

Hardware Reference Guide For The **WORKABOUT PRO**

Windows® CE .NET 4.2

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*ISO 9001 Certified
Quality Management System*



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1.1 About This Manual

This manual provides information on transferring programs from a development system to the Psion Teklogix WORKABOUT PRO. For additional information, refer to the WORKABOUT PRO online help, or the documentation supplied with the application you are using. The manual references other user documents, where applicable.

Chapter 1: Introduction

provides an overview of this manual, WORKABOUT PRO applications, including the PC connectivity software, ActiveSync, and care of the WORKABOUT PRO.

Chapter 2: The Hardware

describes the WORKABOUT PRO's hardware.

Chapter 3: The Software

describes the software of the WORKABOUT PRO.

Chapter 4: Connecting

describes how to connect to the WORKABOUT PRO.

Chapter 5: Downloading Software

provides instructions on copying your developed programs to the WORKABOUT PRO.

Appendix A: Support Services And Worldwide Offices

presents information for technical support, contacts and the Psion Teklogix worldwide web address.

1.2 Text Conventions



Note: *Notes highlight additional helpful information.*



Important: *These statements provide particularly important instructions or additional information that is critical to the operation of the computer and other equipment.*



Warning: *These statements provide important information that may prevent injury, damage to the equipment, or loss of data.*

1.3 Applications Installed On The WORKABOUT PRO

The WORKABOUT PRO is capable of running a wide variety of applications but the ones available on your particular WORKABOUT PRO depend on the purpose for which the WORKABOUT PRO is provided. A number of standard applications exist and custom programs can be installed easily.

Standard programs include:

- **Inbox**, for sending and receiving e-mail.
- **Internet Explorer**, for browsing the World Wide Web.

1.3.1 About ActiveSync

The Microsoft PC connectivity software, ActiveSync, can be used to connect the WORKABOUT PRO to PCs running Windows® 95/98/2000/ME/XP or NT 4.0. By connecting the WORKABOUT PRO to a PC with a cable and running ActiveSync on the PC, you can:

- **View your WORKABOUT PRO files** from Windows Explorer by using the *Mobile Device* icon in the PC's My Computer window.
- **Drag and drop files** between the WORKABOUT PRO and the PC in the same way that you would between PC drives, and they will be automatically converted to the appropriate file format at the same time.
- **Synchronize e-mail and your address book** on the WORKABOUT PRO with the PC to keep them in step with each other.
- **Back up** your WORKABOUT PRO files to the PC, then restore them from the PC to the WORKABOUT PRO again, if needed.

For detailed information, please refer to the *WORKABOUT PRO User Manual*.

1.4 Caring For The WORKABOUT PRO

Screen

When used with the approved stylus, the WORKABOUT PRO screen is very resistant to wear and impact and should last for a considerable time. Use of any object, other than the approved stylus, may result in damage to the WORKABOUT PRO screen.

To maintain the life of the WORKABOUT PRO screen, keep the screen clean. To clean the screen: switch off the WORKABOUT PRO and use a soft, clean, dry cloth to gently wipe the screen. (If the unit is set to turn on automatically when the screen is tapped, you should turn this preference off before cleaning the screen.)



Warning: *Under no circumstances use chemical solvents to clean the screen.*

The Main Battery

The WORKABOUT PRO can operate with a standard 1800-mAh lithium-ion battery pack, a high-capacity 2700-mAh lithium-ion battery pack, or three AA alkaline batteries. The lithium ion battery pack must be charged before it is installed in the unit.

To avoid damage to the WORKABOUT PRO or the WORKABOUT PRO battery packs, use only Psion Teklogix approved chargers and docking stations.

Three AA batteries can also be used in the M and S versions of the WORKABOUT PRO. They fit directly in the battery compartment without the need for an adapter.

Backup Battery

The WORKABOUT PRO has a backup battery designed to retain data while the main battery pack is charging or changed over. The backup battery is a coin cell located on the main circuit board. It can be reached by opening the back panel of the device, and removing any expansion card that may be installed.



Important: *If both the main battery pack and the backup battery are allowed to fully discharge, you will lose all your information on the internal disk. However, some of your data can be protected from loss using the Flash folder. Please refer to page 56 for details..*

1.5 Additional Programs And Third Party Applications

Psion Teklogix has partnered with a number of companies to provide a suite of connectivity and database tools for the WORKABOUT PRO. Details are available on the Psion Teklogix Partner Program web site at:

<http://partners.psionteklogix.com/partners/>

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2.1 Features Of The WORKABOUT PRO

The WORKABOUT PRO is a Windows® CE.Net OS-based mobile computer with a touch-sensitive screen. The WORKABOUT PRO is available with a colour or a monochrome display (the C and M variants). An S variant with a short body and a 24-key keyboard is also available:



Figure 2.1 The WORKABOUT PRO. C Variant (left); S Variant (right)

2.2 Hardware

2.2.1 Processor

Intel PXA 255 X-Scale processor running at 400 MHz.

2.2.2 Memory

32 megabytes of flash, 64 or 128 megabytes of SDRAM.

2.2.3 Display

3.5" QVGA (240 x 320) colour or monochrome transfective display with electroluminescent backlight.

2.2.4 Controls

Resistive touchscreen; 52-key alpha-numeric keyboard with backlighting and hard-capped keys. The S variant has 24-key keyboard, plus two scan buttons on the body.

2.2.5 Audio

AC97 codec; 2.5 mm-diameter stereo headphone socket; speaker for alarms, buzzers and key clicks; internal microphone.

2.2.6 Radio

Integrated Bluetooth personal-area network (PAN) on C and S variants; optional 802.11b, GSM/GPRS, CDMA/1xRTT wireless wide-area network (WAN).

2.3 Operating Specifications

2.3.1 Operating Temperature

-10 to +50 C (+50 F to +120 F), non condensing excluding display.

2.3.2 Humidity

5 - 95% relative humidity, non-condensing.

2.3.3 Temperature Change

+/- 20 Celsius degrees (36 Fahrenheit degrees) over 10 minutes.

2.3.4 IP Rating

IP54.

Dust rating of 5 (dust shall not interfere with the operation of the device or impair safety); water rating of 4 (water splashed from any direction shall not have harmful effects).

2.3.5 Impact Resistance

Multiple 1.2-m drop onto concrete at room temperature.

2.3.6 Static Electricity

The portions of the unit that are susceptible to static are protected to withstand a static discharge of up to 4kilovolts.

2.4 Battery And Charger Options

2.4.1 Main Battery

- 1800 mAh @ 4.2V Lithium Ion polymer battery pack.
This battery has a protection circuit and guage. Battery life is 8 hours with no radio or scanner. Battery life with WLAN and scanner, 4 hours, tested with 5 scans/RF per minute. Battery low enough to have data loss, 30 hours monochrome, 24 hours colour.
- 2700 mAh @ 4.2V Lithium main battery pack available.
- Three alkaline AA-size batteries may be used instead of the rechargeable battery (M and C variants only).

2.4.2 Backup Cell

The WORKABOUT PRO uses a user-replaceable lithium coin cell as a backup battery to maintain system state (including RAM contents and real time clock) when the main battery is discharged or disconnected.

To get to this cell, remove the device's backplate, and remove any expansion module that may be connected. The cell is in a holder on the motherboard:

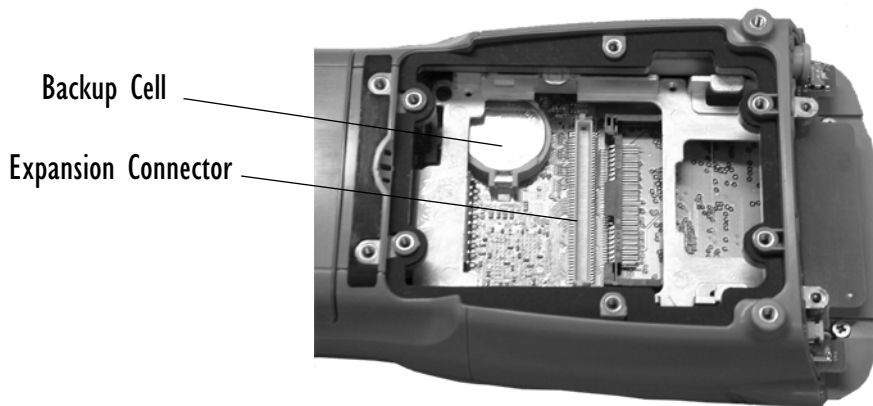


Figure 2.2 Location Of Backup Cell

2.4.3 Charger In Docking Station

The docking station requires 4 hours to charge the 1800-mAh battery in a connected WORKABOUT PRO to 90% of full charge. 1 additional hour is needed to charge the battery to 100%.

If alkaline batteries are being used in the WORKABOUT PRO, the charger is automatically disabled when that WORKABOUT PRO is inserted into the docking station.

2.4.4 Wall Power Adapter

This power adapter can power the WORKABOUT PRO and and charge its battery through a cable connected to the tether port.

DC power output into cable: 2000 mA at 5V.

2.4.5 Vehicle Power Supply

DC input 12 - 16V. Draws 1000 mA from vehicle.

2.5 Memory Cards

The WORKABOUT PRO accepts non-volatile memory cards, which fit into a dedicated slot in the unit and can be used to store application software and/or data. The WORKABOUT PRO can accept the following types of memory cards:

- Compact Flash (CF) cards.
- MultiMedia Cards (MMCs).
- Secure Digital (SD) cards.

