MOBILE DEVICES

Developers Guide

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ISO 9001 Certified
Quality Management System

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INTRODUCTION

1.1 About This Manual

This manual provides guidance on creating applications for Psion devices running Microsoft Windows® CE, or Windows Mobile, operating systems.

Chapter 1: Introduction
provides an overview of this manual, the other documentation available with the SDK, and text conventions used.

Chapter 2: Backlight
describes how to control the backlights on Psion computers.

Chapter 3: Batteries and Power Management
describes how to control battery and external power supplies.

Chapter 4: Reset
describes how to reset Psion computers.

Chapter 5: Display
describes the processes for obtaining display screen information.

Chapter 6: Indicators
describes how to manipulate the LEDs.

Chapter 7: Keyboard and Keyboard Remapping
describes how to disable the keyboard and how to remap scan codes.

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describes how to access and use permanent storage.

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describes how to use the Remote Access Service (RAS).

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describes the configuration of scanners and bar code symbologies.

Chapter 14: Audio
describes how to control the beeper and how to play WAV files.

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describes how to control the Windows security and how to obtain hardware and software information.

Chapter 16: Windows Shell
describes how to set security levels and control access to the Windows shell.

Chapter 17: Trigger Control
describes how to control the trigger sources on a Psion computer.

Chapter 18: Wireless Local-Area Networking
describes how to implement WLAN.

Chapter 19: Wireless Wide-Area Networking
describes how to implement WWAN.

Chapter 20: Registry-based WWAN API
describes how to query properties of thr WWAN modem and WWAN network.

Chapter 21: GPS
describes how use the GPS.

Chapter 22: Sensors
describes how to use the built-in sensors.

Chapter 23: Other Features
describes the vibration feature and PsionVU.

Appendix A: Resources
lists other documents and web sites where you can find information related to developing with the Mobile Devices SDK.

Appendix B: Registry Keys

lists and describes certain Workabout Pro registry keys which may be useful when developing applications on Psion computers.

1.2 Text Conventions

The following conventions and syntax are followed throughout this document, with the exception of when referencing API commands (see Section 1.2.1: "Command Syntax"):

- Instructions to press specific keys on the keypad are indicated with the name or symbol of the key between square brackets.
  e.g. [SPACE], [TAB], [BLUE], [A], [.], etc.
- Instructions to press buttons with dedicated functions are given with the name or function of the button in bold type.
  e.g. **Power**, **Scan**, etc.
- Instructions to type a specific string of text are given between quotation marks.
  e.g. Type "exit", and press [ENTER].

Note: Notes highlight additional helpful information.

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

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

An arrow next to field description information (usually in tables) indicates a recommended or suggested configuration setting.

1.2.1 Command Syntax

When commands are described in text the following conventions are used in the manual:

- Elements that must be typed exactly as shown in the text are in **bold**.
- Elements that are placeholders are in *italic*.

The general form of a command is as follows:

sample {**+r** | **-r**} *argument* ... [*option*]

Where:

Element	Meaning
sample	Indicates the name of the command or utility.
{ }	Surrounds a set of choices from which you must choose one.
|	Separates two mutually exclusive choices in a syntax line. Type one of these choices, not the symbol.
argument	Specifies a variable name or other information that you must provide, such as a path and file name.
...	Indicates that you can type multiple arguments of the same type. Type only the information, not the ellipsis (...).
[ ]	Indicates one or more optional items. Type only the information within the brackets, not the brackets themselves.

1.3 Non-Psion Computers

The Mobile Devices SDK cannot be used on computers other than those made by Psion. Attempts to load a Psion DLL file on a non-Psion computer fail with an error message.

1.4 Other Documentation for Application Development

There are three categories of manuals that should be used when programming Psion computers.

This manual, the *Developers Guide*, provides an overview of the Psion devices. A single *Developers Guide* covers all libraries and devices. This manual is available in Portable Document Format (PDF).

API online help is provided for each language library, in a format appropriate to that language. All information specific to the language libraries, including class, method, field, and property descriptions, are captured by the *API online help*.

In addition to the developer and API documentation, each Psion computer has a dedicated *User Manual*. You need to obtain an actual device in order to test device-specific features such as bar code scanners. The *User Manuals* provide valuable help in getting acquainted with the features of these devices.

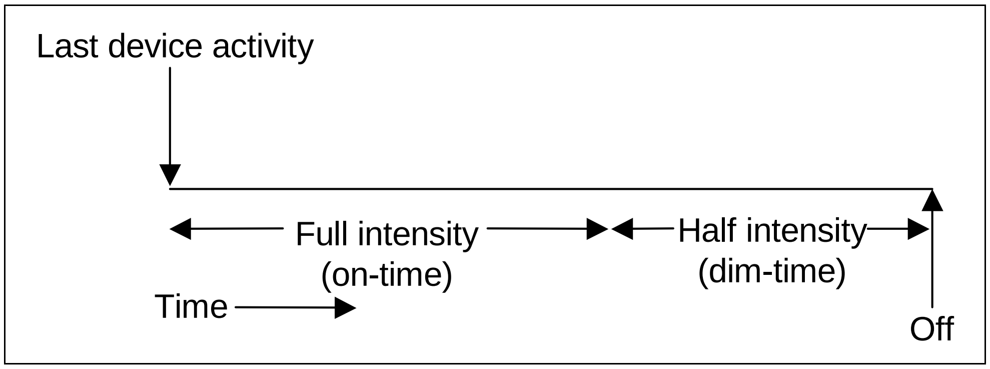
See Appendix A: "Manuals and URLs" for more information.

2 BACKLIGHT

2.1 Backlighting

The Mobile Devices SDK provides functions that control the display and keyboard backlights. The intensity of the backlight and the conditions under which it is activated can be queried and set using the SDK.

To conserve battery power, you can configure the backlights to switch off, or dim to half intensity, after the computer has been inactive for a selected length of time. The following diagram shows how these times are related:



The last device activity is one of the following:

- A key is pressed on the keyboard.
- The touchscreen is pressed.
- The scanner trigger is pressed.
- Data is received from the host.

If the computer is operating with external power, you can configure the backlights to remain on at all times.

2.1.1 Omnii and EP10

These computers have light sensors. For information see Section 22.5 Light Sensor on page 249.

2.1.2 Thresholds

On computers with ambient light sensors (7530 & 7535), there is a threshold value that specifies the light level at which the backlights will turn on. The values for the display and keyboard backlight thresholds are configured independently.

Threshold values are integers between 0 (zero) and 100. A value of 0 ensures that the selected backlight is always off. A value of 100 ensures that the backlight can turn on at all lighting levels. Intermediate values control the level of ambient light at which the backlight turns on. The lower the value, the darker it must be before the keyboard backlight can turn on. Regardless of the threshold settings, the backlights only come on if there is activity to trigger it, such as a keyboard, or a touch screen, event.

