

# TFC1

## *Owner's Manual*

**Part Number: 29345-00**

**Revision: A**

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# Preface

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Welcome to the *TFC1 Owner's Manual*. This manual describes Trimble Navigation Limited's TFC1 is a portable, rugged, IBM-compatible computer which uses the Microsoft MS-DOS operating system and the Microsoft Windows Graphical User Interface (GUI). It lets you run a vast range of off-the-shelf or custom applications while on the move.

The TFC1 has an IBM-compatible keyboard and a pen interface for easy operation of pen-aware applications.

The TFC1 can be enhanced by connecting peripherals or add-ons to its wide range of ports. The standard ports include serial, parallel and PCMCIA card sockets.

## Scope and Audience

Even if you have used other handheld computers we recommend that you spend some time reading this manual. The following section provides you with a guide to this manual, as well as to other documentation included with this product.

## Organization

The manual is divided into the following chapters:

- Chapter 1, Getting Started - provides an introduction to TFC1 operations.
- Chapter 2, Batteries and Power - contains information on checking, recharging, and replacing batteries.
- Chapter 3, Options - discusses how to use the main options and accessories available for the TFC1.
- Chapter 4, Maintenance and Troubleshooting - tells you how to handle routine maintenance and problems.
- Appendix A, Program Installation - provides directions for installing application programs
- Appendix B, System Precautions - contains information on system compliance to electronic standards.

At the end of this manual you will find a reader comment form. We appreciate any feedback you have about this manual. If this form is not available, comments and suggestions can be sent to Trimble Navigation Limited, 645 North Mary Avenue, Post Office Box 3642, Sunnyvale, CA 94088-3642. All comments and suggestions become the property of Trimble Navigation Limited.

## Related Information

This manual contains system-wide, general information about the TFC1. The following sections discuss other sources of information.

## Update Notes

You will find a Warranty Activation Sheet with your TFC1. By sending in your Warranty Activation Sheet, you are automatically sent update notes as they become available. When you receive these packages, read them. They contain important information about software and hardware changes. Contact your local Trimble Dealer for more information about the support agreement contracts for software and firmware, and an extended warranty programs for hardware.

## Trimble Bulletin Board Service

If you have a modem, check the Trimble Surveying and Mapping Bulletin Board Service (BBS) on a regular basis for application notes, new software release notices, and other information. The phone numbers are:

+1-408-732-6717

+1-408-732-8936 high-speed modem

## Technical Assistance

If you have problems and cannot find the information you need in this document, call the Trimble Technical Assistance Center (TAC). The phone numbers are:

+1-800-SOS-4TAC (in North America)

+1-408-481-6940 (International)

+1-408-737-9142 (fax)

You can call the Technical Assistance Center phones between 6 AM to 6 PM Pacific Standard Time. A support technician will take your call, help you determine the source of your problem, and provide you with any technical assistance you might need.

## **FaxBack**

FaxBack is a completely automated fax response system for selecting documents and catalogs (lists of available documents) to be faxed back to a fax machine. Call from a tone-dialing phone and FaxBack guides you through the call by playing a pre-recorded voice message.

The FaxBack system is available 24 hours a day, seven days a week. You can order a variety of documents, including; data sheets, application notes, technical documentation, configuration guides, assembly drawings, and general information.

To call the FaxBack service, dial +1-408-481-7704 and follow the instructions received.

## **Other Manuals**

You may find the following Microsoft Press material of use:

- *The MS-DOS User's Guide and Reference* - for information on the TFC1's operating system and its commands.
- *The MS-DOS Technical Reference* - for detailed information on programming for the MS-DOS Operating System.
- *The Microsoft Windows User's Guide* - for information on setting up and using Microsoft Windows.
- *The Microsoft Windows Guide to Pen Computing* - for information on setting up and using the pen in Windows.

## Document Conventions

*Italics* identify software menus, menu commands, dialog boxes, and the dialog box fields.

SMALL CAPITALS identify DOS commands, directories, filenames, and filename extensions.

*Courier* is used to represent what you see printed on the screen by the DOS system or program.

**Courier Bold** represents information that you must type in a software screen or window.

Return or Ctrl + C identifies a hardware function key or key combination that you must press on a PC.

## Notes, Tips, Cautions, and Warnings

Notes, tips, cautions, and warnings are used to emphasize important information.



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**Note** – Notes give additional significant information about the subject to increase your knowledge, or guide your actions. A note can precede or follow the text it references.

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**Tip** – Indicates a shortcut or other time or labor-saving hint that can help you make better use of the TFC1.

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**Caution** – Cautions alert you to situations that could cause hardware damage or software error. A caution precedes the text it references.

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**Warning** – Warnings alert you to situations that could cause personal injury or unrecoverable data loss. A warning precedes the text it references.

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# 1 Getting Started

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This chapter provides an introduction to the use of the TFC1. The TFC1 is a rugged, light-weight portable computer, designed for use in the field and in the office:

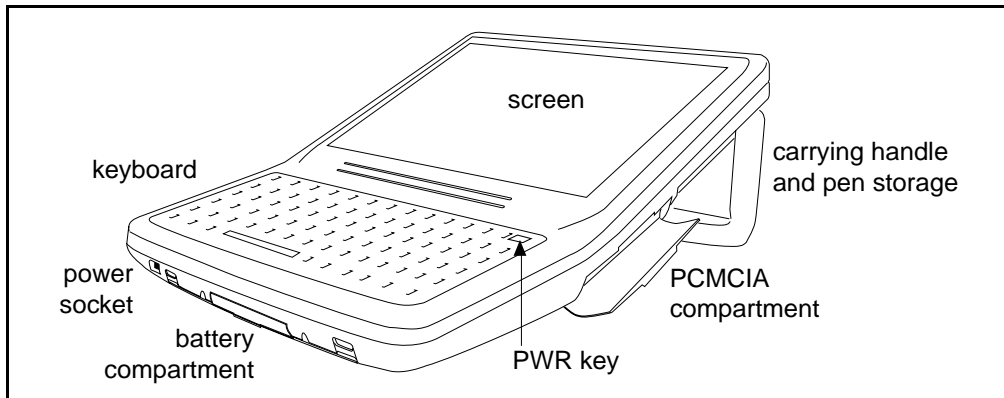
- The comfortably sized keyboard and screen and compact AC Adaptor mean you can use the TFC1 like a desktop system.
- At under five pounds, the TFC1 is light and compact, and runs for 3 to 4 hours on a single battery charge.
- The sealed case protects the TFC1 even in the rain.
- The backlighted screen lets you work under very low light conditions in the field or at night.

## 1.1 Charging the TFC1

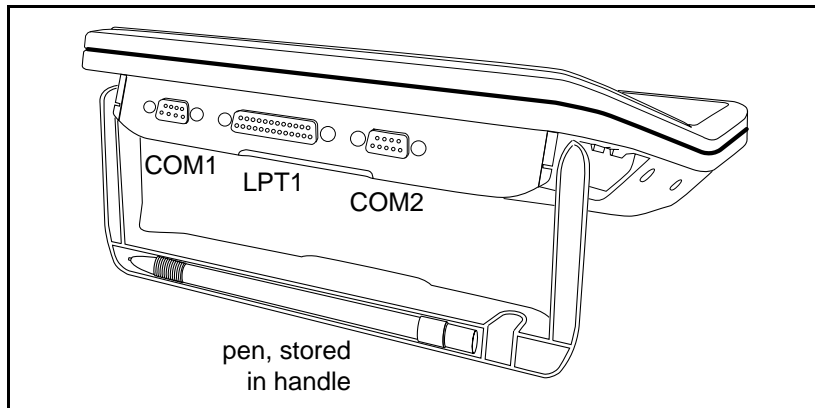
When you unpack the TFC1 you should fully charge the main battery pack by connecting the AC Adaptor for at least 10 hours with the TFC1 turned off. This makes sure that the batteries are at their fully capacity before using the unit. Refer to section 2.1.2 of Chapter 2 for instructions.