An optional adapter permits the installation of a PCMCIA card.

Each memory card appears as a separate folder in the My Computer file browser. See section 5.9 on page 55.

2.5.1 Inserting And Removing An MMC Or SD Card

The MMC/SD slot is located inside the battery bay:



Figure 2.3 Location Of MMC/SD Card Slot

MMC and SD cards are keyed so that they may not be inserted wrongly. Insert the card so that the contacts face towards the WORKABOUT PRO and enter the slot first. When a card is inserted, a folder for it appears in the My Computer file browser.



Important: *The WORKABOUT PRO Hand-Held Computer does not support hot swapping. All power sources must be turned off before inserting any card or module in the unit.*

To insert an MMC or SD card:

Inserting And Removing An MMC Or SD Card

1. Disconnect AC power.
2. Remove the battery cover.
3. Remove the battery.
4. Swing the 'gate' up so that the MMC/SD card slot is revealed.



Note: *The Workabout S variant has no gate.*

5. Push the MMC or SD into the slot until it clicks. It will then bounce outward slightly.



Note: *Always insert the MMC or SD card with the contacts first and the notch to the right.*

6. Swing the gate down.
7. Replace the battery.
8. Replace the battery cover.

To remove a card:

1. Remove the battery cover.
2. Remove the battery.
3. Swing the 'gate' up so that the MMC/SD card slot is revealed.
4. Push the edge of the card inwards. It will click, and then bounce out. The end may then be grasped. Pull the card outward to remove it.
5. Swing the gate down.
6. Replace the battery.
7. Replace the battery cover.

Store your MMC or SD card safely, particularly if it contains valuable data.

2.5.2 Inserting And Removing A Compact Flash Card

The CF slot is located inside the top of the WORKABOUT PRO.

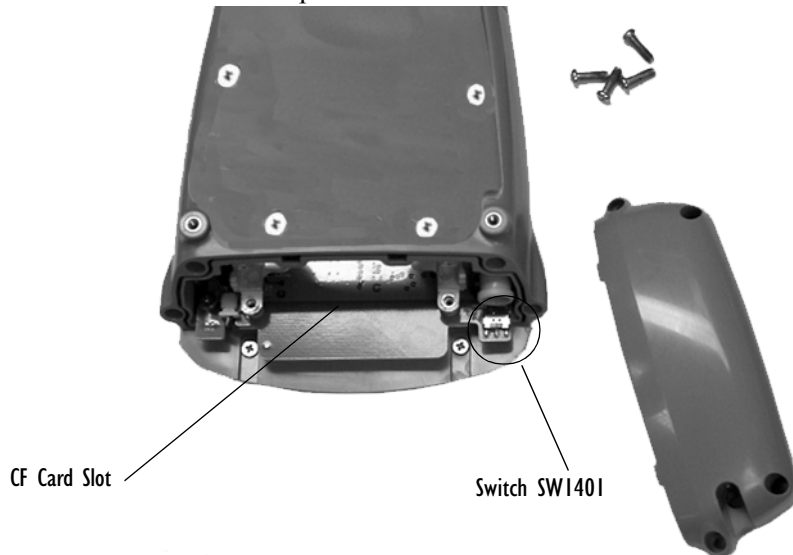


Figure 2.4 Location Of CF Slot

CF cards are keyed so that they may not be inserted wrongly. When a card is inserted, a folder for it appears in the My Computer file browser.



Important: *The WORKABOUT PRO Hand-Held Computer does not support hot swapping for PCMCIA or Compact Flash cards. All power sources must be turned off before inserting a PCMCIA or CF card or module in the unit.*

To insert a Compact Flash card:

1. Disconnect AC power, if present.
2. Loosen the four Philips screws that fasten the endcap of the WORKABOUT PRO.
3. Remove the endcap. The interior of the device is revealed, with the CF card slot at the centre.

Inserting And Removing A Compact Flash Card

4. Slide switch SW1401 to the left to shut off internal backup battery power.
5. With the back of the WORKABOUT PRO facing you, slide the card (label up) into the CF slot at the top of the unit until it clicks into place.
6. Slide switch SW1401 to the right to reconnect internal backup battery power.
7. Replace the endcap.
8. Tighten the four Philips screws.

To remove a CF card:

1. Disconnect AC power, if present.
2. Loosen the four Philips screws that fasten the endcap of the WORKABOUT PRO.
3. Remove the endcap. The interior of the device is revealed, with the CF card slot at the centre.
4. Slide switch SW1401 to the left to shut off internal backup battery power.
5. Press the eject button next to the slot inwards. The card pops outward, and may be pulled outwards.
6. Slide switch SW1401 to the right to reconnect internal backup battery power.
7. Replace the endcap.
8. Tighten the four Philips screws.

These steps are also described in Psion Teklogix document 8100028, “WORKABOUT PRO Compact Flash Expansion Module Instructions”.

Store your Compact Flash card safely, particularly if it contains valuable data.

2.5.3 Inserting And Removing A PCMCIA Card

The PCMCIA slot, if present, is located inside the top of the WORKABOUT PRO.

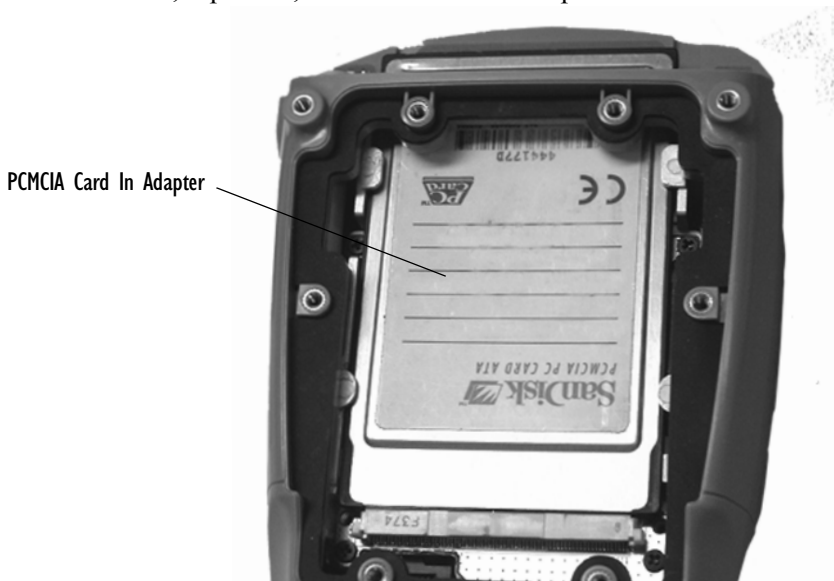


Figure 2.5 Location Of PCMCIA Card

The PCMCIA slot requires that a PCMCIA expansion module be installed inside the WORKABOUT PRO. This expansion module connects to the WORKABOUT PRO's 100-pin expansion bus.

For details on installing the PCMCIA expansion module, see Psion Teklogix document 8100037, "WORKABOUT PRO PCMCIA Expansion Module Instructions".

PCMCIA cards are keyed so that they may not be inserted wrongly. When a card is inserted, a folder for it appears in the My Computer file browser.



Important: *The WORKABOUT PRO Hand-Held Computer does not support hot swapping for PCMCIA or Compact Flash cards. All power sources must be turned off before inserting a PCMCIA or CF card or module in the unit.*

To insert a PCMCIA card in a WORKABOUT PRO that has the PCMCIA expansion module:

1. Disconnect AC power, if present.

2. Loosen the four Philips screws that fasten the endcap of the WORKABOUT PRO.
3. Remove the endcap. The interior of the device is revealed, with the PCMCIA card slot at the centre, above the CF slot.
4. Slide switch SW1401 to the left to shut off internal backup battery power.
5. With the back of the WORKABOUT PRO facing you, slide the PCMCIA card (label up) into the slot at the top of the unit until it clicks into place.
6. Slide switch SW1401 to the right to reconnect internal backup battery power.
7. Replace the endcap.
8. Tighten the four Philips screws.

2.6 Ports

The WORKABOUT PRO has the following external ports:

- Tether port.
- Audio port.
- LIF port.

There are also a number of internal ports.

2.6.1 Tether Port

Located at the bottom of the terminal, the tether port complies with the IP54 code and is used for USB clients. Life cycle > 5000 times. Contains: USB host (low, or self power). RS-232 (data TX,RX at TTL levels for internal debug only); DC output (5V, 100mA); DC input (5V, 2000mA).

2.6.2 Audio Port

The audio port allows connection of a microphone.

2.6.3 LIF Port

Located at the bottom of the terminal, the LIF port can be used to charge the terminal or connect devices via the cradle. Life cycle is > 40,000 times. Contains USB & serial connections, plus DC input (5V, 2000mA)

This port connects the WORKABOUT PRO to the docking station, and allows battery charging and connection to USB and Ethernet.

2.6.4 Internal Expansion Connectors

CF Card slot

SD Memory Card/MMC Card Slot. Can be accessed from the battery housing.

100-pin connector

Supports PCMCIA (type II), WAN and other expansion modules, and supplementary battery charging.

Scanner connector

Supports scanner (serial) and imager (USB) modules.