2.1.3 Timeouts

Using the Mobile Devices SDK, the backlight on-times and dim-times can be set to any positive integer within the range of the parameter (typically 0 to 2147483647, measured in milliseconds). However, when setting the values using the GUI, the choices are limited to a handful of predetermined values presented in a drop-down list.

If a backlight timeout is set to one of the selectable values shown in the list, then the GUI applet displays the correct value for that timeout. On the other hand if a backlight timeout is set, using the Mobile Devices SDK, to a value that is not on the list of selectable values, then the GUI applet displays an empty box for that timeout setting.

For all computers that have backlights, the following tables list the on-time, and dim-time, values that are available in the GUI.

Windows CE-based computers

On Windows CE-based computers, the Display, and Keyboard, Backlight On-time values determine how long the display and keyboard backlights remain on. Any user interaction (key press, touch screen press, scan, etc.) resets both timeout counters back to the beginning. If there has been no user interaction by the end of the keyboard on-time duration, the keyboard backlight turns off. At the end of the display on-time duration, the display backlight dims to half intensity. If there is still no user interaction by the end of the display dim-time duration, then the display backlight turns off completely.

Time (milliseconds)	Display Backlight On-time	Display Backlight Dim-time	Keyboard Backlight On-time
0	No	**Yes**	No
5000	**Yes**	**Yes**	**Yes**
10000	**Yes**	**Yes**	**Yes**
15000	**Yes**	**Yes**	**Yes**
30000	**Yes**	**Yes**	**Yes**
60000	**Yes**	**Yes**	**Yes**
120000	**Yes**	**Yes**	**Yes**
180000	No	No	No
240000	No	No	No
300000	**Yes**	**Yes**	**Yes**
360000	No	No	No
420000	No	No	No
480000	No	No	No
540000	No	No	No
600000	No	No	No
2147483647 (Always On, maximum value)	**Yes**	No	**Yes**

Windows Mobile-based computers

On Windows Mobile-based Psion computers, the display, and keyboard, backlight timeouts are not controlled independently: Both are controlled by a single timeout value. However, there are still two timeout values which may be set; one for when the computer is running on battery power, and one for when it is connected to a constant external power source.

Time (milliseconds)	Battery Power Backlight On-time	External Power Backlight On-time
0	No	No
5000	No	No
10000	**Yes**	No
15000	No	No
30000	**Yes**	No
60000	**Yes**	**Yes**
120000	**Yes**	**Yes**

Time (milliseconds)	Battery Power Backlight On-time	External Power Backlight On-time
180000	**Yes**	**Yes**
240000	**Yes**	**Yes**
300000	**Yes**	**Yes**
360000	No	**Yes**
420000	No	**Yes**
480000	No	**Yes**
540000	No	**Yes**
600000	No	**Yes**
2147483647 (Always On, maximum value)	No[1]	No[1]

[1]The setting for **Always On** is controlled by a checkbox that enables/disables the On-time parameter. If the checkbox is disabled, the On-time value is ignored and the backlight remains on.

2.2 Backlight Configuration Parameters

The following universal methods are available in all development languages for getting and setting backlight configuration values—see the API Reference Manuals for the name of the method in each development environment:

- Get a boolean setting.
- Get an integer setting
- Set a boolean setting.
- Set an integer setting

2.2.1 Mobile Devices SDK Version 5.4 and Later

For all computers the following apply:

Parameter	Range Of Values	Default Value
Display threshold (% of maximum)	0 to 100	50
Display intensity (% of maximum)	0 to 100	50
Display timeout (% of maximum)	0 to 100	50
Display dimtime (% of maximum)	0 to 100	50
Display always on for external power (boolean)	True / False	True
Keyboard threshold (% of maximum)	0 to 100	50
Keyboard intensity (% of maximum)	0 to 100	50
Keyboard timeout (ms)	0 to 100	50

Parameter	Range Of Values	Default Value
Keyboard dimtime (% of maximum)	0 to 100	50
Keyboard always on for external power (boolean)	True / False	False

2.2.2 Mobile Devices SDK Version 5.3 and Earlier

The following table lists the ranges of values and the default values available for each Psion computer:

Parameter	Computer	Range Of Values	Default Value
Display threshold (%)	753x	0 to 100	71
	8515		N/A
	8525/8530		N/A
	Ikôn Windows CE		N/A
	Ikôn Windows Mobile		N/A
	NEO		N/A
	Workabout Pro Windows CE		N/A
	Workabout Pro Windows Mobile 2003 SE		N/A
Display intensity	753x	0 to 100	80
	7545	1 to 10	7
	8515	0 to 100	48
	8525/8530	0 to 100	100
	Ikôn Windows CE	0 to 100	65
	Ikôn Windows Mobile	0 to 100	65
	NEO	0 to 100	47
	Workabout Pro Windows CE	0 to 100	35
	Workabout Pro Windows Mobile 2003 SE	0 to 100	35
Display timeout (ms)	753x	0 to 2147483647	30000
	7545	0 to 4294967295	30000
	8515	0 to 2147483647	30000
	8525/8530	0 to 2147483647	30000
	Ikôn Windows CE	0 to 2147483647	30000
	Ikôn Windows Mobile	60000 to 600000	30000[1]
	NEO	0 to 2147483647	30000
	Workabout Pro Windows CE	0 to 2147483647	30000

Parameter	Computer	Range Of Values	Default Value
	Workabout Pro Windows Mobile 2003 SE	60000 to 600000	30000[1]
Display dimtime (ms)	753x	0 to 2147483647	30000
	7545	0 to 4294967295	30000
	8515	0 to 2147483647	30000
	8525/8530	0 to 2147483647	30000
	Ikôn Windows CE	0 to 2147483647	30000
	Ikôn Windows Mobile		N/A
	NEO	0 to 2147483647	30000
	Workabout Pro Windows CE	0 to 2147483647	30000
	Workabout Pro Windows Mobile 2003 SE		N/A
Display always on for external power (boolean)	753x	True / False	True
	7545	True / False	True
	8515	True / False	True
	8525/8530	True / False	True
	Ikôn Windows CE	True / False	True
	Ikôn Windows Mobile	True / False	False
	NEO	True / False	True
	Workabout Pro Windows CE	True / False	True
	Workabout Pro Windows Mobile 2003 SE	True / False	False
Keyboard threshold (%)	753x	0 to 100	0
	7545		N/A
	8515		N/A
	8525/8530		N/A
	Ikôn Windows CE		N/A
	Ikôn Windows Mobile		N/A
	NEO		N/A
	Workabout Pro Windows CE		N/A
	Workabout Pro Windows Mobile 2003 SE		N/A