## 1.2 TFC1 Components

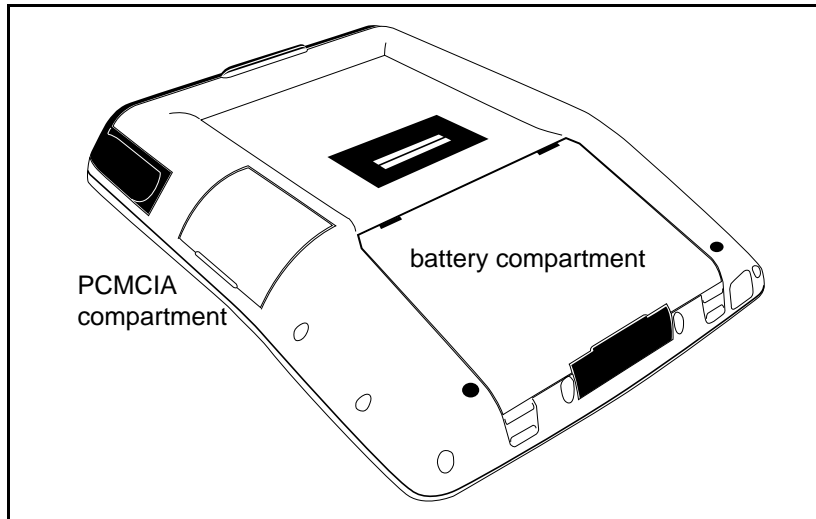
The components of the TFC1 are illustrated in Figure 1-1, Figure 1-2, and Figure 1-3. Table 1-1 describes the components.



**Figure 1-1. TFC1 Layout, Front View**



**Figure 1-2. TFC1 Layout - Back View**



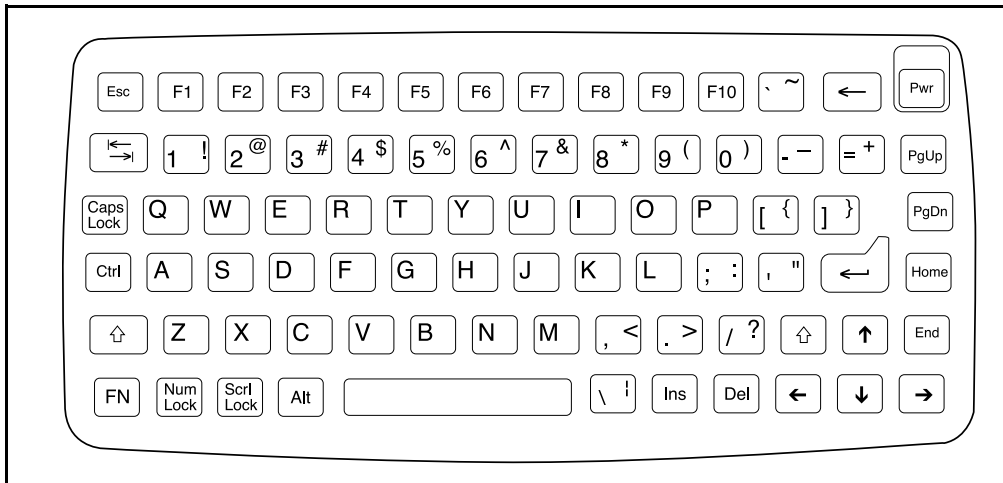
**Figure 1-3. TFC1 Layout - Bottom View**

**Table 1-1. TFC1 Components**

<b>Component</b>	<b>Description</b>
keyboard	The keyboard has 81 keys in a QWERTY layout.
screen	The screen is a monochrome VGA screen, with 16 grey scales and 640x480 pixels, and backlight.
carrying handle	The carrying handle allows you to carry the TFC! and provides storage for the pen.
PCMCIA compartment	The PCMCIA compartment contains the two external PCMCIA sockets. The sockets accept PCMCIA cards such as modems, ATA hard disk drives and memory cards. The compartment is watertight when closed correctly.
battery compartment	The battery compartment stores the main battery. The compartment is watertight when closed correctly.
power socket	The power socket provides a connection for the TFC1 AC Adaptor, to charge the main battery pack.
COM1	The main serial port connects external serial devices, such as external modems, or is used to exchange information with other computers through Microsoft's INTERLINK.
LPT1	The parallel printer port connects devices with a parallel interface, such as a parallel printer, or is used to exchange information with other computers.
COM2	The secondary serial port connects external serial devices, such as external modems, or is used to exchange information with other computers.

## 1.3 Keyboard

The keyboard works like a normal PC keyboard, with a few special features. The keyboard is shown in Figure 1-4. The function that each key performs is indicated by symbols located on its keycap, and on the keyboard overlay behind it.



**Figure 1-4. Keyboard Layout**

The letter keys (**A**, **B**, **C**) normally type small letters (a, b, c). To type a CAPITAL letter, hold down either of the (**⇧ Shift**) keys and type the letter required. If you want to type a series of capitals, press the **Caps Lock** key to select *caps lock* mode. The letter keys type capitals. When in *caps lock* mode, you can type lower case letters by pressing the (**⇧ Shift**) key. Press **Caps Lock** again to return to normal typing.

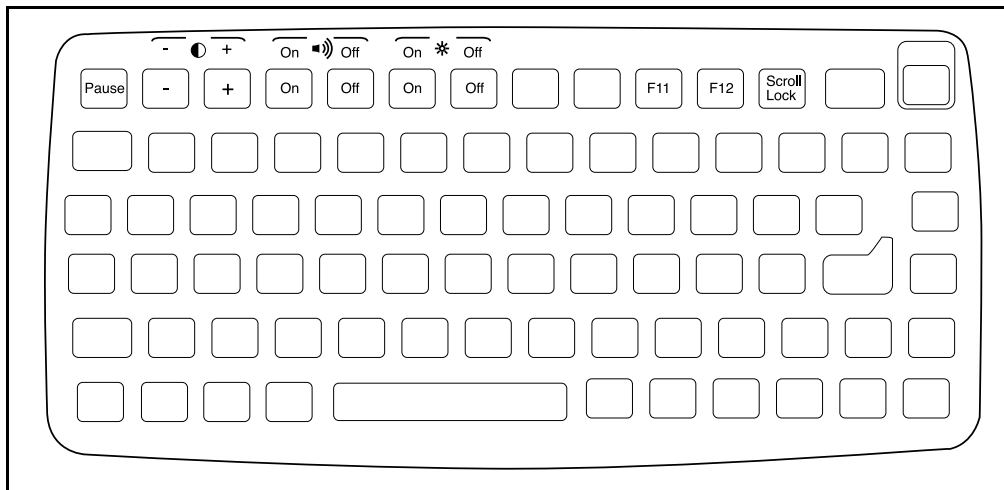
The (**⇧ Shift**) key produces a capital letter or the character shown in the upper part of the keycap.

The **Ctrl** key produces control codes that can control your application.

The **[Alt]** key typically provides access to menus in Windows, but can also enter characters and symbols by typing their ASCII code on the numeric keypad (see section 1.3.2).

### 1.3.1 Control Keys

The TFC1 provides keyboard control of the computer's screen contrast and brightness, and of speaker volume. To execute one of these functions, press the **[FN]** key (located in the lower left corner of the keyboard) and the appropriate **[F#]** function key (located in the first row of keys at the top of the keyboard). See Figure 1-5 and Table 1-2.



**Figure 1-5. Control Keys**

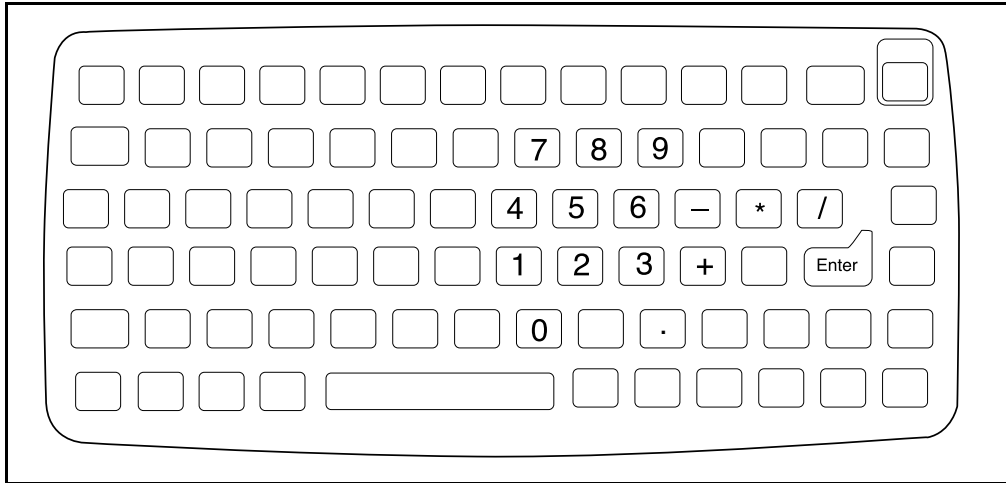
**Table 1-2. Control Keys**

<b>FN Key +</b>	<b>Produces</b>
Esc	Pause
F1	Decrease screen contrast
F2	Increase screen contrast
F3	Speaker on
F4	Speaker off
F5	Backlight on
F6	Backlight off
F7	Reserved
F8	Country-specific characters
F9	F11
F10	F12
PrtSc	Scroll Lock

The control functions are described in section 1.3.4.