2.6.5 Serial And USB Ports

Although its primary serial communication is through USB, the WORKABOUT PRO has a number of internal serial ports. When present on connectors, these ports use signals at TTL level:

| Serial Port | Location |
|-------------|---|
| COM1 | Internal 100-pin expansion slot. |
| COM2 | Internal Bluetooth radio. On units without Bluetooth, and on all units when the bootloader is running, this port provides console output. |
| COM3 | Internal scanner connector. |
| COM8 | Internal serial connection to the USB host, for use with external USB-to-serial converters. |

Table 2.1 Locations Of Serial Ports

USB ports are provided in the following locations:

| USB Port Location | Port Type |
|--------------------------------------|---------------------------------|
| Tether connector | Host. No ActiveSync capability. |
| LIF connector | Host and client (two ports). |
| Internal scanner connector | Host. |
| Internal 100-pin expansion connector | Host. |

Table 2.2 Locations Of USB Ports

To use the COM8 serial port, connect an external USB-to-RS232-serial adapter to any of the USB host ports on the WORKABOUT PRO. The USB driver identifies the USB-serial converter by the ID codes built into the device, and connects the converter to COM8. COM8 doesn't exist if there is no USB-serial converter connected.

2.7 The Scanner/RFID Reader

The WORKABOUT PRO can be fitted with an optional scanner or radio-frequency identification (RFID)-tag reader.

Such a module is installed by replacing the backplate of the unit with a new backplate that has space for the module.

Available scanners include the Symbol SH1223HP laser scanner and the HHP IT4000 imaging scanner. These scanners connect via a flex cable to the scanner connector on the motherboard.

2.8 Power Management

The WORKABOUT PRO has a rechargeable main battery. The M and C variants of the WORKABOUT PRO can also use three AA cells in place of the rechargeable main battery. When the main battery is removed, memory is maintained by a coin cell located inside the unit.

The WORKABOUT PRO can be powered from AC when used with the AC adaptor and tether cable (see page 45). When the WORKABOUT PRO is powered from the AC adaptor, it will also charge the battery pack.



Note: *How long your batteries last will depend upon how you use your WORKABOUT PRO. The WORKABOUT PRO will use considerably*

more battery power when you are recording sounds, have the brightness turned up, are using files stored on a multimedia card, or are using wireless communication.

2.8.1 Power Properties

Power Properties for the battery can be accessed either through the *Power* icon in the Control Panel, or by double-clicking the taskbar power icon (this icon changes depending on power status, as described in Table 2.3):






| Icon | Description |
|--|--|
|  Low Back-up Battery | Appears when back-up battery voltage is less than 2.500 V. |
|  Docked Indicator (WORKABOUT PRO connected to external power) | Appears when the WORKABOUT PRO is connected to the AC adaptor and the main battery is fully charged. Disappears when the AC adaptor is disconnected. |
|  Low Main Battery | Appears when main battery voltage drops below ~ 7.450 V. |
|  Critical Main Battery | Appears when main battery voltage drops below ~ 7.250 V. |
|  Charging Main Battery | Appears when the WORKABOUT PRO is connected to a powered docking station and the battery is charging. |
| No Charge Icon | All charge-related icons disappear if battery levels are not low or critical, and the WORKABOUT PRO is not connected to an external power source. |

Table 2.3 Battery Charge Icons

2.8.2 Battery Status

To check the battery power status, click on the *Battery* tab. As shown on page 21, this screen describes the main and backup batteries, and their state. A warning message to change or recharge the battery will appear when the main or backup battery levels become critically low.

2.8.3 Power Saving Schemes

The *Schemes* tab accesses the **Suspend** power state. This state can be enabled after an elapsed time range, depending on whether the WORKABOUT PRO is on battery power or external power.

When setting the Suspend state, keep the following in mind. Because the WORKABOUT PRO ‘wakes up’ from the User Idle and System Idle states almost instantaneously following any user input (button press, screen tap), the timeouts you set will not slow user activity. The Suspend timeout should be selected carefully since the WORKABOUT PRO will go to sleep (appear off) when this time has elapsed, saving battery power.

Psion Teklogix recommends starting with a total of **10 minutes** for the Suspend timeout. Setting the timeout to **Never** does not affect other options, but will adversely affect the battery run time. If the timeout is set to **Never**, the WORKABOUT PRO will remain on. To further reduce power consumption, carefully consider the duration of time that the display backlight is ON or turned up.

The following are the default values for the power schemes options:

| Option | AC Power | Battery Power |
|-------------------------|----------|----------------|
| Switch State to Suspend | Never | After 5 minute |

Table 2.4 Power Scheme Options

Power Scheme

This dropdown menu allows you to identify whether the unit is using **AC Power** or **Battery Power**.

Switch to Suspend

After , the WORKABOUT PRO begins to count down the time specified in the *Switch to Suspend* option. When the time in the Suspend option elapses, the unit enters *Suspend* state.

In *Suspend* state, the WORKABOUT PRO CPU suspends all activity, turns off the display, and goes into a low power state. The state of the device (RAM contents) is preserved. Select **Suspend** from the *Start Menu* or hold down the power button for 4

seconds to put the WORKABOUT PRO into *Suspend* state. Press the power button to wake up the unit. You can also enable a screen tap to wake the unit from Suspend by checking that option box below the *Switch to Suspend* menu.



Note: *When the WORKABOUT PRO is in suspend state, any network connection is broken. To resume, you must re-establish the network connection.*

2.9 Docking Station

The WORKABOUT PRO docking station charges the WORKABOUT PRO and a spare battery, and also contains Ethernet and USB connections.

See Psion Teklogix document 8100027, “WORKABOUT PRO Desktop Docking Station Guide”, for more information on using the docking station.

2.10 Turning On And Off

2.10.1 Switching The WORKABOUT PRO On

To switch the WORKABOUT PRO on:

1. Press and hold down the <ENTER/ON> key for at least one second.
2. When the LED flashes green, release <ENTER/ON>.

A splash screen displaying the Psion Teklogix logo and the Microsoft® Windows® CE. net logo appears followed by the startup desktop.

Note: If the unit is in suspend state, pressing <ENTER/ON> ‘wakes’ the unit from this state. The screen in which you were working before the computer entered suspend state is displayed.

2.10.2 Switching The WORKABOUT PRO Off



Important: *Turning off the WORKABOUT PRO does not result in a complete reboot; rather, the unit enters a power-saving, “suspend” state. When the WORKABOUT PRO is turned on from suspend state, operation resumes within a few seconds.*

To switch off the WORKABOUT PRO:

- Press the <BLUE> key, and then press <ENTER/ON>.



Important: *Normally, the WORKABOUT PRO will not turn off if the <BLUE> key is locked 'on'. However, if the 'Blue' option is enabled in the 'One Shots' dialogue box (accessible through the 'Keyboard' Control Panel icon) the WORKABOUT PRO can be turned off when the <BLUE> key is locked 'on'.*

2.11 How To Reset The WORKABOUT PRO

If you find that you can't exit a program normally, right-click on the taskbar and select *Task Manager* from the context menu. Select the task that appears to be unresponsive and click on the **End Task** button.

If this does not work, or your WORKABOUT PRO appears to have "locked up", you can perform a "warm reset". This should restart your WORKABOUT PRO while preserving most of your information. It is worth trying a reset if the keys on the WORKABOUT PRO do not appear to respond, or if the WORKABOUT PRO appears to switch on and you are sure that the batteries are good, but the screen is otherwise blank.

If the WORKABOUT PRO still does not respond, a cold reset may be necessary. All working data in RAM will be lost during a cold reset.

2.11.1 Performing A Warm Reset

During the warm reset or warm boot, all applications are closed, but working RAM is not cleared and the file system is preserved. A warm reset resumes with working RAM and a file system whose contents have been preserved from a previous session.

A warm boot can be triggered by pressing <ORANGE> + <TAB>, or by pressing <Blue> + <. > to get the *Start* menu, then selecting **Shut Down, Warm Reset**.

The screen goes dark, and then the desktop appears.

2.11.2 Performing A Cold Reset

During the cold reset or cold boot, all applications are closed, and RAM is cleared. The operating system is reloaded into RAM, and a new file structure is built. Only the contents of the Flash folder are preserved.

A cold reset can be triggered by holding the <BLUE> and <ENTER/ON> keys down for six seconds, or by pressing <BLUE> <.> to get the *Start* menu, then selecting **Shut Down, Cold Reset**.

During a cold reset, the WORKABOUT PRO's screen goes dark, then the Windows CE .NET screen appears with a status bar at the top. This bar shows the progress of the cold boot. When the process is complete the desktop appears.

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3.1 Overview Of The WORKABOUT PRO's Software

This chapter describes features of the boot process and operating-system software that are specific to the WORKABOUT PRO.

The WORKABOUT PRO uses a custom build of Microsoft's Windows CE.NET 4.2, with OS-native device drivers for its custom hardware. It can accept executables written for the Intel X-Scale PXA255 processor, or (with the appropriate runtime engine) .NET CIL executables or Java bytecode executables.

The Psion Teklogix-developed 'BooSt' bootloader and mini-OS is used to perform initial hardware configuration and load system software.

The system software design supports the services required by applications. The operating system environment and standard development tools provide the standard services; an application may interface with Psion Teklogix' custom hardware and software interfaces via the Psion Teklogix Mobile Devices SDK.

3.2 Power Transitions

3.2.1 Overview

The WORKABOUT PRO is normally in one of two power states: Run and Suspend.

During the Run state, the system is fully powered and things run normally. During the Suspend state, the backlight and display are turned off, and the main processor is halted, but the contents of RAM are preserved, and the device's auxiliary keyboard processor remains active, waiting for interruption or input.