Parameter	Computer	Range Of Values	Default Value
Keyboard intensity	753x	0 to 100	48
	7545	1 to 10	3
	8515	0 to 100	47
	8525/8530	0 to 100	48
	Ikôn Windows CE	0 to 100	50
	Ikôn Windows Mobile	0 to 100	50
	NEO	0 to 100	0
	Workabout Pro Windows CE	0 to 100	40
	Workabout Pro Windows Mobile 2003 SE	0 to 100	40
Keyboard timeout (ms)	753x	0 to 2147483647	15000
	7545	0 to 4294967295	15000
	8515	0 to 2147483647	15000
	8525/8530	0 to 2147483647	15000
	Ikôn Windows CE	0 to 2147483647	15000
	Ikôn Windows Mobile	60000 to 600000	30000[1]
	NEO	0 to 2147483647	15000
	Workabout Pro Windows CE	0 to 2147483647	15000
	Workabout Pro Windows Mobile 2003 SE	60000 to 600000	30000[1]
Keyboard dimtime (ms)	753x	0 to 4294967296	0
	7545	0 to 4294967296	0
	8525/8530	0 to 4294967296	0
	Workabout Pro Windows CE	0 to 4294967296	15000
	Workabout Pro Windows Mobile 2003 SE	N/A	N/A
Keyboard always on for external power (boolean)	753x	True / False	False
	7545	True / False	False
	8515	True / False	False
	8525/8530	True / False	False
	Ikôn Windows CE	True / False	False
	Ikôn Windows Mobile	True / False	False

Parameter	Computer	Range Of Values	Default Value
	NEO	True / False	False
	Workabout Pro Windows CE	True / False	False
	Workabout Pro Windows Mobile 2003 SE	True / False	False

[1]On Windows Mobile devices, reading the default value returns the Battery Power Backlight On-time value of 30000. However, when setting the backlight value, it is written to the External Power Backlight On-time value which enforces the range of 60000 - 600000 for that parameter (1 minute to 10 minutes).

2.3 Getting Started with Backlights

For articles on Ingenuity Working that will guide you in getting started with backlights see:
community.psion.com/tags/backlight/noteDG.

2.4 Code Samples for Backlights

For postings on Ingenuity Working that contain code samples that use backlights see:
community.psion.com/tags/backlight/codeDG.

2.5 Backlight API Elements

C++: The backlights on all computers are controlled using the **PsionTeklogix::Backlight** namespace.

Java: The backlights on all computers are controlled using the **com.teklogix.backlight** package.

.NET: The backlights on all computers are controlled using the **PsionTeklogix.Backlight** namespace.

Omnii and EP10

These computers have light sensors.

C: Light sensor hardware on all computers with a light sensor is read, using the **AmbientLight** group.

C: The keyboard backlight and the display backlight on all computers with a light sensor is controlled using the **Backlight** group.

3 BATTERIES AND POWER MANAGEMENT

3.1 Suspend Timeout

The suspend timeout determines how long the computer will wait after any activity (key press, scan, or touch screen event, or a wireless radio transmission) before it goes into *suspend mode*.

When the computer wakes, the device returns to the normal powered state. The backlight, the display, and all peripheral devices turn on and the suspend timer begins counting again.

The suspend timeout is configured as an integer variable measured in seconds. Any value between 0 and the maximum value of 2147483647 can be configured, however the GUI Power applet only allows a small number of predefined values to be set. If you set the suspend timeout using the Mobile Devices SDK to a value not on the predefined list, the GUI Power applet displays the default value for that setting.

The following tables list of predefined GUI Power applet suspend timeouts, and their corresponding integer values in seconds:

Windows CE-based computers

Timeout	Int Value	Battery Power	External Power
Never	0	**Yes**	**Yes**
1 min	60	**Yes**	**Yes**
2 min	120	**Yes**	**Yes**
3 min	180	**Yes**	No
4 min	240	**Yes**	No
5 min	300	**Yes**	**Yes**
10 min	600	**Yes**	**Yes**
15 min	900	No	**Yes**
30 min	1800	**Yes**	**Yes**

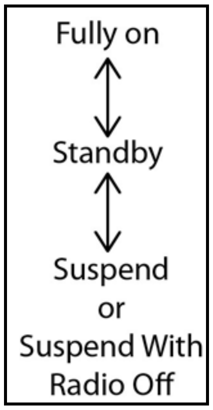
Windows Mobile-based computers

Timeout	Int Value	Battery Power	External Power
Never	0	**Yes**	**Yes**
1 min	60	**Yes**	**Yes**
2 min	120	**Yes**	**Yes**
3 min	180	**Yes**	No
4 min	240	**Yes**	No
5 min	300	**Yes**	**Yes**
10 min	600	No	**Yes**
15 min	900	No	**Yes**
30 min	1800	No	**Yes**

3.2 Psion Power States

3.2.1 Suspend/resume Cycle

On all Psion computers there is an intermediate state between *fully on* and *suspend*. The process—referred to as the *suspend/resume cycle*—is as follows:



3.2.2 Comparison of Power States

Function	Fully On	Standby Mode	Suspend Mode	Suspend with Radio off Mode	Power Off Mode
Applications	Executing	Executing	Not executing	Not executing	CPU powered down
Display	On	Off	Off	Off	Off
Touchscreen	Unlocked	Locked	Locked	Locked	Off
Keyboard	Unlocked	Locked	Locked	Locked	Off
Radios	On	On	On	Off	Off
Backlights	On	Off	Off	Off	Off

3.2.3 Fully on

Everything is on.

3.2.4 Standby Mode (Unattended Mode)

In *standby mode* the processor remains on so any running applications continue executing. *Standby mode* consumes more power than *suspend mode*.

3.2.5 Suspend Mode

In *suspend mode* the computer is in a power-saving state. When the computer is woken from this state, operation resumes within a few seconds continuing from where it stopped on suspend.

Suspend mode may occur automatically after a period of inactivity, or when the battery power reserve drops below a specified threshold. Typically the device goes into *suspend mode* when the user manually powers down the computer.

In *suspend mode*, the display, the keyboard and the peripherals are powered down. The operating system and any running applications are maintained in their current state, until the power source depletes.

3.2.6 Suspend with Radio Off Mode (Shutdown Mode)

In *suspend with radio off mode* the computer is in a power-saving state. When the computer is woken from this state, operation resumes within a few seconds continuing from where it stopped on suspend. On waking, all radios that were powered up, before entering *suspend with radio off mode*, are again powered up.

Suspend with radio off mode does not occur automatically. The computer enters this mode immediately when this option is selected on the **Shutdown** menu.

In *suspend with radio off mode*, the display, the keyboard , the radios, and the peripherals are powered down. The operating system and any running applications are maintained in their current state, until the power source depletes.

3.2.7 Power Off

Everything is powered down with the exception of Syscon (the component that detects power up).

The computer is woken from this state by pressing the **Power** button.