### 1.3.2 Numeric Keypad

The keyboard also has an embedded numeric keypad, as shown in Figure 1-6. To use this numeric keypad, enter *num lock* mode by pressing the **(FN)** key and the **(Caps Lock)** key. This modifies the keys. To return to normal keyboard operation, repeat the key sequence.



**Figure 1-6. Embedded Numeric Keypad**

### 1.3.3 Typing Extended Characters

You can use the **[Alt]** key in *num lock* mode to type characters that are not on the keyboard.

When using DOS or Windows:

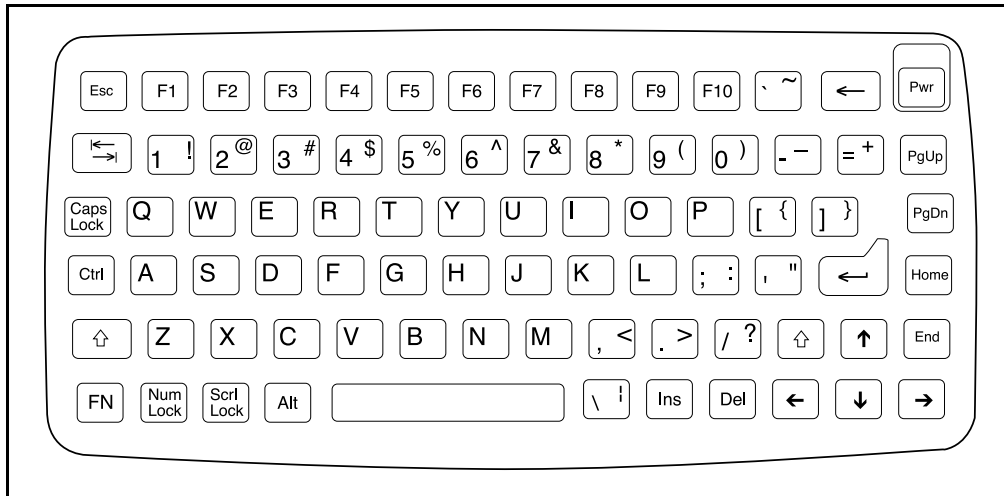
1. Select *num lock* mode (see section 1.3.2).
2. Hold down the **[Alt]** key and type the character's ANSI code, using the numeric keypad keys (NOT the numbered function keys along the back row of the keyboard). When you release the **[Alt]** key, the ANSI character displays.

ANSI codes are listed in your DOS guides. Within Windows you should always type a 0 at the start of the ANSI code.

When using Windows, you can also use the Character Map accessory to provide point-and-click selection of extended characters. Refer to the documentation supplied with Microsoft Windows for more information.

### 1.3.4 Control and Switch Keys

The TFC1's controls and switches are provided by keys and key combinations shown in Figure 1-7.



**Figure 1-7. Control and Switch Keys**

To turn on or off, press the **Pwr** key. The TFC1 can also turn itself off to conserve power if inactive for a period. See section 1.6.1.

To adjust the screen contrast, hold down **FN** and press **F1** to decrease contrast, or **F2** to increase contrast. Release both keys when the contrast setting is satisfactory.

To turn the screen backlight on, press **FN** + **F5**. To turn it off, press **FN** + **F6**. To conserve battery power, the backlight turns off automatically after a short time, usually 5 minutes.

The TFC1 can produce a number of sounds through its speaker. To turn the speaker off, press **[FN] + [F4]**; to turn it on, press **[FN] + [F3]**. Turning off the speaker prevents all sound output, including:

- Keyclicks
- Low power warning beeps
- Tones to confirm PCMCIA card insertion, removal and configuration
- Beeps, tones and other sounds that may be produced by your software

Your software may also provide options to control these and other functions.

## 1.4 Using the Pen

The pen provides a simple, intuitive pointing device. It utilizes a digitizer under the monitor screen that senses the position of the pen tip. The operation of the pen depends on whether you are using it with Windows or with the DOS operating system.

- If you are using a Windows application, the screen pointer follows the pen tip around the screen, and you use Pen Windows gestures to select commands such as delete, insert, and so on. For information on pen functions in Microsoft Windows, refer to *The Microsoft Windows Guide to Pen Computing*.
- DOS applications that support the use of a pointing device, such as a mouse, may also work with the pen. However, DOS applications cannot use the pen for handwriting or recognize gestures.

Whichever type of application you are using:

- Tap the pen tip anywhere on the screen. The pen turns itself off to conserve power when there is no pen input for a period.
- Move the pen around the screen to move the pointer. The pen tip does not have to rest on the screen. It can be up to about 7mm (0.3") from it and still operate correctly. The pen tip should touch the screen when using it to write on forms laid on the screen.
- To click, press the pen tip on the screen. This is equivalent to a left-button click.
- To right-click, press the button on the barrel of the pen.

## 1.5 Turning the TFC1 On

To turn the TFC1 on, press the **Pwr** key, in the upper right corner of the keyboard.

When it turns on, the TFC1 usually starts from where you turned it off, instead of rebooting like a desktop computer. This is much more convenient than having to restart the applications and reload your data. The *resume mode* operation may be disabled by your application.

If you see the following message when you turn the TFC1 on:

BATTERY POWER LOW

it means the battery needs recharging.

The TFC1 only stays on for a few seconds, so turn it off. Recharge or replace the battery pack. See section 2.1 of Chapter 2.

If you can not turn the unit on at all, the battery pack may be fully discharged. Recharge or replace the battery pack. See section 2.1 of Chapter 2.

## 1.6 Turning the TFC1 Off

To turn the TFC1 off, press the **[Pwr]** key again. Turning the unit off suspends your application. The next time you turn the TFC1 on, you can carry on exactly as if you had not turned the unit off.

To get the maximum working time from the batteries, turn the TFC1 off when you are not using it, even if only for a few minutes.

If you can not turn the unit off, your software may have disabled the **[Pwr]** key to make sure that it can complete a task. You should be able to turn the TFC1 off on completion of the task.

### 1.6.1 Automatic Turn-off

The TFC1 can turn itself off for the following reasons:

- The TFC1 has been inactive for a time, typically 4 minutes. This is the idle timeout. Your application can adjust this period or prevent idle timeout completely.
- The software turns off, for example, once it has completed a long, unsupervised task.
- The battery voltage has fallen below a threshold level. Before this happens, the TFC1 displays warning messages and sounds warning beeps (providing that the speaker is enabled and the TFC1 is in DOS, not Windows).
- The battery pack has failed or been removed.

In the first two cases, you can turn on again and use the TFC1 as normal. If the battery voltage is low, you may be able to turn on, but the TFC1 displays warning messages and turns off again. Connect the AC adaptor to recharge the battery. If the battery pack has been removed or has failed completely, install a working battery pack. If the battery needs charging, connect the AC adaptor.

## 1.6.2 Rebooting the TFC1

Occasionally, you may need to reboot the TFC1. For example, after changing the CONFIG.SYS or AUTOEXEC.BAT files. To effect the changes, you must reboot the TFC1. Turning it off and on will not do this.

To reboot, press **Ctrl** + **Alt** + **Del**. That is, hold down the **Ctrl** and **Alt** keys and press the **Del** key. A series of messages display that end with your application being run, or the DOS command prompt or Windows.