3.2.2 Booting

The boot process is the series of steps between pressing the 'On' key on the WORKABOUT PRO to when the device is in the Run state with the main operating system is ready for user input. There are three possible times that this may happen:

- the first time the terminal is turned on at the factory ('initial software load')
- the terminal is turned on after it is powered down ('cold boot')
- the terminal is turned on after it was suspended ('resume from suspend').

The most common type of boot is the 'resume' from the Suspend power state.

Cold boot only occurs if the terminal is intentionally rebooted or if both the main battery and the backup super-capacitor become fully discharged.

The first-time software load, as the name suggests, only happens once, at the factory, and is not discussed further here.



Note: *The following descriptions assume no errors during the boot process.*

3.2.2.1 Cold Boot

During a cold boot, the WORKABOUT PRO's memory (its SDRAM and that part of its Disk-on-Chip flash memory that will be accessible to the main OS) is completely cleared. The main operating system is reloaded into RAM and restarted, and it builds up a new filesystem in RAM.

The cold boot process occurs after the following events:

- The WORKABOUT PRO receives power for the first time.
- A cold-boot command is received from the user.
- All power sources are depleted, then power is reapplied.

During a cold boot, the keyboard processor is the first device powered up. It performs the following steps:

1. Turns on an LED to confirm the button press by the user.
2. Initializes the WORKABOUT PRO's SDRAM and that part of the Disk-on-Chip flash memory that will be accessible to the main OS.
3. Initializes the main processor.

The main processor:

1. Boots the bootloader image located in the bootloader partition of the Disk-on-Chip flash memory.
2. Communicates back to the keyboard controller that everything is okay.
3. Jumps to the bootloader.

The bootloader:

4. Initializes itself.

5. Writes a message on the terminal screen and the console port.
6. Loads the OS image from the OS partition of the Disk-on-Chip flash memory into RAM.
7. Runs the OS image.

While the Windows CE image is being loaded into RAM, a splash screen is displayed on the terminal's display.

A cold boot can be triggered by holding the <BLUE> and <ENTER/ON> keys down for six seconds, or by pressing <BLUE> <. > to get the *Start* menu, then selecting **Shut Down, Cold Reset**.

During a cold boot, the WORKABOUT PRO's screen goes dark, then the Windows CE .NET screen appears with a status bar at the top. This bar shows the progress of the cold boot. When the process is complete the desktop appears.



Important: *Any data not synchronized with the ActiveSync host computer may be lost.*

3.2.2.2 Warm Boot

The warm boot is a transition from Run to Suspend to Run. When transitioning from Run to Suspend, all applications are closed, but working RAM is not cleared and the file system is preserved. A warm boot resumes with working RAM and a file system whose contents have been preserved from a previous session.

A warm boot can be triggered by pressing <ORANGE> + <TAB>, or by pressing <Blue> + <. > to get the *Start* menu, then selecting **Shut Down, Warm Reset**.

The screen goes dark, and then the desktop appears.

3.2.3 Suspend

Suspend is the usual state of the terminal when it is 'turned off'. It can be triggered by the user in two ways:

- by pressing <BLUE> + 0 to get the start menu, then selecting **Shut Down, Suspend**.
- by pressing the OFF key-combination, <BLUE> + <ENTER/ON>.

A transition to the Suspend state (stopping the microprocessor) occurs when:

Resume

- There is a timeout of the user-input inactivity timer, or
- External power is removed, and the battery is low.

If the unit is running on battery power, and the remaining battery power drops to critical levels as reported by the battery pack, the system will transition gracefully to the Suspend state, and no data will be lost.

If the unit is running on external power without a battery installed, and external power is removed, the system will make a ‘non-graceful’ transition to the Suspend state. The object store is preserved, the file system in flash is intact, but registry changes that have not been stored in the registry files in flash are lost, running applications are lost, unsaved data is lost. Restart from this state is a cold boot.

3.2.4 Resume

During a Resume transition from the Suspend state, the boot process starts in the same way as a cold boot. When going into Suspend, the main operating system writes a value into the Power Management Scratch Pad register. This value can be “run the main operating system on resume” or “run the boot loader on resume”.

When a value is read from this register on resume that corresponds to the value for “run the main operating system on resume”, the bootloader jumps to the OS image in RAM, and the boot continues. If the value read corresponds to the value “run the boot loader on resume”, the bootloader continues to run, giving the user a command prompt.

The user can go to the bootloader’s command prompt manually by:

- pressing and holding the <LEFT SCAN>, <BLUE>, and <ENTER/ON> keys simultaneously for 6 seconds
- pressing <BLUE> + <. > to get the start menu, then selecting **Shut Down, Bootloader**.

3.2.4.1 Resume

To start using the WORKABOUT PRO while the unit is in suspend mode, press any key. The screen will light up and display the applications that were in progress prior to suspend mode.

3.2.5 User Interface

During the boot process, indicators let the user know what is happening:

- When the user presses the ON button, the LED turns on momentarily to confirm the button press.
- When the bootloader is loaded and running on the main processor, a message is displayed on the terminal's screen and on the console port.
- When the main operating system is loaded and run, a splash screen is displayed on the terminal's screen.
- At the end of the boot process, the WORKABOUT PRO's shell is displayed on the screen.

Status messages are written to the WORKABOUT PRO's on-screen console during the boot process.

The main processor (the PXA250) can display the following messages on the console port:

- Starting BooSt
- Recovering from sleep
- PXA250 jumping to Windows CE
- Going to BooSt prompt
- Valid image in flash date code = <date code>
- Invalid image in flash
- Valid image on CF card date code = <date code>
- Invalid image on CF card

The user has also been given the ability to adjust when certain transition times are affected. This is done using the Power Properties applet in the Windows Control Panel. One of two power schemes, 'AC Power' or 'Battery Power' can be chosen. The following options can be changed by the user:

- **Switch To Suspend**
This is the amount of time the unit is idle before the unit executes the Run-to-Suspend transition. This setting is on the *Schemes* tab of the *Power Properties* dialog. Possible settings are: Never, 1, 2, 3, 4, 5, 10, and 30 minutes.

- **Suspend Threshold**

This is the percentage of battery charge left when the unit executes the Run-to-Suspend transition. This setting is on the *Suspend Threshold* tab of the *Power Properties* dialog. Possible settings are: 0 to 50 percent, in 5% steps.

3.3 The Shell

3.3.1 Overview

The shell is responsible for providing an interface to the user for access to the terminal's applications, files, and configuration. It also monitors and provides notifications to the user about the system state.

3.3.2 System Structure

The shell is the first user application run by the system. It registers several windows with the operating system and has several responsibilities defined by the OS. These responsibilities include monitoring system memory and power levels. Along with the tasks that are required by the OS, the shell is responsible for providing the user with usability features. These features include a notification area, a window that displays currently running tasks and a method to run applications.

The shell is a multithreaded application. Information is passed between the threads using Windows CE graphical window and event system (GWES) and shell-defined message types. Certain parts of the shell must register with the OS to receive special messages.

3.3.2.1 The System Monitor

The system monitor task contains one window to receive messages and can potentially be multithreaded. Each thread can be used to monitor a system resource. The initial design has only one thread that monitors system memory and power. This thread is woken up periodically and checks the system resources.

Memory Monitoring

When the free memory drops below a configurable limit, the shell sends a ‘hibernate’ message to the last used application window. Application windows are supposed to reduce their memory consumption when they receive this message. If the free memory situation has not improved, the system monitor will send hibernate messages to the other windows.

Power Monitoring

The power monitor provides two different means of feedback to the user.

The first method of feedback is a battery-gauge icon in the system tray. This icon, which resembles a battery, shows the level of charge left in the main battery.

When the battery is fully charged the icon is completely green, when the battery is completely discharged, the battery is red. The other levels in between vary in the amount of green and red in the battery icon (for example, at 60% charge level the battery is 3/5 green and 2/5 red). The shades of red and green will be chosen so that they display as light and dark on a monochrome display.

The battery-gauge icon is replaced with a icon displaying a power connector when the terminal is connected to external power and is not charging. It is replaced with an icon displaying a battery with a lighting bolt when the terminal is connected to external power and the battery is being charged.

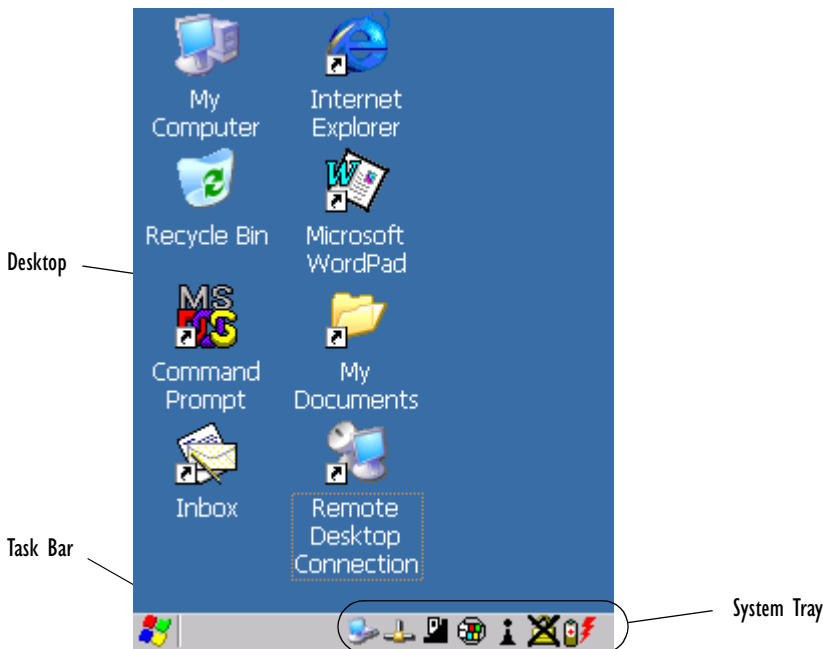
The second method of feedback is the display of popup messages when the main battery level drops below a certain limit or the battery life has been exceeded.