3.3 Manual Initiation of Standby and Suspend

Psion Computer	Standby	Suspend	Suspend with Radio Off (menu option hidden by default)	Power Off
753x (Windows CE 5.0)	Not accessible.	Press **BLUE**, then press **ENTER** *or* Tap **Start** > **Shutdown** > **Suspend**.	Not available.	Not available.
8515 (Windows CE 5.0)	Not accessible.	Press **BLUE**, then press **ENTER** *or* Tap **Start** > **Shutdown** > **Suspend**.	Not available.	Not available.
8525 / 8530 (Windows CE 5.0)	Not accessible.	Press **BLUE**, then press **ENTER** *or* Tap **Start** > **Shutdown** > **Suspend**.	Not available.	Not available.
Workabout Pro (7525) (Windows CE .NET 4.2)	Not accessible.	Press **BLUE**, then press **ENTER/ON** *or* Tap **Start** > **Shutdown** > **Suspend**.	Not available.	Not available.
Workabout Pro (7525) (Windows Mobile 2003 SE)	Not accessible.	Press **BLUE**, then press **ENTER/ON**	Not available.	Not available.
Workabout Pro (7525) (Windows Mobile 5.0)	Not accessible.	Press **BLUE**, then press **ENTER/ON**	Not available.	Not available.
Workabout Pro G2 (7527) (Windows CE 5.0)	Press **FN/BLUE**, then press and hold **ENTER**, select **Standby**, then press **ENTER**. **Note:** Through the GUI, you can set an option that suspends the device when **FN/BLUE** then **ENTER** is pressed.	Press **FN/BLUE**, then press **ENTER** *or* Press **FN/BLUE**, then press and hold **ENTER**, select **Suspend**, then press **ENTER**. *or* Tap **Start** > **Shutdown** > **Suspend**.	Not available.	Not available.

Psion Computer	Standby	Suspend	Suspend with Radio Off (menu option hidden by default)	Power Off
Workabout Pro G2 (7527) (Windows Mobile 6.1 Classic and Pro)	Press **FN/BLUE**, then press and hold **ENTER**, select **Standby**, then press **ENTER**. **Note:** Through the GUI, you can set an option that suspends the device when **FN/BLUE** then **ENTER** is pressed.	Press **FN/BLUE**, then press **ENTER** *or* Press **FN/BLUE**, then press and hold **ENTER**, select **Suspend**, then press **ENTER**.	Not available.	Not available.
Workabout Pro3 (7527) (Windows CE 5.0)	Press and hold **POWER**, select **Standby**, then press **ENTER**. **Note:** Through the GUI, you can set an option that suspends the device when **POWER** is pressed.	Press **POWER.** *or* Press and hold **POWER**, select **Suspend**, then press **ENTER** *or* Tap **Start** > **Shutdown** > **Suspend**.	Not available.	Not available.
Workabout Pro3 (7527) (Windows Mobile 6.1 Classic and Pro)	Press and hold **POWER**, select **Standby**, then press **ENTER**. **Note:** Through the GUI, you can set an option that suspends the device when **POWER** is pressed.	Press **POWER.**	Not available.	Not available.
Ikôn (7505) (Windows CE 5.0)	Not accessible.	Press **Power** button *or* Tap **Start** > **Shutdown** > **Suspend**.	Press and hold **POWER** *or* Tap **Start** > **Shutdown** > **Shutdown**.	Not available.
Ikôn (7505) (Windows Mobile 6)	Not accessible.	Press **Power** button.	Press and hold **POWER**	Not available.
NEO (PX750) (Windows CE 5.0)	Not accessible.	Press **FN/BLUE**, then press **ENTER** *or* Tap **Start** > **Shutdown** > **Suspend**.	Not available.	Not available.
NEO (PX750) (Windows Mobile 6.1)	Not accessible.	Press **FN/BLUE**, then press **ENTER**.	Not available.	Not available.
Omnii XT10 (7545XV) Omnii XT15 (7545XA) Omnii RT15 (7545XC) Windows Embedded CE 6.0)	Not accessible.	Press **FN/BLUE**, then press **Power** *or* Tap **Start** > **Shutdown** > **Suspend**.	Not available.	Not available.
Omnii XT15 (7545XA) Omnii RT15 (7545XC) (Windows Embedded Hand-Held 6.5)	Not accessible.	Press **FN/BLUE**, then press **Power** *or* Tap **Start** > **Shutdown** > **Suspend**.	Not available.	Not available.
EP10 (7515) (Windows Embedded Hand-Held 6.5)	Not accessible.	Press **Power** button.	Press and hold **POWER** *or* Tap **Start** > **Shutdown** > **Suspend With Radio Off**.	Press and hold **POWER** *or* Tap **Start** > **Shutdown** > **Power Off**.

3.4 Wake up from Suspend Mode, or Suspend With Radio Off Mode

When one of the following occurs, a computer that is in *suspend mode*, or *suspend with radio off mode*, wakes up:

- The device is connected to external power.
- A USB peripheral is connected.
- The battery is inserted.
- The battery door is closed.
- The touch screen is touched.
- *Suspend mode* only: The WWAN radio receives an incoming voice call, or it receives SMS or IP data packets.
- An expansion port, controlled through the HDK, is connected.

Not all of these wake-up sources are available on all Psion computers. Consult the user manual for your computer to find out which features are on your device.

3.5 EP10 Power Options Registry Settings

The following registry settings on the EP10 control the appearance and behaviour of the Suspend dialog:

HKEY_LOCAL_MACHINE\Drivers\BuiltIn\PMDrv\PBC

Value Name	Value Type	Default	Description
DlgEnabled	REG_DWORD	1	Must be enabled to make the rest of the options available. The following settings are possible: **Value** / **Description** 0 Disable 1 Enable
DlgShowDelay	REG_DWORD		Length of time (in milliseconds) that **Power** must be held before the **Shutdown** dialog is displayed (minimum 2000 ms).
DlgShowTimeout	REG_DWORD	0	Length of time (in milliseconds) that the **Shutdown** dialog is displayed before the highlighted menu item is automatically activated. The following settings are possible: **Value** / **Description** 0 Disable ≥5000 Duration in ms
DlgDefaultAction	REG_DWORD	0	**Shutdown** menu item that is highlighted when the dialog opens. The following settings are possible: **Value** / **Description** 0 First item on the list 1 Second item on the list 2 Third item on the list

Value Name	Value Type	Default	Description
DlgHideSuspend	REG_DWORD	0	Controls display of the **Suspend** option. The following settings are possible: **Value** — **Description** 0 — Display 1 — Hide
DlgHideSuspendRadiosOff	REG_DWORD	1	Controls display of the **Suspend with Radios Off** option. The following settings are possible: **Value** — **Description** 0 — Display 1 — Hide
DlgHideStandby	REG_DWORD	0	Controls display of the **Standby** option. The following settings are possible: **Value** — **Description** 0 — Display 1 — Hide
DlgHideShutdown	REG_DWORD	0	Controls display of the **Power Off** option. The following settings are possible: **Value** — **Description** 0 — Display 1 — Hide
UseSuspendDialog	REG_DWORD	1	Controls the **Suspend** dialog that is displayed when **Power** is pressed very soon after a resume. The following settings are possible: **Value** — **Description** 0 — Hide the suspend dialog. 1 — Display the suspend dialog. This prevents a second suspend immediately after resuming. **Warning: The Suspend dialog ensures that the radios have enough time to power up and power down. It is recommended that this setting is not disabled.**

3.6 Programmatic Control of the Suspend/resume Cycle

3.6.1 Initiation of Suspend

The Mobile Devices SDK includes APIs that can initiate a suspend. The device passes through *standby mode* before going into *suspend mode*; however, the Mobile Devices SDK does not contain APIs than can specifically place a computer into *standby mode*.

