-4

detailed procedure

 connecting the IAS module 2-34
 hookswitch/alerter bezel 5-30
 removing the PCP assembly 3-5
 replacing the alerter module 5-19
 replacing the card reader assembly 5-4
 replacing the display window 4-17
 replacing the front housing 2-15
 replacing the handset/swivel 2-25
 replacing the hookswitch module 5-24
 replacing the lock 2-21
 replacing the quick access keys bezel 4-23
 replacing the rear terminal PCP 2-29
 replacing the upper bezel 4-9
 replacing the VFD 4-4
 smart card alert 3-19
 dialer bezel interlock tab
 removing the a multi-card reader 5-6
 removing the upper bezel 4-13

disconnecting power 2-9, 6-6
display bracket, *See* clamp plate
display window
 detailed replacement procedure 4-17
 replacing 4-15
 replacing the assembly 4-15

E

ESD
 connection points (diagram) 2-8
 grounding to the terminal 1-1
 precautions 2-8
external interface hookswitch module
 alerter connections 4-7, 4-10
 cable connections 5-25
 rain shield 5-25

F

firmware
 datajack upgrade 5-11
 replacing 3-15
 uninstall if replacing 3-5
flowchart
 changing the quick access keys
 bezel 4-22
 installing the IAS module 2-33
 installing/removing the portable
 display 6-2
 removing/replacing PCP assembly 3-3
 replacing the alerter module 5-18
 replacing the card reader assembly 5-3
 replacing the display window 4-16
 replacing the front housing 2-14
 replacing the handset/swivel
 assembly 2-23
 replacing the hookswitch module 5-23
 replacing the hookswitch/alerter
 bezel 5-29
 replacing the lock 2-20
 replacing the rear terminal PCP 2-28

flowchart (continued)
 replacing the smart card alert
 daughter board 3-18
 replacing the tiebar pivots 2-41
 replacing the upper bezel
 assembly 4-8
 replacing the VFD 4-3
 setup/restore maintenance
 processes 1-9
front housing
 detailed replacement steps 2-15
 replacing assembly 2-15

G

gasket
 card reader 5-8
 window assembly 4-18
grommets for VFD 4-5

H

handset
 cable connection 2-25
 replacing handset and cord 2-23
handset/swivel, detailed replacement
 steps 2-25
hookswitch module
 detailed replacement procedure 5-24
 replacing 5-22
 See also hookswitch/alerter bezel 5-22
hookswitch/alerter bezel
 detailed replacement procedure 5-30
 replacing 5-28
housing assembly, opening the
 terminal (diagram) 2-7

I

IAS module
 about the module 2-31
 detailed steps for connecting 2-34
 installing 2-34
 interconnect diagram 2-32

I-4 Index

-
- IAS module (continued)
 - replacing 2-31
 - terminal block for ISWs 2-10
 - ID bezel, removing 4-11
 - identifying the terminal, product ID label 1-6
 - inmate terminal
 - closing the terminal 6-12
 - disconnecting the power 2-9
 - identifying the terminal 1-6
 - installing the display 6-4
 - locking the terminal with the keys 2-12
 - mattock fender 5-21, 5-33
 - opening the housing 2-6
 - opening the housing (diagram) 2-7
 - opening the terminal housing 6-5
 - portable display 4-2
 - preparing the terminal for maintenance 2-2
 - removing control/telephony PCPs 3-11
 - removing PCP assembly 3-2
 - removing the ID bezel 4-11
 - removing the portable display 6-10
 - replaceable parts 1-3
 - replacing alerter module 5-17
 - replacing firmware 3-15
 - replacing front housing 2-14
 - replacing handset, cord, and swivel 2-23
 - replacing rear terminal PCP 2-28
 - replacing the blank quick access keys bezel 4-21
 - replacing the card reader assembly 5-2
 - replacing the hookswitch module 5-22
 - replacing the hookswitch/alerter bezel 5-28
 - replacing the IAS module 2-31
 - replacing the lock 2-20
 - replacing the number card 5-32
 - replacing the steel instruction plate 4-19
 - replacing upper bezel assembly 4-7
 - inmate terminal (continued)
 - restoring to operation 2-11
 - unique parts 1-6
 - upgrading tiebar pivots 2-39
 - inside service wires (ISWs)
 - insulating the wires 2-9
 - INSTALL
 - changing card reader types 5-4
 - removing the control PCP 3-11
 - replacing firmware 3-15, 3-19
 - when to run 2-1
 - installation
 - polarity on the terminal block 2-37
 - tools and equipment required 1-7
 - installing
 - IAS module 2-31
 - inmate instruction plate 4-19
 - portable display 6-7
 - See also removing
 - smart card alert 3-18
 - instruction card
 - craftsperson 2-3, 6-4, 6-9
 - external, replacing 4-20
 - instruction plate, replacing 4-19
 - instruction window, replacing 4-15
 - interconnect cable, IAS module 2-10
 - interlock tab 5-6
-
- ## K
- keypad
 - alerter/hookswitch connections 4-10
 - removing the upper bezel assembly 4-13
 - smart card alert cable 3-23
 - knuckle saver, using to remove the external instruction card 4-21
-
- ## L
- label
 - control/telephony PCPs 1-7
 - number card, replacing 5-32
 - product ID label 1-6
 - quick access keys 4-25
 - replacing external card 4-20

lanyard 2-26
locking the terminal 2-12
locking tiebars 2-11, 2-16
lock, detailed replacement steps 2-21