Security Monitoring

The system monitor thread is also responsible for the current security level on the terminal.

The terminal has three security levels: User, Teklogix, and Supervisor. The system monitor task monitors the security level and will display an icon in the system tray if the terminal is in the Teklogix or Supervisor level. Any application that needs to set or get the current security level should do it through a shell API that will be handled by the system monitor task.

3.3.2.2 The Desktop



The desktop provides the user with a starting point to access the terminal's file system (through a link to Windows Explorer), and configuration (through a link to the **Control Panel**).

The user may also put any applications or files in the `\Windows\desktop` folder and they will be displayed on the desktop. This gives the user quick and easy access to files and applications they might use frequently.



Important: *This folder resides in RAM, and its contents will be lost during a cold boot.*

The desktop window is also implicitly registered with the OS by naming itself 'DesktopExplorerWindow'. The OS uses it to hide applications. Because Windows CE does not support true minimization, any minimized windows are just placed behind the desktop.

The Taskbar



The taskbar is a window drawn across the bottom of the terminal's screen. The taskbar has its own thread, and runs its own window, the system tray window, and the task manager dialog box.

The taskbar registers itself with the OS. The OS sends the taskbar two kinds of special messages:

- application creation and destruction events.
- certain key presses and key sequences.

Application creation and destruction events can be used for displaying buttons on the taskbar for running applications.

Key presses and key sequences can be used by the shell for any purpose.

The taskbar displays the Task Manager on receiving **<ALT> + <ESC>**, cycles running application windows on receiving **<ALT> + <TAB>**; and it displays the start menu on receiving a **Menu** (**<BLUE> + 0**) key press. This start menu can be used to access certain shell features.

The taskbar is also responsible for displaying the start menu when the **Menu** key combination is pressed.

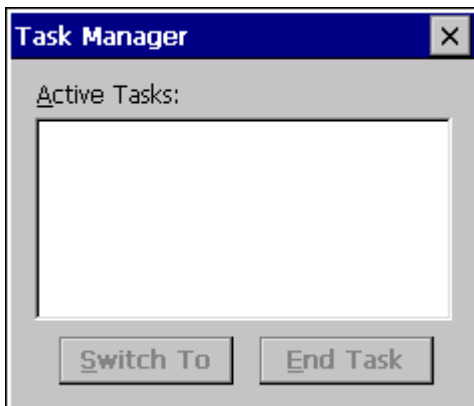
The System Tray



The system tray is a window within the taskbar. It registers a callback with the OS. Once registered the OS will forward messages sent by applications to display notification icons (`Shell_NotifyIcon()`) to the system tray.

The system tray task processes these messages and draws the notification icons in the system tray window. The system tray also forwards any mouse or touch events on the icons back to the window that registered them. The system tray also displays the current time in its window when configured to do so.

The Task Manager



The task manager is a dialog box that is created on startup but is only displayed when the user requests it (by pressing <Blue> + <.>, then **T**, or by pressing <ALT> + <ESC>, or by selecting **Start Menu, Task Manager**). When it is displayed, it lists the currently running applications. It allows the user to start a new application, close a running application, or bring a running application to the foreground.

When attempting to close an application, the task manager sends it a close message. If the application does not close, the task manager checks to make sure they can close this application and ask the user if they really want to kill it. If the user answers yes, the task manager kills the application's process.

3.3.2.3 The User Interface

The desktop contains icons for shortcuts to the most commonly access files and folders. At the bottom of the desktop is the taskbar. On the right side of the taskbar is the system tray. The system tray window does not have an outline but is only as tall as the taskbar and as wide as the icons it is displaying. The taskbar and the system tray can be configured to display on any edge of the screen.

3.3.2.4 Navigation

The shell and the standard start menu are fully navigable using the keyboard. The following table outlines special keys and key combinations for the shell.

| Operation | Key Or Key Combination |
|--------------------------------|--|
| Navigation | Arrow pad |
| Open / Forward / Exit and save | <ENTER> |
| Close / Exit and don't save | <ESC> |
| Back | <BKSP> |
| Focus Cycle (dialog boxes) | <TAB> |
| Select / Button press | <SPACE> |
| Start Menu | <BLUE> + < . > (period) |
| Task Manager | <BLUE> + < . >, then T; <ALT> + <ESC> |
| Cycle Tasks | <BLUE> + 0, then C; <ALT> + <TAB> |
| Go to System Tray | <BLUE> + < . >, then Y |
| Show Desktop | <BLUE> + < . >, then D |
| Change security level | <BLUE> + < . >, then S |
| Show power information | <BLUE> + < . >, then P |

The shell is fully navigable by touch, except there is no means of bringing up the start menu.

3.3.2.5 Colour Schemes

The shell uses system-defined colour types to display the desktop and the taskbar. The user can use the *Appearance* tab of the Display control-panel applet to adjust these colours. Applications can use the Windows system-colours API to change them.

3.3.2.6 Error Messages

The shell uses the Windows CE standard error messaging system to display major errors and uses on screen message boxes to display runtime errors.

3.4 Power Management

The Power Manager acts as a mediator between devices, applications, and defined OS power states. It implements the following set of rules for facilitating communication between those three parties:

- OS power states impose maximum power consumption limits on all devices.
- Applications impose minimum power consumption limits on specific devices to obtain minimum performance levels.
- The Power Manager allows devices to intelligently manage their own power as long as they keep their power levels between the maximum and minimum limits.
- If the minimum power consumption limit is set higher than the maximum, the power of the device will remain elevated for as long as the application requires the device.
- If the OS transitions to a suspended power state, application-imposed minimum power limits will be set aside while the OS is suspended.

3.5 The Filesystem

The filesystem of the WORKABOUT PRO appears as one unified space. However it is composed of several different types of memory: internal RAM, internal flash, and installed memory cards.

When the WORKABOUT PRO cold-boots, the bootloader installs the operating system into RAM. The resulting filesystem, which includes the `\Windows`, `\Program Files`, and `\My Documents` directories, resides in RAM, and is cleared during a cold boot.



Note: *In normal usage, the WORKABOUT PRO is not cold-booted. The unit is merely suspended when it is turned off, and the RAM retains its contents.*

The WORKABOUT PRO's internal nonvolatile flash memory and any available memory cards are made available to this filesystem. That part of the WORKABOUT PRO's internal flash memory available to the user appears as the `\Flash`

Disk folder. Each partition on a memory card appears as a separate folder under the root folder. (Most memory cards have one partition by default; this can be changed through the Storage Manager.)

Memory-card folders are named as follows:.

| Type Of Card | Name Of First Or Only Partition | Name of Second And Later Partitions |
|--------------------|---------------------------------|-------------------------------------|
| SD Card or MMC | \SD-MMC Card | \SD-MMC Card2, \SD-MMC Card3... |
| Compact Flash card | \CF Card | \CF Card2, \CF Card3... |
| PCMCIA card | \PC Card | \PC Card2, \PC Card3... |

3.6 Locations Of Applications

Applications may be located in several places in the WORKABOUT PRO.

An application can be installed either to RAM or to flash memory. If the application is installed to RAM, it is completely lost when the unit is cold-booted. Applications in RAM can be backed up and restored through the Total Recall utility.

The default directory for files installed through ActiveSync's Application Manager is `\Program Files\<appname>`, where `<appname>` is the name of the program. On the WORKABOUT PRO, this directory resides in RAM and will be lost during a cold boot.

The application may be installed into flash, but only if the application can be run from some folder other than the `\Program Files` folder.

If the application is installed into the WORKABOUT PRO's internal flash memory in the folder `\Flash Disk`, the application will remain in the WORKABOUT PRO, even after a cold or warm boot.

Application executables placed in `\Flash Disk\Startup` will be automatically started when the operating system starts after a cold boot. This will not happen after a resume from suspend. Applications may be placed as `.cab` files in `\Flash Disk\Startup`. When the WORKABOUT PRO cold-boots, it will automatically install any `.cab` files located in this folder.

Applications may also be placed in memory cards.

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4.1 Overview

This chapter describes how to connect to the WORKABOUT PRO.

It may be possible to connect to the WORKABOUT PRO through the following methods:

- USB serial cable. See section 4.2 on page 47.
- Bluetooth wireless network. See section 4.3 on page 51.
- TCP/IP network. See section 4.4 on page 55.

The ActiveSync software from Microsoft can be used to establish communication with the device, once the physical connection has been made.

Once communication has been established, software can be deployed as described in the *Mobile Devices SDK Developers' Guide*.

4.1.1 Setting Up ActiveSync

ActiveSync allows you to connect the WORKABOUT PRO to a PC through USB or radio communication. File transfers, file synchronization and sending email can all be done via ActiveSync.



Important: *On the WORKABOUT PRO, ActiveSync **must** be connected through a serial link (USB or Bluetooth) at least once before other connection types (802.11 or Ethernet) are possible.*

Install the most recent version of ActiveSync on your PC (check the Microsoft website for the latest software).