3.6.2 Selection of Wakeup Sources

Using the Mobile Devices SDK you can select which potential wakeup sources are active on a device. This option is not available through the GUI. The following functions are available:

- **EnableWakeupSource**—selectively enable and disable a potential wake-up source.
- **IsWakeupSourceEnabled**—query the status of a wake-up source.

The first time you enable a wakeup source programmatically, it may not bring the device into the *fully on* state. The device is in *standby mode*. For a code sample showing how to deal with this see: community.psion.com/downloads/developer_sdkhdk/m/sample__demo_code/34578.aspx.

Usually, after Windows is restarted, an enabled wakeup source brings the device out of *suspend mode* into *fully on*. For details see Section 4.3 Programmatic Initiation of Resets on page 34.

3.6.3 Accelerometer and Gyroscope

The accelerometer and the gyroscope do not wake a computer from *suspend mode*.

3.6.4 Wake up that Stops in Standby Mode

For some wakeup sources—such as WWAN radio events—the wakeup event raises the device from *suspend mode* into *standby mode*, and not to *fully on*. In this case the application must monitor the transition from suspend mode to reset mode. It can then programmatically bring the device from *standby mode* to *fully on*.

3.6.5 Setting a Time Until Wakeup

To suspend a computer for a selected length of time, use the Microsoft APIs.

3.7 Getting Started with the Suspend/resume Cycle

For articles on Ingenuity Working that will guide you in getting started with the suspend/resume cycle see: community.psion.com/tags/wakeup/noteDG.

3.8 Code Samples for the Suspend/resume Cycle

For postings on Ingenuity Working that contain code samples that use the suspend/resume cycle see: community.psion.com/tags/wakeup/codeDG.

3.9 Suspend API Elements

You cannot programmatically put a Psion computer into standby mode.

C++: Suspend on all computers is controlled using the **PsionTeklogix::PowerManagement** namespace. For suspending the computer and setting the time until wake-up use Microsoft Power Management APIs; for details see
http://msdn.microsoft.com/en-us/library/ms895437(v=MSDN.10).aspx.

Java: Suspend on all computers is controlled using the **com.teklogix.power** package.

.NET: Suspend on all computers is controlled using the **PsionTeklogix.Power** namespace. Power can also be controlled by the Windows Power Management Functions; for details see
http://msdn.microsoft.com/en-us/library/ms895437(v=MSDN.10).aspx.

Selection of wakeup sources

C++: Wakeup sources on all computers is controlled using the **PsionTeklogix::PowerManagement** namespace.

Java: Wakeup sources on all computers is controlled using the **com.teklogix.power** package.

.NET: Wakeup sources on all computers is controlled using the **PsionTeklogix.Power** namespace.

3.10 Power Management

3.10.1 Events

C++

C++ applications must use the Microsoft **RequestPowerNotifications** and **GetSystemPowerStatusEx2** APIs.

Java and .NET

The following power state events are generated by the computer and can be detected by the Mobile Devices SDK. These events are used by Java and .NET applications:

Event	States	Description
AC Power online		
AC Power online		
Battery status change	High	Fully charged
	Low	Low charge
	Critical	Needs to be charged immediately
	Charging	Charging
	NoSystemBattery	No battery detected
	Unknown	None of the other states
Power information change	On	On
	Off	Full off
	Critical	Critical off
	Boot	Device is booting
	Idle	Idle state
	Suspend	Suspend state
	Resume	Resume state
	Reset	Reset state
	Preferred	Preferred state
	UserIdle	User idle state
Power transition	Offline	Not on external power
	Online	On external power
	BackupPower	On backup power
	Unknown	None of the other states

3.11 Battery Information

3.11.1 Battery Suspend Threshold

Some computers have only a small backup battery, or no backup battery. On these computers, once the main battery has completely discharged, users have a very short time during which to change the battery before all volatile data is lost. In this situation, it can be desirable to have the device give the low battery warning prematurely, thus ensuring it gets replaced, or recharged, before data is lost.

Setting the battery suspend threshold forces the computer to suspend when that threshold is reached, before the main battery has fully discharged. The battery suspend threshold is a percentage, between 0 (zero) and 100, of the maximum allowed battery threshold charge. The actual amount of charge, remaining at the selected battery suspend threshold, is calculated based on the type of computer and the type of battery.

3.11.2 Main Battery and Backup Battery Lifetimes and Remaining Charge

The battery lifetime reported by the Mobile Devices SDK may not be accurate as various system configurations, power management settings, and the activity of various peripheral devices all affect the rate that charge is drained from the battery.

It may not be possible to determine the remaining lifetime or the full lifetime of the backup battery while the computer is being powered by an external source, such as an AC adaptor. As a result, these calls may throw an exception if the computer is on external power.

The amount of charge reported as remaining in the battery may not be accurate. Also, this value can vary due to the activity of peripheral devices such as radios.

3.11.3 Smart Batteries

Smart batteries can accurately report their status. The main use of these smart battery functions is to determine when to replace old batteries. All the batteries available for the following Psion computers are smart batteries:

- 7530
- 7535
- 8525
- 8530
- Ikôn
- Omnii
- EP10

The smart battery APIs in the Mobile Devices SDK throw an exception stating **Not Supported** on devices that do not support smart batteries.

Smart Battery Function	Description
GetBatteryCycleCount	This is important in determining the health of a battery, and determining when the battery is at the end of its life. A battery charge cycle occurs when the battery has been drained to 0%, and then refilled to 100%, of its maximum capacity. Some batteries have a life span that can be measured in cycle counts (usually from 500 – 1000, but can be more).
GetBatterySerialNumber	Returns either a string or an integer.
GetBatteryManufactureDate	This measures how old the battery is. Together with the cycle count, this determines whether the battery is wearing out too fast.

3.12 Smart Battery Registry Settings

HKEY_LOCAL_MACHINE\Services\BatteryStatus

Value Name	Value Type	Default Value	Description
Flags	REG_DWORD	0	Microsoft-required value for controlling an auto-started service. Set to **0**: Enable service Set to **4**: Disable service.
CycleThreshUsed	REG_DWORD	300	The cycle-count threshold at which a terminal is considered *Good*. Below this threshold it is considered *Excellent*.
CycleThreshOld	REG_DWORD	400	The cycle-count threshold at which a terminal is considered *Expired*. Below this threshold it is considered *Good*.