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**Note** – If the TFC1 normally runs an application that is specially written for your work and you think you need to reboot but can not contact Trimble's Technical Support Center (TAC) for advice.

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## 1.7 Storing the TFC1

If you need to store the TFC1 for more than a few days, do the following:

1. Fully charge the battery pack. The battery pack should be fully recharged every two or three weeks.
2. Exit any applications that are running.
3. Store any data files on nonvolatile storage, to avoid the possibility of data loss. For example, copy them to a desktop computer.
4. Disconnect any peripherals or cables.
5. Store the pen in the TFC1's handle.
6. Make sure that the **Pwr** key cannot be pressed accidentally.
7. Store the TFC1 at room temperature

## 2 Batteries and Power

---

The TFC1 uses three types of batteries and one other source of power:

- A removable, rechargeable, main battery pack. This is the main power source for mobile operation. It can be charged internally by using the AC Adaptor.
- The AC Adaptor, can power the TFC1 for desktop operation. The battery pack must be installed in the TFC1 while using the AC Adaptor.
- A fixed internal backup battery, trickle-charged from the main power source. This provides sufficient power to maintain all the information stored on the TFC1 for at least 72 hours even if the main power source fails.
- Non-rechargeable button cells, located inside the pen. These power the pen.



---

**Caution** – Rechargeable batteries are recyclable. At the end of their useful life, depending on the applicable local and national law, it may be illegal to dispose of rechargeable batteries through the municipal waste system. Check with your local solid waste officials for details of the recycling and disposal options in your area.

---

## 2.1 Main Battery Pack

The main battery pack is a reliable and long lived Duracell DR30 NiMH (Nickel Metal Hydride). In normal operation, you need to recharge it when it runs down and replace it at the end of its useful life.

The TFC1's power-conservation facilities help you get the maximum operating time from the main battery pack. For best results, you need to:

- Make sure that the main battery pack is fully charged.
- Turn the TFC1 off when not using the main battery pack.
- Use the backlight as little as possible.

In standard operation, with the full power-saving facilities enabled, a full charge can last up to 3 to 4 hours. If you have a spare charged battery pack, you can swap batteries at any time to extend operating time. If you follow the instructions, each battery pack should last for approximately 500 charge/discharge cycles.



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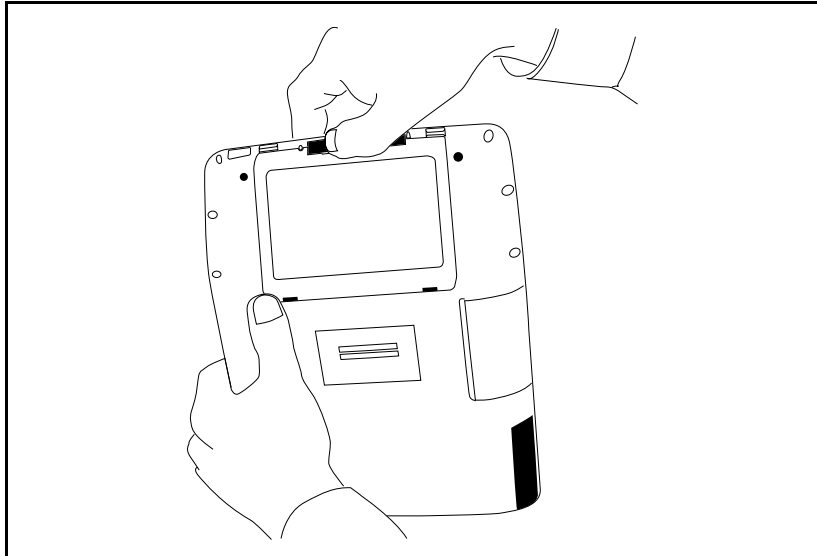
**Caution** – Use only Duracell DR30 (or compatible) battery packs specifically designed for use with the TFC1, available as an accessory from Trimble, P/N 29347.

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### 2.1.1 Checking and Replacing the Main Battery Pack

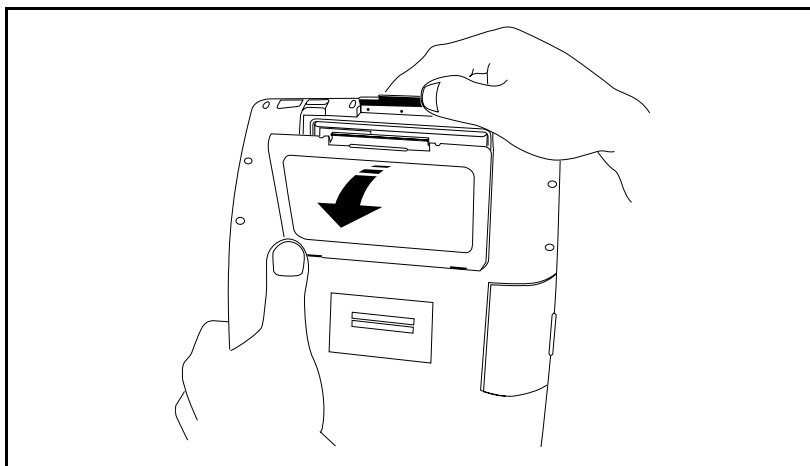
You should check the main battery pack visually, at least twice a year:

1. Turn the TFC1 over and pull out the catch of the battery door. See Figure 2-1.



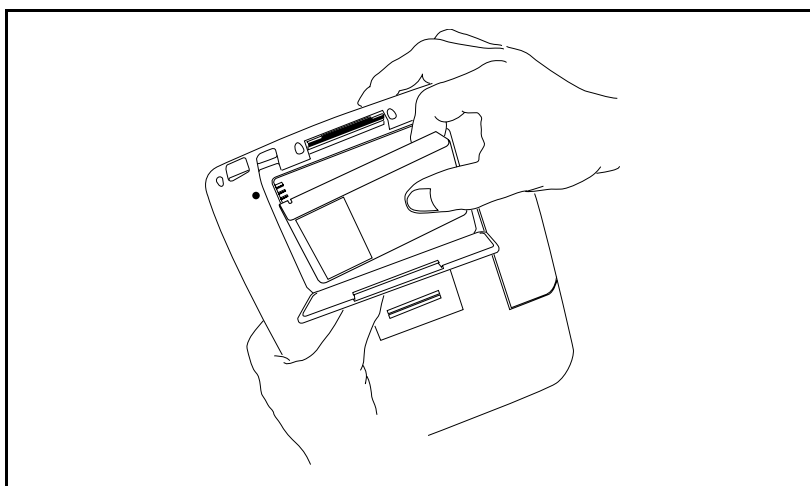
**Figure 2-1. Unlatching the Battery Door Catch**

2. Open the battery door. See Figure 2-2.



**Figure 2-2. Opening the Battery Door**

3. Turn the TFC1 over and remove the battery. See Figure 2-3.



**Figure 2-3. Removing the Battery**

4. Examine the battery pack for leaks or cracks. If you see any, remove the battery pack.



---

**Warning – BATTERY LEAKAGE IS CORROSIVE.** In the unlikely event of battery leakage, do not touch the leaked material. In case of accidental contact, rinse immediately with running water.

---

5. Examine the compartment for signs of water leakage, such as white deposits or corrosion of the contacts. If you see deposits, clean them as well as you can and check the battery compartment seals and latch mechanism. If these are damaged, return the TFC1 to Trimble's Technical Support Center (TAC) for repair.
6. Place the current battery pack or a new battery pack in the battery compartment so that it fits over the charging contacts and lies flat. It only fits the correct way.
7. Close the battery compartment door. Make sure it is fully closed and securely latched before taking the TFC1 into the field.
8. Fully charge the battery pack, (see section 2.1.2). A new battery pack should have no charge.
9. If you are exchanging battery packs, charge the one you have removed so it is ready when you need it.

---

## 2.1.2 Charging the Main Battery Pack

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**Caution** – Use only the AC Adaptor to charge or operate the TFC1. Observe the AC Adaptor cautions in section 2.2.1. The AC Adaptor is for indoor use only.