4.1.2 Partnerships

There are two types of connection provided for by ActiveSync:

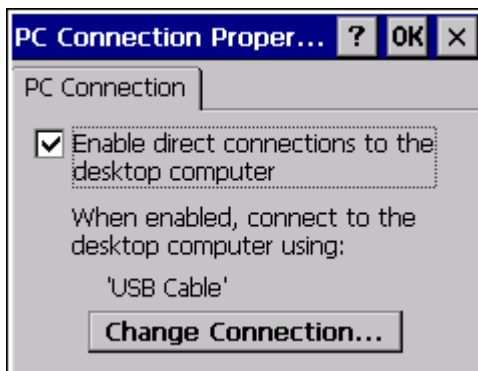
- **Guest** - A guest connection allows file transfers. No synchronization is performed. If the WORKABOUT PRO is password protected, the password prompt will appear when connecting as guest.
- **Partnership** - A partnership connection allows for synchronization of files, e-mail and other data. If the WORKABOUT PRO is password protected, a password prompt will appear before allowing synchronization.



Important: *It is necessary to establish a partnership before trying to connect to ActiveSync via a TCP/IP network (Ethernet or 802.11 wireless).*

You can disconnect any ActiveSync connection by double-clicking on the blue icon in the WORKABOUT PRO's system tray and selecting the **Disconnect** button from the dialogue.

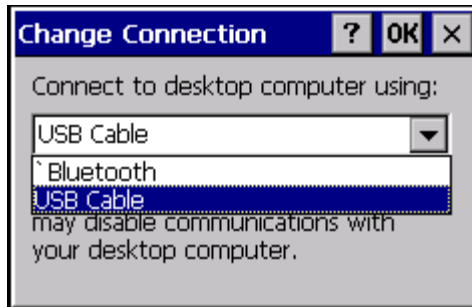
Double-click the **PC Connection** icon in the Control Panel. The PC Connection Properties dialogue appears. Verify that the checkbox that allows connection to the desktop is checked:



“Connect using” specifies the port to be used for connecting to the PC:

- **USB** specifies using the USB client port (the square port) at the back of the docking station.
- **Bluetooth** specifies using the Bluetooth radio in the WORKABOUT PRO. This connection appears if Bluetooth has been configured on the WORKABOUT PRO.

To change the connection type, click on the **Change...** button and select the connection from the dropdown list:



4.2 USB Serial Connections

4.2.1 Overview

The USB architecture defines a “host” device that can communicate with up to 127 client devices through a serial connection. When the host device powers up, it queries the USB bus, identifying devices.

USB serial connections are available at a number of different data rates.

- “High speed” USB devices communicate at 480 Mb/s.
- “Full speed” USB devices communicate at 12 Mb/s.
- “Low speed” USB devices communicate at 1.5 Mb/s.

USB devices may be self-powered, or powered through the USB cable.

Any device that draws less than 100 mA from the USB cable is called a “low-powered” device; this includes self-powered devices that need no power, as well as devices such as tablets and mice that need little power.

Devices that draw more than 100 mA from the USB cable are called “high-powered” devices. The USB cable must be connected to another device that can supply this power.

USB cables can have two types of connectors. The “A” connectors, found on USB host devices such as desktop computers, are wide and flat. The “B” connectors, found on client devices and peripherals, are narrower and squarer.



Figure 4.1 USB Connectors

To join two A-type connectors, a device called a “USB bridge” or “USB-to-USB adapter” is needed.

USB cable lengths are limited. Full-speed cables are a maximum of 5 m long.

The WORKABOUT PRO can connect through USB when it is inserted in its docking station. The docking station has two USB connectors; the square connector is a USB client connector, and the rectangular connector is a host connector. For ActiveSync, the USB client connector is used.

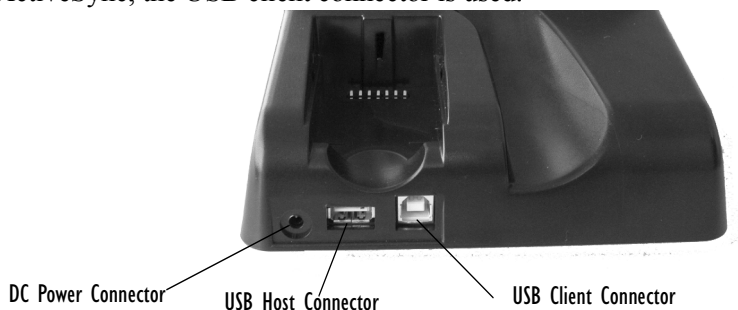



Figure 4.2 Location Of USB Connectors

The client connector is intended for connecting the WORKABOUT PRO as a client through the docking station to another computer for ActiveSync connection. The host connection is intended for connecting USB peripherals such as a mouse or keyboard to the WORKABOUT PRO.

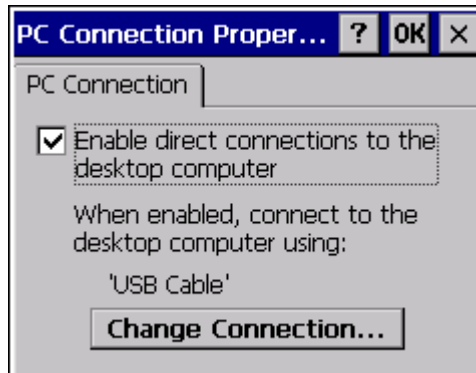
4.2.2 Connecting Via USB

To connect using ActiveSync via USB:

1. Insert the WORKABOUT PRO in the docking station.
2. Connect the USB cable from the USB client port on the docking station to the USB host port on your computer. The client port is the square one on the docking station (labelled with the  symbol).

On the WORKABOUT PRO...

3. Open the WORKABOUT PRO's Control Panel.
4. Double-click on the **PC Connection** icon. The PC Connection dialogue opens:

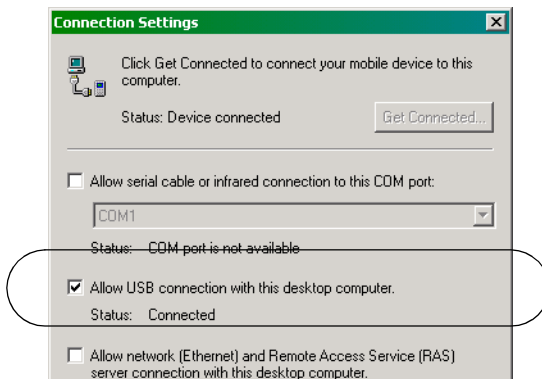


5. Verify that the **Enable direct connections to the desktop computer** checkbox is checked and that the unit will connect using USB.

On the PC...


6. Double-click on the ActiveSync icon in the system tray. The Active-Sync application appears.

7. Select **File, Connection Settings**. The *Connection Settings* dialogue appears:



8. Place a checkmark in the checkbox labeled **Allow USB connection with this desktop computer**.
9. Press **OK**. The *Settings* dialogue disappears.
10. Select **File, Get Connected**. The Get Connected wizard appears.
11. Press **Next**. ActiveSync searches for a connection.

On the WORKABOUT PRO...

12. Click on the **Start** button, then **Programs**, then **ActiveSync**, and select **direct** from the ActiveSync menu. A dialogue appears, indicating that the WORKABOUT PRO is attempting to connect.
13. A successful connection is indicated by a blue icon  in the WORKABOUT PRO's system tray. The WORKABOUT PRO and the PC will also play sounds to indicate that they are connected, if sound is enabled on the devices.

4.3 Bluetooth Wireless Connections

4.3.1 Overview

Bluetooth connections use a short-range wireless link to implement peer-to-peer “piconets” of up to seven devices. Each device on the piconet is identified by a three-digit MAC. An individual device can be a member of more than one piconet. Different piconets are distinguished by different frequency-hopping codes.

Bluetooth radios use FHSS in the unlicensed 2.4-GHz ISM band.

Bluetooth radios are divided into three power classes:

| Power Class | Maximum Output | Power |
|-------------|----------------|----------|
| 1 | 100 mW | (20 dBm) |
| 2 | 2.5 mW | (4 dBm) |
| 3 | 1 mW | (0 dBm) |

Table 4.1 Bluetooth Power Classes

Bluetooth connections can run at up to 741 kb/s, with a range of up to 10 metres for classes 2 and 3, and 100 metres for class 1.

The WORKABOUT PRO has a Bluetooth radio. When the Bluetooth driver is active, a Bluetooth icon is visible in the system tray.

Bluetooth connections may have a number of different service profiles, such as Printer or Async. ActiveSync uses the Async service; its Bluetooth connections appear as serial connections.

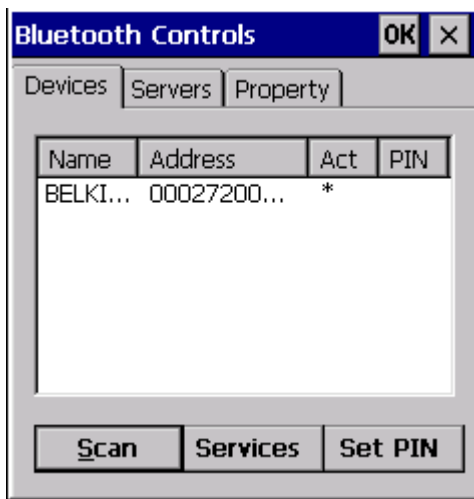
This configuration guide assumes you have a Bluetooth base station or device connected to your computer, and that it is configured as a serial connection, using the Async service.