Value Name	Value Type	Default Value	Description
ShowPopupOnResume	REG_DWORD	1	The **Battery Quality** dialog appears whenever external power is connected or disconnected—the pop-up is limited to once per minute. This flag allows the pop-up to appear on resume as well. To disable this feature, set it to 0.
ShowWhenNew	REG_DWORD	4	The amount of time (in sec) that the pop-up stays visible when the green, or *Excellent*, battery icon is displayed.
ShowWhenUsed	REG_DWORD	7	The amount of time (in sec) that the pop-up stays visible when the yellow, or *Good*, battery icon is displayed.
ShowWhenOld	REG_DWORD	10	The amount of time (in sec) that the pop-up stays visible when the red, or *Expired*, battery icon is displayed. If you want this pop-up to remain visible until manually dismissed set the value to 99999.
ShowWhenUnknown	REG_DWORD	0	The amount of time (in sec) that the **Unknown** pop-up stays visible when cycle-counting is not supported (for batteries predating the smart battery feature),

3.13 Getting Started with Power Management and Smart Batteries

For articles on Ingenuity Working that will guide you in getting started with power management and smart batteries see:

community.psion.com/tags/battery power/noteDG.

3.14 Code Samples for Power Management and Smart Batteries

For postings on Ingenuity Working that contain code samples that use power management and smart batteries see:

community.psion.com/tags/battery power/codeDG.

3.15 Power Management and Battery API Elements

C++: The power on all computers is controlled using the **PsionTeklogix::PowerManagement** namespace.

Java: The power on all computers is controlled using the **com.teklogix.power** package.

.NET: The power on all computers is controlled using the **PsionTeklogix.Power** namespace. Power can also be controlled by the Windows Power Management Functions; for details see http://msdn.microsoft.com/en-us/library/ms895437(v=MSDN.10).aspx.

4 RESET

4.1 Reset Types and Effects

Table 4.1 Location of Operating System Files and Application Files

Operating System	Operating System Files	Application Files
Windows CE 5	RAM	RAM
Windows Mobile SE 2003	Flash	Flash
Windows Mobile 5.0	Flash	Flash
Windows Mobile 6.x	Flash	Flash
Windows CE 6.0	Flash	Flash

Table 4.2 Effects of Resetting Psion Computers

Feature	Warm Reset	Cold Reset or Hardware Reset	Clean Start
Restarts Windows	Yes	Yes	Yes
Restarts all drivers	Yes	Yes	Yes
Clears application memory (RAM)	Yes	Yes	Yes
Clears operating system if stored in RAM Applies to Windows CE 5 only	No	Yes	Yes
RAM disk folder is preserved Does not apply to Windows CE 5	Yes (Windows CE 6.x) No (Windows Mobile)	No	No
Sets registry to factory default	No	No	Yes
Sets Windows image to factory default	No	No	Yes
Clears addressable persistent storage (flash)	No	No	No
Can be invoked with Mobile Devices SDK API function call	Yes	Yes (Windows CE) No (Windows Mobile)	No

Warm Reset

A *warm reset* restarts the operating system.

Registry settings, installed programs, and data files are preserved. Running applications are halted and unsaved data is lost. Flash content is preserved. RAM content is not preserved. The **RAM Disk** folder is preserved on Windows CE 6.x, but it is not preserved on Windows Mobile.

Windows CE 5 Operating System

When you perform a *warm reset* on a Psion computer running Windows CE 5, the operating system is restarted *without* reloading the operating system into memory.

Windows Mobile SE 2003

On Windows Mobile SE 2003-based computers, a *warm reset* reloads and restarts the operating system. RAM memory is cleared and the RAM disk is reinitialized.

Reset

A *reset* restarts the operating system. This replaces the *warm reset* available on earlier Psion computers.

Registry settings, installed programs, and data files are preserved. Running applications are halted and unsaved data is lost. Flash content is preserved. RAM content is not preserved. The **RAM Disk** folder is not preserved.

Reset is available on the following operating systems:

- Windows Mobile 5.0
- Windows Mobile 6.x
- Windows CE 6.0

Cold Reset and Hardware Reset

Cold reset and *hardware reset* are two names for the same process. They power down, and then power up, all the hardware on a Psion computer. In effect they reinitialize all the hardware. All RAM including the **RAM disk** is erased. Nonvolatile storage such as the flash disk is preserved. All peripherals are reinitialized.

Clean Start

A *clean start* resets the computer to its factory settings.

4.2 Manual Initiation of Resets

Table 4.3 Methods for Resetting Psion Computers Using the Keyboard and Touchscreen

	Warm Reset	Reset	Cold Reset	Hardware Reset	Clean Start
753x (Windows CE 5.0)	Tap **Start** > **Shutdown** > **Warm Reset** *or* Press and hold **BLUE** and **ENTER** for six seconds.		Tap **Start** > **Shutdown** > **Cold Reset** *or* Press and hold **Scan**, **BLUE** and **ENTER** for six seconds. At BooSt menu, press **&**.		Press and hold **Scan**, **BLUE** and **ENTER** for six seconds. At BooSt menu, press **!**.
8515 (Windows CE 5.0)	Tap **Start** > **Shutdown** > **Warm Reset** *or* Press and hold **BLUE** and **ENTER** for six seconds.		Tap **Start** > **Shutdown** > **Cold Reset** *or* Press and hold **SPACE**, **BLUE** and **ENTER** for six seconds. At BooSt menu, press **&**.		Press and hold **SPACE**, **BLUE** and **ENTER** for six seconds. At BooSt menu, press **!**.
8525 / 8530 (Windows CE 5.0)	Tap **Start** > **Shutdown** > **Warm Reset** *or* Press and hold **BLUE** and **ENTER** for six seconds.		Tap **Start** > **Shutdown** > **Cold Reset** *or* Press and hold **SPACE**, **BLUE** and **ENTER** for six seconds. At BooSt menu, press **&**.		Press and hold **SPACE**, **BLUE** and **ENTER** for six seconds. At BooSt menu, press **!**.
Workabout Pro (7525) (Windows CE .NET 4.2)	Tap **Start** > **Shutdown** > **Warm Reset** *or* Press and hold **FN/BLUE** and **ENTER** for six seconds.		Tap **Start** > **Shutdown** > **Cold Reset** *or* Press and hold **ORANGE**, **FN/BLUE** and **ENTER** for six seconds.		Press and hold **Front Left Scan**, **FN/BLUE** and **ENTER** for six seconds. At BooSt menu: • For short variant, press **FN/BLUE** then **1** • For all other models, press **!**
Workabout Pro (7525) (Windows Mobile 2003 SE)	Press and hold **FN/BLUE** and **ENTER** for six seconds.		Press and hold **ORANGE**, **FN/BLUE** and **ENTER** for six seconds.		Press and hold **Front Left Scan**, **FN/BLUE** and **ENTER** for six seconds. At BooSt menu, press **!**
Workabout Pro (7525) (Windows Mobile 5.0)		Press and hold **FN/BLUE** and **ENTER** for six seconds.			Press and hold **Front Left Scan**, **FN/BLUE** and **ENTER** for six seconds. At BooSt menu, type **.25326**