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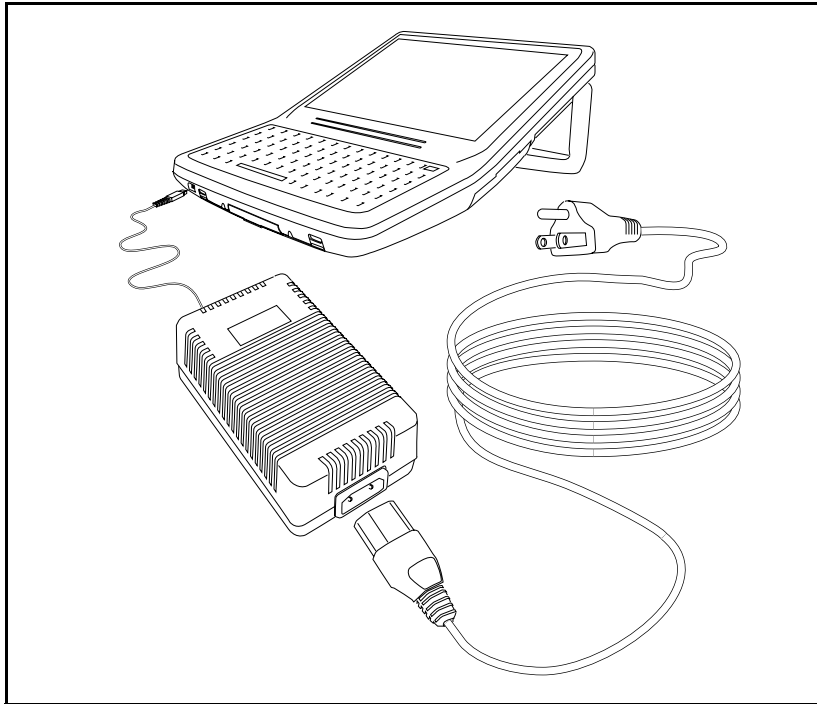
To maintain a battery pack's capacity and prolong its working life, you should recharge it when it is almost fully discharged (when the TFC1 unit is displaying battery low warnings). This is the recommended procedure.

You can recharge the battery at any time, regardless of the condition of the charge, as long as you do not do so too often. A battery that was recharged after partial use should be run down to the low battery condition as soon as possible, then fully recharged.

To recharge the battery:

1. Turn the TFC1 off.
2. Plug the AC adaptor into the AC supply.

3. Plug the AC adaptor into the power socket on the front of the TFC1.



**Figure 2-4. Using the AC Adaptor**

4. Leave the battery to charge. Charging may take up to 10 hours for a fully discharged battery, providing the TFC1 is turned off while charging.
5. When charging has finished, disconnect the AC Adaptor from the TFC1 and the AC supply.

You can turn the TFC1 on and use it while charging its battery, but this increases the charging time. In some cases, with high current peripherals attached and in constant use, this may even prevent charging entirely.

---

## 2.2 AC Adaptor



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**Caution** – Use only the AC Adaptor to charge or operate the TFC1. Observe the AC Adaptor cautions in section 2.2.1. The AC Adaptor is for indoor use only.

---

You can use the AC Adaptor to charge the main battery pack; see section 2.1.2. You can also use the AC Adaptor as your main power source. A battery pack must be installed in the TFC1 in order to use the AC Adaptor.

To use the AC Adaptor as the main power source:

1. Turn the TFC1 off.
2. Plug the AC Adaptor into the AC supply.
3. Plug the AC Adaptor into the power socket on the front of the TFC1.
4. You can now use the TFC1 exactly as if operating from the main battery pack. The usual power-saving functions still operate, even though power is not being drawn from the battery pack. The main battery pack also charges automatically.
5. You can turn the TFC1 off or on as normal, by using the Pwr key.
6. When you have finished operating the TFC1 from the AC Adaptor, disconnect the AC Adaptor from the TFC1 and AC power supply.

## 2.2.1 AC Adaptor Cautions



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**Caution** – The AC Adaptors for the TFC1 are class 11 (double insulated W with no ground) and built to EN60950: 1988 or EN60742: 1989, BS415 and DIR73/23/EEC safety requirements, and international EMC standards including EN55022 classes A & B.

---

Use the AC Power Adaptor only after reading and understanding the following cautions:

- Hazardous voltages inside, do not attempt to open.
- No user serviceable parts inside, do not attempt to open.
- Indoor use only.
- Avoid liquid spillage, do not connect if suspected damp.
- Make sure ventilation is not restricted.
- Make sure the supply specification matches the input rating of the TFC1.
- Use only the supplied AC Adaptor. Trimble Navigation Limited cannot be held responsible for any damage caused if the supplied AC Adaptor is not used.
- Inspect the AC adaptor before connecting, do not use if there are signs of damage or deterioration.
- Regularly check the battery for leakage as this may damage the product.
- Battery chemical leakage is corrosive, do not touch. In case of accidental contact wash immediately with running water.
- Avoid mechanical strain to cables or connectors.
- Make sure connectors are soundly mated.

- 
- In the event of overloading due to a fault, the adaptor may overheat and stop functioning. Some models recover after disconnecting from the power supply for a few minutes. Others fail permanently. These are not repairable and must be replaced.
  - If, after following the instructions, the AC adaptor appears to be faulty, it should be returned to the supplier for servicing, with a description of the fault.
  - The AC Adaptor should never be replaced by an alternative unapproved model, as damage can result.
  - Do not attempt to use the AC Adaptor for alternative purposes; use only with the TFC1 products supplied by Trimble Navigation Limited.
  - Use only a readily accessible power outlet, and disconnect when not in use.
  - Although the AC Adaptor is rated for continuous operation, it is important not to exceed the charging limitations of the battery. Refer to appropriate instructions for charging.
  - Avoid use in dusty or contaminated environments.
  - If a fused plug is present, make sure that only a suitable fuse is fitted inside the plug and that only identical replacements are used.

### 2.3 Internal Backup Battery

The internal backup battery is charged automatically from the main TFC1 power source (battery pack, AC Adaptor, or Vehicle Adaptor). If fully charged, the internal battery provides sufficient power to maintain all information stored within the TFC1 for at least 72 hours. It does NOT provide sufficient power to operate the TFC1 or any of its peripherals.

If the backup battery is exhausted, it may take up to a week to fully recharge once main power is restored. The backup battery is designed to last for the lifetime of the TFC1 and is not user-replaceable.

### 2.4 Pen Batteries

The digitizer pen has its own internal batteries. These should be replaced when the pen begins to function erratically. To replace the pen batteries:

1. Obtain a set of three SR48 button cells. These are available from most battery suppliers.
2. Depress the top of the pen and turn it about 120° counter-clockwise to release it from the body of the pen.
3. Turn the pen upside down and pull off its top, to drop out the three used batteries.



---

**Warning** – Keep the pen batteries out of the reach of children.

---

4. Turn the pen right-side up and insert the three new batteries, negative poles down.
5. Insert the pen top. Press it down and turn it 120° clockwise to lock it into place.
6. Turn the TFC1 on and check the operation of the pen.



## 3 Options

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You can enhance the TFC1 with the following accessories and peripherals:

- PCMCIA cards
- Vehicle adaptor
- Parallel printers
- Serial devices

Other options may become available later. For a complete list, contact your supplier.

### 3.1 PCMCIA Cards



---

**Note** – Read this section if you need to insert or remove PCMCIA cards. If the cards are already set up for you, leave them in place and skip this section.

---

PCMCIA cards or PC cards are credit-card size devices that add options to the TFC1, such as GPS receivers, modems, memory, hard disk drives, and network adaptors. PCMCIA cards are installed in one of the TFC1's two external PCMCIA sockets, accessed through a door and waterproof cover on the right-hand side of the case.

PCMCIA cards come in three thicknesses, from Type 1 (thinnest) to Type 3 (thickest). The TFC1 holds two Type 1 or Type 2 cards, or one Type 3 card.