4.3.2 Configuring Bluetooth

To configure the Bluetooth connection:

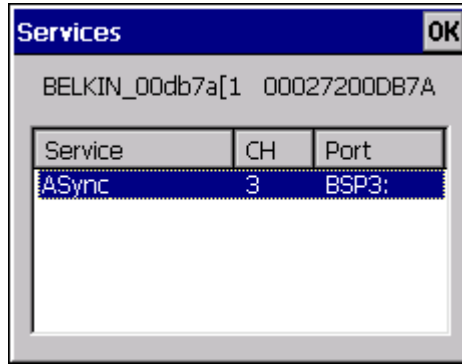
On the WORKABOUT PRO...

1. Bring the WORKABOUT PRO within range of the Bluetooth device or base station.
2. Double-click on the **Bluetooth** icon in the system tray. The *Bluetooth Controls* dialogue opens:



3. Press the Scan button. The WORKABOUT PRO searches for neighbouring Bluetooth devices with which to connect, then lists discovered devices. These devices should include your Bluetooth base station.

4. Press the <CTRL> button on the WORKABOUT PRO twice to lock it (“CTRL KEY” appears in the system tray), then double-tap the listing corresponding to the Bluetooth base station. The base station’s *Services* dialogue appears, with available services listed:



For use with ActiveSync, the Async service should be present.

5. With the <CTRL> button locked, double-tap the Async service. An activation menu appears.
6. Select Active from this menu. The menu disappears, and a port designator appears next to the service in the *Services* listing.
7. Press the <CTRL> button to unlock it.
8. Press **OK** to close the *Services* dialogue.
9. Press **OK** to close the *Bluetooth Controls* dialogue.


The Bluetooth connection is now configured.

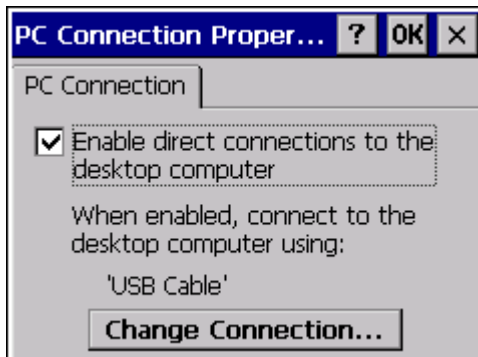
4.3.3 Connecting Via Bluetooth

To connect using ActiveSync via Bluetooth, a partnership must already be established between the PC and the WORKABOUT PRO. A Bluetooth base station is also needed.

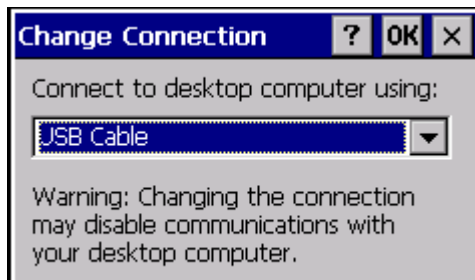
To connect using ActiveSync via Bluetooth serial:

On the WORKABOUT PRO...

1. Open the WORKABOUT PRO's *Control Panel*.
2. Double-click on the **PC Connection** icon . The *PC Connection* dialogue opens:



3. Verify that the **Enable direct connections to the desktop computer** checkbox is checked.
4. Press the **Change Connection** button. The *Change Connection* dialogue opens.



5. Select Bluetooth from the dropdown menu.
6. Press the **OK** button. The *Change Connection* dialogue closes.
7. Press the **OK** button. The *PC Connection* dialogue closes.


On the PC...

8. Select **File, Connection Settings** in the *ActiveSync* window, or double-click on the **ActiveSync** icon in the system tray. The *ActiveSync* menu appears.

9. Select **Connection Settings**. The *Connection Settings* dialogue appears.
10. Place a checkmark in the checkbox labeled **Allow serial cable or infrared connection to this COM port:**.
11. Select the COM port to which you configured the Bluetooth base station on your PC.
12. Press **OK**. The *Settings* dialogue disappears.

On the WORKABOUT PRO...

13. Click on the **Start** button, then **Programs**, then **ActiveSync**, and select **direct** from the ActiveSync menu. A dialogue appears, indicating that the WORKABOUT PRO is attempting to connect.

A successful connection is indicated by a blue icon  in the WORKABOUT PRO's system tray. The WORKABOUT PRO and the PC will also play sounds to indicate that they are connected, if sound is enabled on the devices.

4.4 TCP/IP Connections

4.4.1 Overview

An ActiveSync connection can be made directly to the WORKABOUT PRO's IP address, if the WORKABOUT PRO is on a TCP/IP network. Such connections can be made through standard wired LAN (Ethernet) connections, or through wireless LAN (802.11) connections.

Ethernet connections are available to the WORKABOUT PRO through its docking station: a USB-to-Ethernet adapter can be connected to the docking station's USB host port.



Note: *Data transmission speeds through the USB-to-Ethernet adapter are limited to around 4 megabits per second by the USB link.*

Wireless connections are an extension of LAN techniques across a radio link. There are several variants, designated by letters: 802.11b, a, g:

| Variant | Data rate | Radio Frequency | Modulation |
|---------|-----------|-----------------|------------|
| b | 11Mb/s | 2.4 GHz | DSSS |
| a | 54 Mb/s | 5 GHz | OFDM |
| g | 54 MB/s | 2.4 GHz | |

Table 4.2 802.11 Variants

Devices using 802.11 wireless connections may communicate with a wired LAN through an “access point”; they may also communicate directly with each other using an “ad-hoc mode”.

The WORKABOUT PRO can be fitted with an 802.11 wireless-LAN radio. A Compact Flash-sized radio will fit in the device’s Compact Flash slot. A PCMCIA-size radio will fit in the optional PCMCIA slot.




Important: *You must already have established a partnership with the WORKABOUT PRO via USB or Bluetooth before you can establish a partnership via an IP network.*

You must have a correctly configured access point to use an 802.11 wireless LAN to access your PC via ActiveSync.

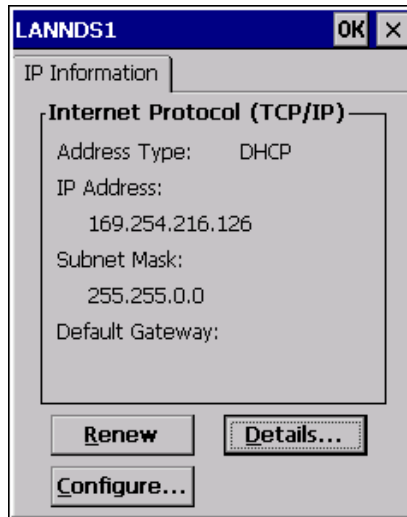
The PC and the WORKABOUT PRO must be on the same network, or on networks that have access to each other, for this to function correctly.

4.4.2 Configuring Ethernet

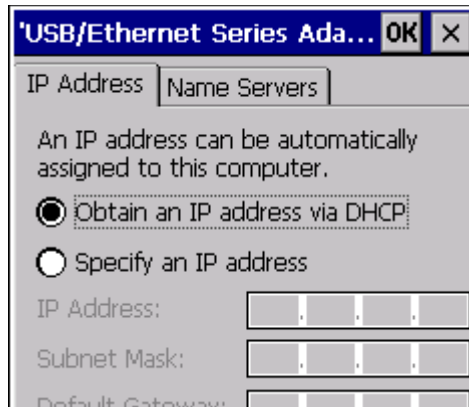
To configure a wired Ethernet connection:

1. Connect the Ethernet cable to the docking station through the USB adapter. The network icon  appears in the system tray.

2. Double click on the network icon. The *IP Information* dialogue appears:



3. Click on the **Configure** button. The configuration dialogue appears:



This dialogue has two tabs at which network information can be entered.

4. Click on the **OK** button. The configuration dialogue disappears.
5. Press the **OK** button. The *Network Connection Details* dialogue disappears.



Note: To view all the network settings at once, press the **Details** button.

6. Press the **OK** button. The *IP Information* dialogue disappears.

The wired TCP/IP connection is now configured. See section 4.4.4 on page 58 for details on connecting ActiveSync.

4.4.3 Configuring 802.11

To configure a wireless 802.11 connection:

1. Insert the radio card in the WORKABOUT PRO.



Important: For a CompactFlash or PCMCIA radio card, this requires opening the WORKABOUT PRO. See document 8100028 for details on installing a CompactFlash card, and see document 8100037 for installing a PCMCIA card and its required expansion-card adapter.

2. Select **Start, Settings**. The Control Panel appears.
3. Double-click on the **Network** icon. The *Network* dialogue appears.
4. Double-click on the icon corresponding to the radio card. The radio card's settings dialogue appears.
5. Make any settings you require for a radio connection in this dialogue. This can include IP address, name-server address, the ESSID and WEP key, and so on.
6. Click **OK** to save the settings. The *Network* dialogue disappears.
7. Press the **OK** button. The *IP Information* dialogue disappears.

The wireless TCP/IP connection is now configured. See section 4.4.4 on page 58 for details on connecting ActiveSync.

4.4.4 Connecting

To connect with ActiveSync over an IP network:

1. Select **Start, Programs, Active Sync, Remote**. The *Connecting* dialogue appears.
2. Click the **Connect** button. ActiveSync connects and displays a confirmation and status dialogue.