	Warm Reset	Reset	Cold Reset	Hardware Reset	Clean Start
Workabout Pro G2 (7527) (Windows CE 5.0)	Tap **Start** > **Shutdown** > **Warm Reset** *or* Press and hold **FN/BLUE** and **ENTER** for six seconds.		Tap **Start** > **Shutdown** > **Cold Reset** *or* Press and hold **ORANGE**, **FN/BLUE** and **ENTER** for six seconds.		Press and hold **Front Scan**, **FN/BLUE** and **ENTER** for six seconds. At BooSt menu: • For unsecured BooSt, press **!** • For secured BooSt, type **.25326**
Workabout Pro G2 (7527) (Windows Mobile 6.0, Windows Mobile 6.1)		Press and hold **FN/BLUE** and **ENTER** for six seconds.			Press and hold **Front Scan**, **FN/BLUE** and **ENTER** for six seconds. At BooSt menu: • Alphabetic keyboard: Type **.clean**, then press **ENTER** • Numeric keyboard: Type **.25326**, then press **ENTER**.
Workabout Pro3 (7527) (Windows CE 5.0)	Tap **Start** > **Shutdown** > **Warm Reset** *or* Press and hold **FN/BLUE** and **ENTER** for six seconds. *or* Press and hold **FN/BLUE** and **Power** for six seconds.		Tap **Start** > **Shutdown** > **Cold Reset** *or* Press and hold **ORANGE**, **FN/BLUE** and **ENTER** for six seconds. *or* Press and hold **ORANGE**, **FN/BLUE** and **Power** for six seconds.		Press and hold **Front Scan**, **FN/BLUE** and **ENTER** for six seconds. At BooSt menu: • Alphabetic keyboard: Type **.clean**, then press **ENTER** • Numeric keyboard: Type **.25326**, then press **ENTER**.
Workabout Pro3 (7527) (Windows Mobile 6.1)		Press and hold **FN/BLUE** and **ENTER** for six seconds. *or* Press and hold **FN/BLUE** and **Power** for six seconds.			Press and hold **Front Scan**, **FN/BLUE**, and **ENTER** or **Power** for six seconds. At BooSt menu: • Alphabetic keyboard: Type **.clean**, then press **ENTER** • Numeric keyboard: Type **.25326**, then press **ENTER**.
Ikôn (7505) (Windows CE 5.0)	Tap **Start** > **Shutdown** > **Warm Reset** *or* Press and hold **BLUE** and **ENTER** for six seconds.		Tap **Start** > **Shutdown** > **Cold Reset** *or* Press and hold **Power**, and **ENTER** for six seconds. *or* Press and hold **Left Scan**, **BLUE** and **ENTER** for six seconds. At BooSt menu, press **&**.		Press and hold **Left Scan**, **BLUE** and **ENTER** for six seconds. At BooSt menu: • Alphabetic keyboard: Type **.clean**, then press **ENTER** • Numeric keyboard: Type **.25326**, then press **ENTER**.

	Warm Reset	Reset	Cold Reset	Hardware Reset	Clean Start
Ikôn (7505) (Windows Mobile 6)		Press and hold **BLUE** and **ENTER** for six seconds.	Press and hold **Power**, and **ENTER** for six seconds.		Press and hold **Left Scan**, **BLUE** and **ENTER** for six seconds. At BooSt menu: • Alphabetic keyboard: Type **.clean**, then press **ENTER** • Numeric keyboard: Type **.25326**, then press **ENTER**.
NEO (PX750) (Windows CE 5.0)	Tap **Start** > **Shutdown** > **Warm Reset** *or* Press and hold **FN/BLUE** and **ENTER** for six seconds.		Tap **Start** > **Shutdown** > **Cold Reset** *or* Press and hold **FN/ORANGE**, **FN/BLUE** and **ENTER** for six seconds. *or* Press and hold **Scan**, **FN/BLUE** and **ENTER** for six seconds. At BooSt menu, press **1**.		Press and hold **Scan**, **FN/BLUE** and **ENTER** for six seconds. At BooSt menu, press **!**.
NEO (PX750) (Windows Mobile 6.1)	Press and hold **FN/BLUE** and **ENTER** for two seconds.		Press and hold **Scan**, **FN/BLUE** and **ENTER** for two seconds. At BooSt menu, press **1**.		Press and hold **Scan**, **FN/BLUE** and **ENTER** for two seconds. At BooSt menu, press **!**.
Omnii XT10 (7545XV) Omnii XT15 (7545XA) Omnii RT15 (7545XC) (Windows Embedded CE 6.0, Windows Embedded Hand-Held 6.5)	Press and hold **FN** and **Power** for four seconds.		Press and hold **SYM**, **FN** and **Power** for four seconds. *or if no* ***SYM*** *key,* Press and hold **WINDOWS**, **FN** and **Power** for four seconds		Press and hold **SCAN**, **FN** and **Power** for six seconds. At BooSt menu: • Alphabetic keyboard: Type **.clean**, then press **Power** • Numeric keyboard: Type **.25326**, then press **Power**.
EP10 (7515) (Windows Embedded Hand-Held 6.5)		Press and hold **BLUE/FN** and **Power** for six seconds.		Press and hold **BLUE/FN**, **SYM**, and **Power** for six seconds.	Press and hold **BLUE/FN**, **Power** and **left SCAN** for six seconds. At BooSt menu: • Alphabetic keyboard: Type **.clean**, then press **Power** • Numeric keyboard: Type **.25326**, then press **Power**.

4.3 Programmatic Initiation of Resets

Warm reset, reset, and cold reset

The Mobile Devices SDK includes APIs that can initiate these resets.

WarmBoot: Initiates either a *warm reset* or a *reset*, whichever is available on the operating system of the device.

ColdBoot: Initiates a *cold reset*. This is only available on Windows CE systems.

Note: To restart Windows use **WarmBoot**.

Warning: ColdBoot reinitializes all the hardware as well as restarting Windows.

Hardware reset

A *hardware reset* cannot be initiated programmatically.

Clean start

The Mobile Devices SDK does not support *clean start*. For an alternative method—which is not supported on all Psion computers—of programmatically initiating a clean start, see PsionCleanStart.cpp at:

community.psion.com/downloads/developer_sdkhdk/m/sample__demo_code/25345.aspx

The API used in this example does the following:

- Resets the system hive (registry).
- Resets the user hive (user registry, HKEY_CURRENT_USER).
- Sets a flag for Total Recall auto-restore.
- Formats the root file system, or clears the object store (Windows CE only).
- Formats the boot file system.
- Resets the real time clock (RTC).

This API has a flag that by default selects *all* of these options, but you *can* select a subset of them; however, a true *clean start* **must** include all of them: If they are not all selected, then it is **not** a *clean start*.

Boot to BooSt

For a method—which is not supported on all Psion computers—of programmatically booting to BooSt see:

community.psion.com/downloads/developer_sdkhdk/m/sample__demo_code/31228.aspx

4.3.1 Controlling Keyboard Resets

On each Psion computer there are key combinations that reset the computer. See Section 4.2 Manual Initiation of Resets on page 31 for a list. The key combinations can be enabled or disabled using the Mobile Devices SDK. The following options are available:

Reset Type	Description
BoostResetKey	**Enabled:** Boot to BooSt (bootstrap menu) reset key sequence enabled. **Disabled:** When the BooSt reset key combination is entered, the device performs a cold reset.
ColdResetKey	Not valid on Windows Mobile-based devices. **Enabled:** Cold reset key sequence enabled. **Disabled:** Cold reset key sequence disabled.
WarmResetKey	**Enabled:** Warm reset key sequence enabled. **Disabled:** Warm reset key sequence disabled.