### 3.1.1 Inserting a PCMCIA Card



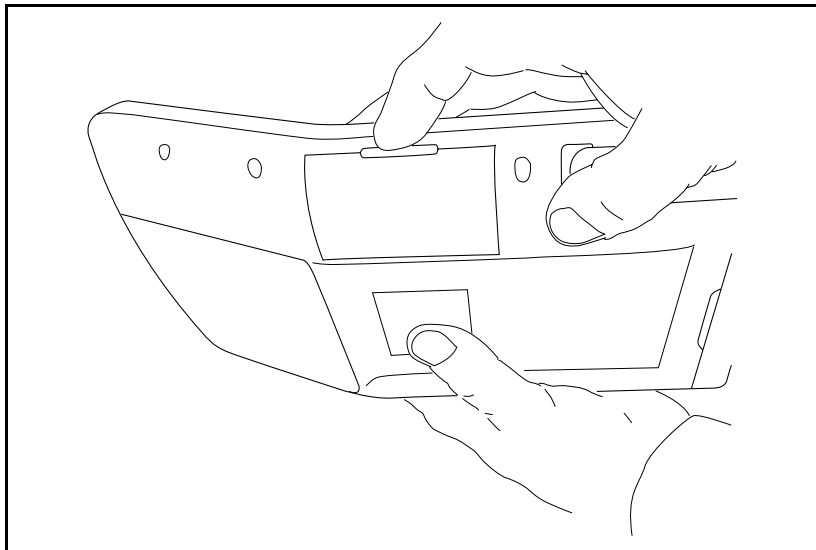
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**Note** – These instructions assume that the CardWare software is installed on the TFC1 and is set to automatically recognize and configure PCMCIA cards when inserted. If any other installation or preparation instructions are provided with the card, read those also.

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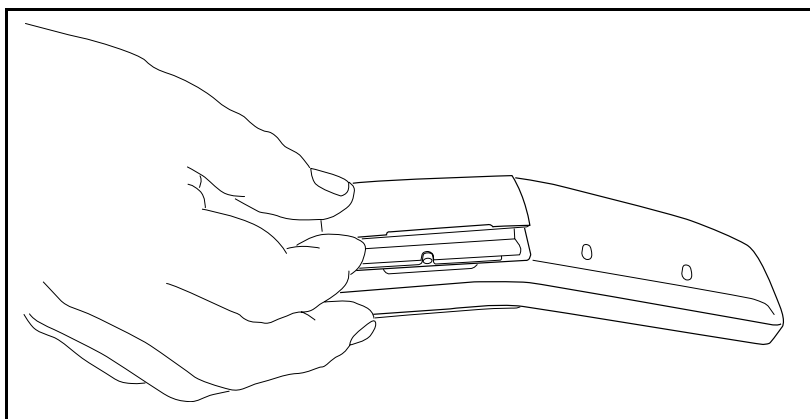
To insert a card:

1. Turn the TFC1 on.
2. Turn the TFC1 over, and pull the catch of the PCMCIA door toward you. See Figure 3-1.



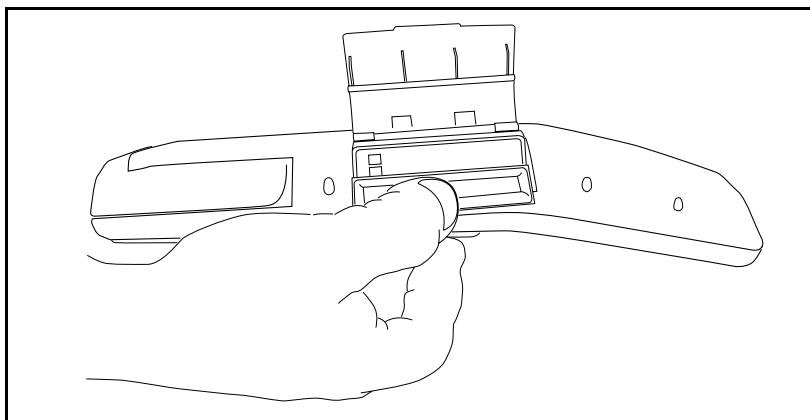
**Figure 3-1. Unlatching PCMCIA Door Catch**

3. Grip the door and rotate the door upwards to open it. See Figure 3-2.



**Figure 3-2. Opening the PCMCIA Door**

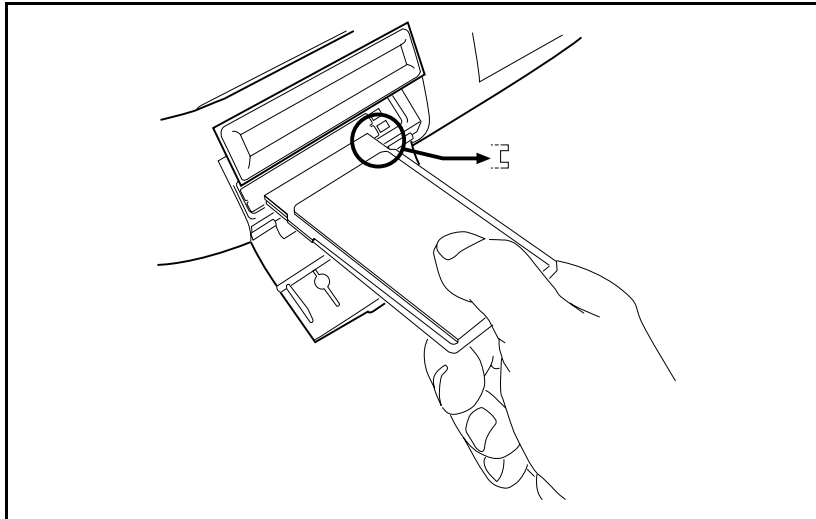
4. Pull open the inner waterproof cover. See Figure 3-3.



**Figure 3-3. Opening the Inner Waterproof Cover**

5. Remove the card from its protective case. Be careful not to damage or contaminate the contacts.
6. Insert the card, connector end first, right way up. Most cards are labeled with the correct orientation. Check the ridges down each side of the card; make sure that the double ridges are to the right. See Figure 3-4.

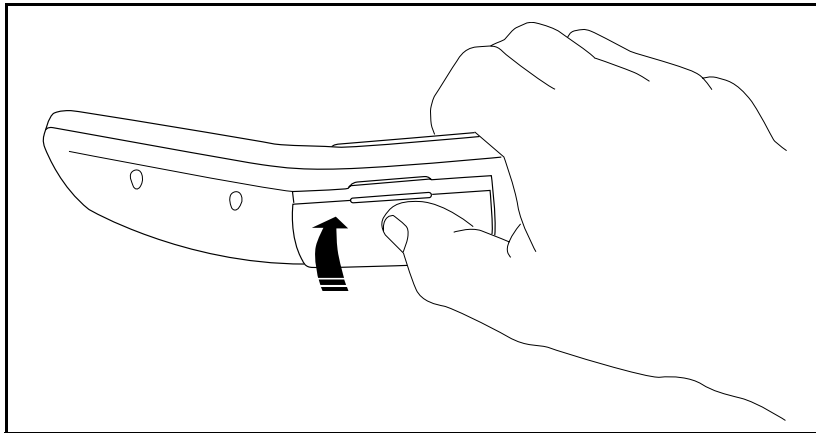
If you are fitting a Type 1 or Type 2 card, you can use either socket. If you are fitting a Type 3 card, remove other cards first and use the lower socket.



**Figure 3-4. Inserting the PCMCIA Card**

7. Press the card home until the ejector pops up (there is some resistance first). If sound is enabled, you should hear a beep when the card is fully inserted and recognized, and another (higher) beep when it has been configured. These beeps are provided by the CardWare utility.
8. Make sure that the card is fully inserted. Check the ejector. It should be popped up above the top of the card.

9. Close the inner waterproof cover and door. See Figure 3-5.



**Figure 3-5. Closing the PCMCIA Door**

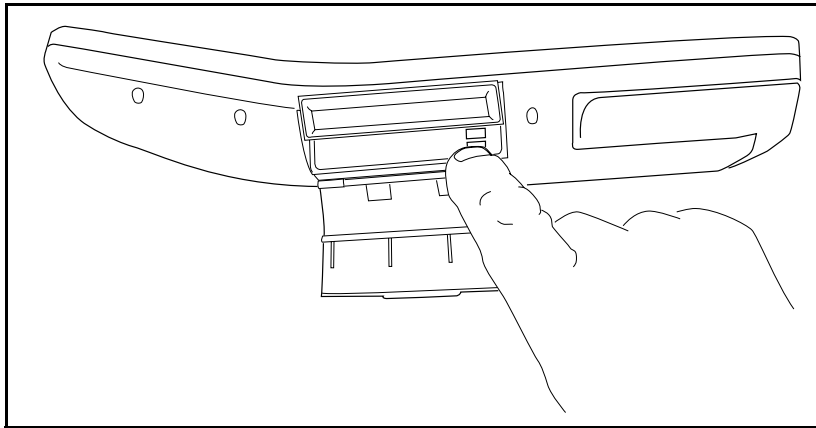
### **3.1.2 Using a PCMCIA Card**

Once a PCMCIA card has been installed and auto-configured, it should operate correctly. Read the instructions provided with the card for guidance on using it. If a PCMCIA card does not operate correctly, contact Trimble's Technical Support Center (TAC) for assistance.