DOWNLOADING SOFTWARE

5

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5.1 Overview

This section describes what you need to do to transfer program executables to your WORKABOUT PRO once they have been compiled on your development system.

The WORKABOUT PRO uses the Windows CE .NET 4.2 operating system, running on the Intel X-Scale processor. It can accept executables written for this processor, or .NET CIL executables written for the .NET runtime engine.

There are several pieces of system software that can be replaced on the WORKABOUT PRO. These include:

- The main operating system (Psion Teklogix part number 1001975).
- The ‘BooSt’ boot loader (part number 1001976).
- The software for the WORKABOUT PRO’s keyboard processor (part number 1030208).

These files can be replaced one at a time, or as a group.

5.1.1 Required Memory Card Format

The memory card used for WORKABOUT PRO OS-image updates can be a Secure Digital or MultiMedia card of 32 megabytes or larger. Such cards are available from Psion Teklogix as follows:

| Card Size | Psion Teklogix Model Number | Psion Teklogix Part Number |
|-----------|-----------------------------|----------------------------|
| 64 MB | SD0064 | 1030201 |
| 128 MB | SD0128 | 1030202 |
| 256 MB | SD0256 | 1030203 |

The card should be formatted using FAT12/16. The files should be placed in the card’s root folder.

The bootloader assumes that the first file starts in the card’s first sector. To guarantee that the file starts there, reformat the card before copying the image file to it.

5.1.2 Date Codes

There are a few ways to display the date code of the main operating system software in the WORKABOUT PRO. The version of this software is reported as a date code

Overview

File Names

from the day the software was built. The date code of the software image can be found using any of the following methods:

- Enter the **Control Panel**, select the **System** icon, and open the **Properties** tab. The item for 'WinCE Code' displays the datecodes of the boot code and the main OS, and the version number of the keyboard controller code.
- Hold down the WORKABOUT PRO's <LEFT SCAN>, <BLUE> and <ENTER> buttons for 6 seconds. The device's LED flashes, then it reboots into its bootloader and displays the datecodes and version number.

By default, the boot loader will only write the image on the memory card to the WORKABOUT PRO's internal flash memory if the date code of the file on the card is different than that of the image file in the WORKABOUT PRO's flash. This allows the user to install new images and to go back to an older image.

The bootloader allows the user to override this default behavior and program the flash with any valid image on the memory card.

5.1.3 File Names

Individual replacement files must be named `7525.img` or `7525os.img`, no matter what their content. The bootloader will recognize them and load them to the appropriate places in the WORKABOUT PRO's system.

More than one file can be replaced at the same time. A scripting file, also provided, is loaded first; it controls how the other files are loaded.

When files are replaced in a group, they must be named as follows:

- `7525.img` (the BooSt image)
- `7525ce.img` (the main OS image)
- `7525up.img` (the keyboard controller software image)

The special scripting file to control the bootloader and direct it how to load the files:

- `7525os.img`

This is the name normally used for the OS image when it is being loaded by itself.

5.2 Replacement From A Card

This section explains how to upgrade the software using a new image file provided on a memory card.

5.2.1 Equipment Needed

Replacing the software image requires the following items:

- The new image files.
- The target WORKABOUT PRO.
- An SD or MMC memory card.

5.2.2 Replacing The Software

To replace the software on a WORKABOUT PRO with another from a memory card:

1. Insert the memory card in the WORKABOUT PRO's MMC/SD slot.
2. Press the <BLUE> and <ENTER> keys for six seconds. The WORKABOUT PRO is hard-reset. Its boot loader loads the new image file or script file, then runs it.

5.3 Replacement Through USB

OS image files can also be loaded into the WORKABOUT PRO's flash memory when it is connected to the PC as a USB Mass Storage Device.

5.3.1 Equipment Needed

Replacing the software requires the following items:

- The new image files.
- A PC with an available USB Type-A (host) connection.
- The target WORKABOUT PRO
- A docking station, which has a USB Type-B (client) port.
- A USB A/B cable.

5.3.2 Replacing The Software

The software on a WORKABOUT PRO is upgraded by rebooting the device into the BooSt bootloader, copying the software image file(s) to the WORKABOUT PRO, then rebooting the device. The WORKABOUT PRO's bootloader loads and runs the new image files.

When the WORKABOUT PRO is booted into BooSt and connected to a PC using a USB cable, a drive labeled "Removable Disk" appears on the PC. This drive is the part of the device's flash memory that is reserved for the operating system; it contains the WORKABOUT PRO software image.

To upgrade the software image, copy the new software image files to this drive.



Important: *Before connecting a WORKABOUT PRO to the PC using USB, you must update the USB driver (the .inf file) on the PC. This can be done by running the USB Setup program included on the CD of the Psion Teklogix Mobile Deices SDK.*

The USB Setup program can also be downloaded from the PTX developers web site at <http://www.psionteklogix.com/developers/> with part number 1000997x.

The following steps explain the process for upgrading the software image in a WORKABOUT PRO connected through USB using a Portable Docking Module:

1. Hold down the <LEFT SCAN>, <BLUE> and <ENTER> buttons simultaneously for 6 seconds. The WORKABOUT PRO reboots to the BooSt bootloader and displays text similar to the following:

```
Psion Teklogix 7525 BooSt.  
Copyright Psion Teklogix Inc. 2004  
Starting BooSt...  
Graphical console connected.  
CPU (rev = 0x6) clock 400 MHz  
Psion Teklogix 7525 Colour  
DiskOnChip: 32 MB  
RAM: 128 MB  
BooSt version C264q (0x4064A028)  
Boot code image info: size = 292488
```



```
BooSt OS for 7525
Build version C264q
7525OS.img image info: size = 11421942
7525 Windows CE.NET
C264q
OS load skipped.
Touch calibration read from EEPROM successful.
doc1-0 mounted: size = 15451136 (30178 * 512)

7525 boot menu
-----
1) Run main OS
!) Clean start main OS
2) Begin YMODEM load
3) Show configuration
4) Audio test
5) Display test
6) Touch test
7) RAM test

Command>
```

2. Connect the WORKABOUT PRO to the PC using the USB cable.

The A end of the USB cable plugs into the PC and the smaller square B end of the cable plugs into the docking station in which the WORK-ABOUT PRO sits. When the USB connection is established, a new drive appears on the PC named “Removable Disk”.

The WORKABOUT PRO displays the following line on the console:

```
doc0-0 removed

Command>
```

That part of the WORKABOUT PRO’s flash memory which stores the operating system image and is normally accessible only by the boot-loader has been dismounted and made available to the bootloader’s USB driver.

The regular bootloader commands (**1** and **!**) to load and run the main operating system will not work, and will give an error that there is no operating system image available.

3. Rename the software image from the part number under which it was provided (such as 1001975A1.img) to 7525OS.img.

Replacement Through USB

Replacing The Software

4. Copy the file 75250S.img to the “Removable Disk” drive on the PC.
5. ‘Stop’ the Removable Disk drive.

Once the file copy has finished, the Removable Disk must be ‘stopped’ to properly save the new file. To do this, select the **Unplug or Eject Hardware** icon in the system tray in the bottom right corner of the PC, or use the **Add/Remove Hardware** option in the **Control Panel** (follow the options to “Uninstall/Unplug a device”, and then “Unplug/Eject a device”, then select the Mass Storage Device).



Important: *If the Removable Disk is not stopped, the WORKABOUT PRO image could become corrupt causing the terminal not to boot properly.*

If this happens, you must boot the WORKABOUT PRO into BooSt, connect it to the PC with the USB cable, and format the Removable Disk (right click on the drive and select the Format option).

Once the Removable Disk has been properly stopped on the PC, the BooSt Console displays a message similar to the following:

```
doc0-0 mounted: size = 16776192 (32766 * 512)
>
```

The flash memory containing the operating-system image has been disconnected from the development computer and is now accessible by the bootloader. The regular bootloader commands (**1** and **!**) to load and run the main operating system now work.

6. Reboot the WORKABOUT PRO by selecting option **1**, “Run Main OS”, from the bootloader menu. The device boots into the new operating system.



Note: *You may need to reconfigure any changes done to the system configuration through the Control Panel. The registry will be set to default values if the new OS determines that the previously-existing registry values are not compatible.*

APPENDIX

A

SUPPORT SERVICES AND WORLDWIDE OFFICES

Psion Teklogix provides a complete range of product support services to its customers worldwide, including technical support and product repairs.

A.1 Technical Support

Technical Support for Mobile Computing Products is provided via e-mail through the Partner Program website. To reach the website, go to www.psionteklogix.com and click on the Partner Program link, which takes you to the Partner Program page. Then click on the **Log-in** button or the **Register** button, depending on whether you have previously registered for Teknet or the Partner Program. (Your UserID and password are the same for TekNet and the Partner Program.) Once you have logged in, search for the “Support Request Form”.

A.2 Product Repairs

International

For product repairs, please contact your local Psion Teklogix office listed on our worldwide website: <http://www.psionteklogix.com>

Click on the heading labelled “Contacts” to choose a Psion Teklogix technical support representative closest to you.

Canada/U.S.A

Canadian and U.S. customers can receive access to repair services by calling the toll-free number below, or via our secure website (see *Technical Support*, above).



Note: *Customers calling the toll-free number should have their Psion Teklogix customer number or trouble ticket number available.*

Voice: 1 800 387-8898 (press option “2”)

Fax: 1 905 812-6304

Web Site: <http://service.psionteklogix.com>

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For a complete listing of international offices, please refer to: *www.psionteklogix.com*

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