M

maintaining the terminal, tools list 1-7
mattock fender 5-21, 5-33
microswitch actuator, multi-card reader 5-8
modem failure, CDRs not uploaded 3-11

N

number card, replacing 5-32

O

opening the housing 2-6

P

parts, list 1-3
PCP assembly
 detailed removal procedure 3-5
 removing 3-2
personal identification number, *See* PIN
PIN, craft interface 2-3, 6-4, 6-9
pivots, upgrading 2-39
polarity, connecting ISWs to terminal block 2-31, 2-37
portable display
 installing 6-4, 6-7
 removing 6-10
power
 connecting ISWs to terminal block 2-31
 disconnecting 2-16
 ESD precautions 2-25, 4-9, 4-17, 4-23, 5-5, 5-19, 5-30, 6-6
 precautions 2-8
 precautions when connecting 2-37
 warning 3-12
prompt

No call records/To continue, press * 2-5

Please use key now/& open the terminal 2-3

Use *=MENU, #=INSTALL/or dial item number 6-8

227. Check cardreader/Use 1=DO IT, #=NEXT 6-8, 6-9

Q

quick access keys
 detailed replacement procedure 4-23
 replacing label 4-25
 replacing the bezel 4-21

R

rain shield
 card reader
 replacing 5-9
 card reader, removing 5-5
 external interface hookswitch module 5-25
rear terminal PCP
 detailed replacement steps 2-29
 interconnect cable to IAS module 2-10
 replacing 2-28
removing
 control and telephony PCPs 3-11
 portable display 6-10
 See also replacing
replaceable parts 1-3
replacing
 alerter module 5-17
 card reader assembly 5-2
 datajack card reader bezel 5-12
 display window assembly 4-15
 external instruction card 4-20
 firmware on the control PCP 3-15
 front housing assembly 2-14
 handset, cord, and swivel 2-23
 hookswitch module 5-22
 hookswitch/alerter bezel 5-28
 housing lock 2-20

I-6 Index

replacing (continued)

- inmate instruction plate 4-19
- internal instruction card 4-19
- number card 5-32
- quick access keys bezel 4-21
- rear terminal PCP 2-28
- See also removing
- smart card alert daughter board 3-18
- upper bezel assembly 4-7
- vacuum fluorescent display (VFD) 3-25
- restoring the terminal to operation 2-11

S

- screwdrivers 1-8
- smart card
 - microswitch actuator 5-8
 - testing the card reader 5-8
- smart card alert
 - alerter connections 4-10
 - cable connections 3-6
 - daughter board connections 3-22
 - detailed replacement procedure 3-19
 - installing 3-18
- swivel, replacing 2-23
- swivel/handset, detailed replacement steps 2-25

T

- Technical Assistance Manager (TAM) 3-17
- teleadapt, extra connector on rear terminal PCP 2-30
- telephony board not responding
 - error 2-12
 - powerup 2-12
- telephony PCP
 - datajack upgrade 5-11
 - label 1-7
 - removing from the frame 3-11
 - removing from the PCP assembly 3-11

terminal block

- disconnecting the power 2-9
- when to reconnect the power 2-12
- terminal housing, opening the housing 2-6
- terminal release number 1-6
- tiebar pivots, upgrading 2-39
- tiebars, left side down is unlocked position 2-11, 2-16
- tools list 1-7

U

- uninstall
 - changing card reader types 5-4
 - removing the control PCP 3-11
 - replacing control PCP or firmware 3-5
 - replacing firmware 3-15, 3-19
 - replacing the front housing 2-15
 - when to uninstall the terminal 2-1
- unlocking the terminal 2-3
- upgrades, datajack and smart card alert 5-11
- upper bezel assembly
 - detailed replacement procedure 4-9
 - hookswitch connections 5-24
 - locating the screws 4-13
 - replacing 4-7
- Use *=MENU, #=INSTALL/or dial item number 6-8
- using cards to make a datajack call 5-17

V

- vacuum fluorescent display, See VFD
- VFD
 - detailed replacement procedure 4-4
 - entering craft interface access codes 2-3, 6-4
 - installing the portable display 6-7
 - replacing 4-2



W

warnings

CDR uploads 2-15, 3-5, 4-9, 5-4

connecting the inside service wires
(ISWs) 2-37

ESD precautions 2-8, 2-16, 2-29, 2-
34, 3-6, 3-12, 4-4, 5-24

warranty expiry 1-6

window assembly, replacing 4-15

wrenches 1-8





I-8 Index







Millennium Card-based terminals:

Replacing parts

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