### 3.1.3 Removing a PCMCIA Card

To remove a card:

1. Press the ejector button next to the card until the card pops out (there is some resistance first). See Figure 3-6.



**Figure 3-6. Pressing the Ejector Button**

2. Pull the card from the socket and put it back in its protective case.
3. Close the inner waterproof cover and door.

## 3.2 Vehicle Adaptor

The Vehicle Adaptor allows you to operate or charge the TFC1 from your vehicle's DC power supply. The Vehicle Adaptor is available as a TFC1 accessory. Contact your local Trimble sales office for details.

### **3.3 Using Parallel Printers**

To use a parallel printer, connect it to the parallel printer connector with a standard Centronics-compatible printer cable. The printer is addressed as LPT1. The port is enhanced for bidirectional use. Remember to configure your application for your printer.

### **3.4 Using Serial Devices**

To use a serial device, connect it to either serial port with a suitable cable. The TFC1 connectors are standard Male DB-9 types.

The device is addressed as COM1 or COM2, depending on which port you use. Use your communications package to configure the port to suit the remote computer or connected peripheral before beginning communications.



# 4 Maintenance and Troubleshooting

---

The TFC1 is a very sophisticated and robust computer, designed to resist the sort of abuse that would stop many less rugged computers in their tracks. However, you can encounter occasional problems with operating the TFC1 or warning signs that indicate a possible problem. This chapter is intended to help you recognize the warning signs and resolve the problems.

## 4.1 Maintenance

DO:

- Read and comply with the operating instructions in this manual.
- Use only approved batteries and AC adaptors in the TFC1.
- Keep the battery and PCMCIA covers closed.
- Carry the TFC1 by the handle.

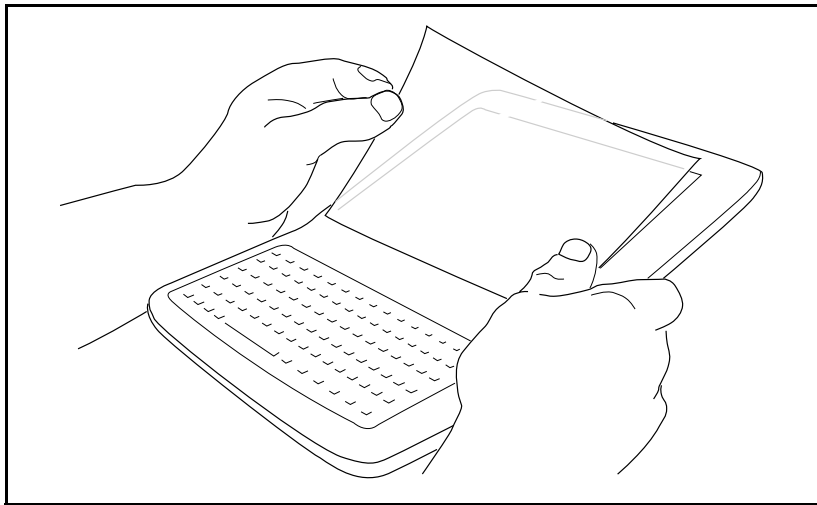
**DO NOT:**

- Expose the TFC1 to temperatures above 71 ° C (160 ° F), or below -23 ° C (-9 ° F).
- Expose the TFC1 to strong magnetic fields. For example, do not leave the unit next to an operating television set, electric motor, or generator.
- Expose the TFC1 to X-rays. For example, do not take the unit through the metal detector gate at airport security.
- Leave the TFC1 in bright sunlight for long periods.
- Expose the TFC1 to corrosive materials or clean with organic solvents or harsh cleaners containing bleaches or abrasives. They can damage the case or screen.
- Handle the TFC1 carelessly. Even though designed specifically for rough usage, the unit is still a precision instrument.
- Force connectors or PCMCIA cards.
- Leave the TFC1 under water.

### 4.1.1 Replacing the Screen Overlay

If the screen overlay gets dirty, clean it with a soft cloth. If it gets scratched, you can replace it with the spare screen overlay provided:

1. Lift once corner of the old overlay. Do not damage the screen. See Figure 4-1.



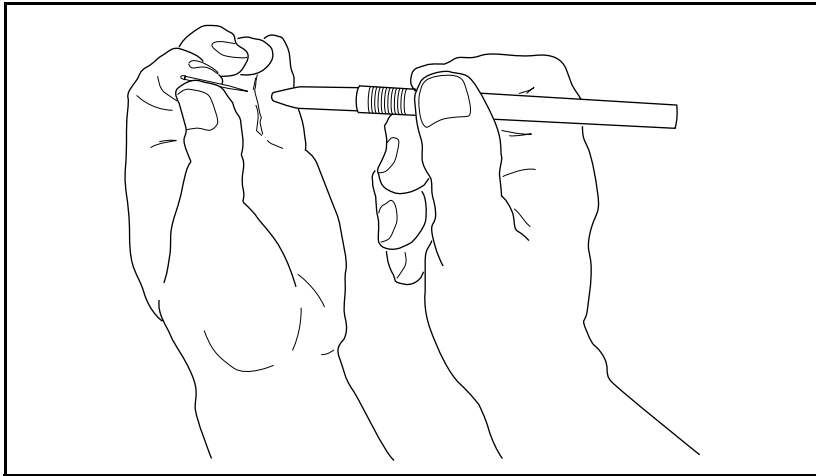
**Figure 4-1. Lifting the Screen Overlay**

2. Pull the old overlay off the screen and throw it away.
3. Peel the protective backing from the adhesive side of the new overlay.
4. Place the overlay carefully on the screen, adhesive side down. Do not trap air or dust under the overlay.
5. If the overlay is not positioned correctly, lift and reposition it.
6. Remove the protective surface from the top of the overlay.

### 4.1.2 Replacing the Pen Tips

If the pen tip is worn, you can replace it with one of the spare tips supplied with each pen:

1. Remove the old tip by grasping it and pulling sharply. See Figure 4-2.



**Figure 4-2. Removing the Pen Tip**

2. Insert a spare tip by pushing it up into the end of the pen.

## 4.2 Cleaning

If the case is dirty, clean it as follows:

1. Make sure that all compartment covers are closed tight and that the case seal is intact.
2. Gently rinse the TFC1 under clear running water (hand hot, no more than 40° C [104° F]). Do not immerse the unit unnecessarily, or use a high pressure jet.
3. Use a soft bristle brush and mild detergent to remove stubborn deposits from the case.
4. After cleaning, blow any water out of the connectors, then leave the unit to air dry in a warm room. Do NOT use forced air drying, such as with a fan heater or hair dryer.
5. When the TFC1 is dry, remove streaks or smears on the case or screen by polishing with a soft, dry, cloth.



**Caution** – Do not use organic solvents or harsh detergents, as they can damage the case or screen.

---

## 4.3 Repairs

Minor repairs can be carried out by suitably equipped and qualified staff. If your TFC1 requires major repairs or upgrades, contact Trimble's Technical Support Center (TAC).

## 4.4 Warning Messages

The TFC1 or your application may display warning messages, accompanied by *beep* sounds (if sound is enabled). Such messages display when the TFC1 is running DOS. They do not display under Windows. Examples of warning messages are shown in Table 4-1.

**Table 4-1. Warning Messages**

Warning Message	Description and Fix
* * * WARNING - BATTERIES LOW * * * (or the screen flashes repeatedly)	The battery power is low. Connect the AC Adaptor or fit another charged battery pack. If you can not do this yet, turn the TFC1 off.
* * * WARNING HUMIDITY * * *	Moisture has entered the case, due to case damage or failure of the seals. IMMEDIATELY DO THE FOLLOWING: <ol style="list-style-type: none"> <li>1. Check the current humidity level within the case, by using the <i>Unit Information</i> option of the <i>UTIL</i> utility.</li> <li>2. Disconnect any peripherals and PCMCIA cards. Leave the battery pack inserted to preserve memory contents.</li> <li>3. If there is any water visible in the compartments or covers, dry it quickly and as much as possible, but do not use forced air.</li> <li>4. Close the covers and return the TFC1 IMMEDIATELY to Trimble's Technical Support Center (TAC) or approved service agent, in the original packaging.</li> </ol>



**Caution** – If you receive the humidity warning, you **MUST** take action promptly to minimize the possibility of corrosion.

If you see any other warning or error messages, write them down. If you are not sure what a message means or what to do about it, contact Trimble's Technical Support Center (TAC). You can also check any manuals supplied with your software or peripherals for error messages.

## 4.5 General Problems

If you do not see any error messages, but believe that something is wrong with the TFC1 check Table 4-2 to see if the problem is described.

**Table 4-2. General Problems**

Symptom	Solution
You can not turn the TFC1 on.	The TFC1 has lost all main power. Check that a battery pack is fitted, then connect the AC Adaptor, or fit another charged battery pack as described in Chapter 2. If you still can not turn the TFC1 on, contact Trimble's Technical Support Center (TAC).
You can turn the TFC1 on, but it turns itself off.	The battery pack is low on power. Connect the AC Adaptor or fit another charged battery pack as described in Chapter 2.
Some of the keys behave oddly.	You may have selected <i>num lock</i> mode by mistake. Hold down the <b>(FN)</b> key and press <b>(Caps Lock)</b> to disable it. If this does not help, contact Trimble's Technical Support Center (TAC).
You can turn the TFC1 on but nothing works.	Your application or the TFC1 has stopped working. Contact Trimble's Technical Support Center (TAC).



# A Installing Application Programs

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This appendix describes the procedures to be followed when installing application programs onto the TFC1.

## A.1 Memory and Disk Configuration

The TFC1 is supplied with 12 MB of RAM and an internal 20 MB Flash memory card. The architecture of the TFC1 allows at most 8 MB of real RAM to be addressed, so the remaining 4 MB is configured as RAM disk and appears as the D: drive. The 20 MB Flash memory card, which appears as the C: drive, is used for storage of Microsoft Windows, your Trimble software application programs and data. If your data requirements exceed the space available on the C: drive, you can purchase and install one Type 3 PCMCIA or up to two Type 2 PCMCIA memory or hard disk drive cards. The following sections describe how these cards should be installed and configured.



---

**Caution** – The contents of the RAM drive (D:) is maintained by a backup battery. If both the main battery and the backup battery are removed or become fully discharged then the contents of the RAM disk are lost.

---

Under normal circumstances, if you observe proper battery management procedures, the main battery maintains the backup battery.

If the contents of the D: drive is lost, the TFC1 rebuilds it when you next install or recharge the main battery and turn the unit on. This rebuilding procedure sets up a 4 MB RAM disk as the D: drive and enables Microsoft Windows to use this drive as a 4 MB swap file, which gives the best possible performance.



---

**Note** – Whenever the D: drive is rebuilt, Microsoft Windows warns that the Windows swap file is corrupt (this means that it does not exist, as the D: drive was recently formatted). Windows asks you to confirm whether or not you wish the existing swap file to be deleted and re-created. You should answer Yes, or wait for a few seconds, as the default answer to this question is Yes. When you subsequently run Windows this warning does not appear, as the D: drive's contents are retained unless the TFC1's main and backup batteries are allowed to discharge fully.

---

## A.2 Using INTERLINK

To install an application program, you must use the DOS INTERLINK utility. This utility allows the TFC1 to access the hard drive(s) and diskette drive(s) of an office PC through a serial or parallel cable.

To install an application program onto the TFC1:

1. Insert the first installation disk for the application program into the diskette drive of the office PC.
2. Connect the office PC's serial or parallel port to the TFC1's serial or parallel port. If installing the ASPEN Field Software, use the supplied serial cable, P/N 18532.

3. On the office PC, run the INTERLINK server program. If using a parallel port connection, type:

**intersvr /lpt1**

If using a serial port connection, type:

**intersvr**

The office PC now acts as an INTERLINK server, and makes its disk drive(s) available to the TFC1.

4. Reboot the TFC1 (hold down the ,  and  keys simultaneously).

When the TFC1 reboots it runs the INTERLINK client program which attempts to establish a communications link with the office PC. If it is successful, the office PC and the TFC1 both indicate the mapping of drives that has been defined. The office PC's diskette drive is mapped to a drive letter such as I: on the TFC1. If communication is not established then check the cabling before rebooting the TFC1 and trying again.

5. The TFC1 should run Microsoft Windows by default, whenever you reboot, but if the AUTOEXEC.BAT file has been modified then you may have to run Windows by typing the command:

**win**

6. From the Windows Program Manager, select *File/Run* and specify the program to run as I:\SETUP.EXE.

If the office PC's diskette drive has been mapped to a TFC1 drive other than I:, you have to specify a different drive letter. If the application's installation program is not called SETUP.EXE you have to specify a different program name.

Installation of software using INTERLINK is slower than installation directly onto a computer with its own diskette drive. However you should only have to install an application program onto the TFC1 once when you purchase this application (and whenever you purchase an upgrade to that application program).



---

**Note** – Installation of software using INTERLINK is considerably faster using the parallel ports of the office PC and TFC1 than using a serial (RS232) connection.

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**Tip** – If you use INTERLINK to transfer files to or from the TFC1, reboot the TFC1 before using it to run ASPEN. Otherwise, the COM1 port is not accessible to ASPEN, and the TFC1 operates much slower.

---

### A.3 Configuring a PCMCIA Card

You can install and use a PCMCIA memory or hard disk card in the TFC1 without the need to install special drivers, as these are pre-loaded and pre-configured. You may need to turn the TFC1 off and on again to access a newly inserted card. In some cases, you may need to reboot the TFC1 for a card to be recognized.

The two external PCMCIA slots are assigned drive letters D: and E:. If you have inserted a Type 3 PCMCIA card then this appears as drive E:. If you have inserted a Type 2 PCMCIA card then this appears as drive E: or drive F: (depending on the slot into which you inserted the card).

If you insert an unformatted memory or hard disk PCMCIA card, you need to format the card:

To format the E: drive, at the C:\ DOS prompt type:

**pcprep E:**

To format the F: drive, at the C:\ DOS prompt type:

**pcprep f:**



# B System Precautions

---

## B.1 Canadian Department of Communication Compliance Statement

### B.1.1 English

This digital apparatus does not exceed the class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

### B.1.2 Francais

Avis de conformité aux normes du Ministère des Communications du Canada.

Le présent appareil numérique n' émet pas de bruits radioélectriques dépassant les limites applicable aux appareils numériques de classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

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## B.2 European EMC Regulations

This equipment has been tested and found to comply with the requirements of DIR89/336/EEC.

## B.3 FCC Statement

### B.3.1 Radio Interference



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**Note** – This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna  
Increase the separation between the equipment and the receiver  
Connect the equipment into an outlet on a circuit different from that to which the receiver is connected  
Consult the dealer or an experienced radio-TV technician for help.

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**Caution** – Unapproved modifications, or operations beyond or in conflict with these instructions for use, may void authorization by the FCC to operate the equipment.

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**Caution** – Approved accessories only may be used with this equipment. In general, all cables must be shielded, correctly terminated and normally restricted to 2 meters length. Supplied AC adaptors employ special provisions to avoid radio interference and should not be altered.

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## B.4 Notices

Please be aware that this product is not intended for use in medical applications. Use of this product in such applications requires the written approval of the appropriate Trimble Navigation Limited officer. Certain applications involving this product may involve potential risk of personal injury, property damage, or loss of life. In order to minimize these risks, adequate design and operating safeguards should be provided by the customer to minimize inherent or procedural hazards. Inclusion of this product in such applications is understood to be fully at the risk of the customer.

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Trimble Navigation Limited products are not designed for, and should not be used in, intrinsically unsafe applications.



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