4.3.2 Detecting and Identifying Resets

See the following article for instructions on programmatically identifying warm resets, cold resets, and clean starts after they have occurred:

community.psion.com/knowledge/w/knowledgebase/1071.aspx

4.4 Getting Started with Resets

For articles on Ingenuity Working that will guide you in getting started with working with resets see:

community.psion.com/tags/reset/noteDG

4.5 Code Samples for Resets

For postings on Ingenuity Working that contain code samples that contain resets see:

community.psion.com/tags/reset/codeDG

4.6 Reset API Elements

C++: Reset on all computers is controlled using the **PsionTeklogix::PowerManagement** namespace. For suspending the computer and setting the time until wake-up use Microsoft Power Management APIs: For details see http://msdn.microsoft.com/en-us/library/ms895437(v=MSDN.10).aspx.

Java: Reset on all computers is controlled using the **com.teklogix.power** package.

.NET: Reset on all computers is controlled using the **PsionTeklogix.Power** namespace. Power can also be controlled by the Windows Power Management Functions; for details see http://msdn.microsoft.com/en-us/library/ms895437(v=MSDN.10).aspx.

5 DISPLAY

5.1 Display

The Mobile Devices SDK provides functions that obtain information on the display hardware that cannot be easily obtained using standard features of the development languages. Display features are available as follows:

Psion Computer	Screen Size	Number of Colours	Touchscreen	Type
7530	• 240 pixels wide • 320 pixels high • ¼ VGA • 3.5 in. diagonal	65536	Optional	Reflective
7535	• 240 pixels wide • 320 pixels high • ¼ VGA • 3.5 in. diagonal	65536	Optional	Reflective
8515	• 640 pixels wide • 480 pixels high • VGA • 6.4 in. diagonal	65536	Yes	Reflective
8525	• 640 pixels wide • 240 pixels high • ½ VGA • 8.8 in. diagonal	65536	Yes	Transmissive
8530	• 800 pixels wide • 600 pixels high • SVGA • 10.4 in diagonal	65536	Yes	Reflective
Ikôn (7505)	• 480 pixels wide • 640 pixels high • VGA • 3.7 in. diagonal	65536	Yes	Reflective
NEO (PX750)	• 240 pixels wide • 320 pixels high • ¼ VGA • 2.7 in. diagonal	65536	Yes	Transmissive
Workabout Pro (7525)	• 240 pixels wide • 320pixels high • ¼ VGA • 3.5 in. diagonal	Monochrome	Yes	Transflective
Workabout Pro (7525)	• 240 pixels wide • 320pixels high • ¼ VGA • 3.5 in. diagonal	65536	Yes	Transflective
Workabout Pro G2 (7527) & Workabout Pro3 (7527)	• 480 pixels wide • 640 pixels high • VGA • 3.7 in. diagonal	65536	Yes	Reflective

Psion Computer	Screen Size	Number of Colours	Touchscreen	Type
Omnii XT10 (7545XV) Omnii XT15 (7545XA) Omnii RT15 (7545XC)	• 480 pixels wide • 640 pixels high • VGA • 3.7 in. diagonal	65536	Yes	Reflective
EP10 (7515)	• 480 pixels wide • 640 pixels high • VGA • 3.7 in. diagonal	65536	Yes	Reflective

Refer to the user manuals for the computers for more information.

The following display information can be retrieved using the SDK:

Display Hardware Property	C++	Java	.NET
Colour or monochrome	No	Yes	Yes
Display type	No	Yes	Yes
Display dimensions in pixels	No	Yes	Yes
Display dimensions in millimetres	No	Yes	Yes
Maximum number of colours, or shades of grey	No	Yes	Yes
Touchscreen, or non-touchscreen	Yes	Yes	Yes

The following properties are returned, as name/value pairs, by the Mobile Devices SDK:

Property Name String	Value Type	Value
Display Type	String	Transmissive, Reflective, Transreflective, or Unknown
Physical Width	Integer	Display width in millimetres
Physical Height	Integer	Display height in millimetres
Colour Display	Boolean	True, or False
Touch Screen Installed	Boolean	True, or False
Width in Pixels	Integer	Display width in pixels
Height in Pixels	Integer	Display height in pixels
Maximum Colours	Integer	Number of colours, or shades of grey available

5.2 Getting Started with the Display

For articles on Ingenuity Working that will guide you in getting started with working with the display see: community.psion.com/tags/display/noteDG

5.3 Code Samples for the Display

For postings on Ingenuity Working that contain code samples that use the display see: community.psion.com/tags/display/codeDG

5.4 Display API Elements

C++: Information concerning the display on all Psion Windows CE computers is retrieved using the **PsionTeklogix::DisplayInformation** namespace. Additional display details are obtained using the Windows CE User Interface Services GDI function **GetDeviceCaps** ().

Java Information on the display hardware on all Psion Windows CE computers is retrieved using the **com.teklogix.display** package.

.NET: Information on the display hardware on all Psion Windows CE computers is retrieved using the **System.Windows.Forms** namespace in the .NET Compact Framework, or using the **PsionTeklogix.SystemPTX.DisplayInformation** class.

6 INDICATORS

6.1 Indicators

Most Psion computers have a LED that can be controlled by applications. Typically, these are used to indicate device activity, data reception, data transmission, error conditions, alerts, and software updates.

6.2 Using LED Colours

Each LED emits one or more colours. Some colours are built into the LED. Other colours are created by illuminating two or more built-in colours at the same time. The following terms are used to distinguish these colours:

Component colour: This colour is built into the LED.

Composite colour: This colour is created by illuminating two or more component colours at the same time on the LED.

Default on colour: A LED is illuminated with the default on colour, when it is illuminated without explicitly naming an illumination colour.

Available colour: This can be either a component colour or a composite colour.

Application-controllable LEDs are available on Psion computers as follows:

Psion Computer	Number Of LEDs Available For Applications	LED Name	Component Colors	Composite Colours	Default On Colour
7530	1	Application	Red Green	Yellow	Green
7535	1	Application	Red Green	Yellow	Green
8525/8530	1	Application	Red Green	Yellow	Green
8515	0				
Workabout Pro (7525)	1	Application	Red Green	Yellow	Green
Workabout Pro G2 (7527)	1	Application	Red Green	Yellow	Green
Workabout Pro3 (7527)	1	Application	Red Green	Yellow	Green
Ikôn (7505)	1	Application	Yellow	Yellow	Yellow
NEO (PX750)	1	Application	Red Green	Yellow	Green
Omnii XT10 (7545XV)	1	Application	Yellow	Yellow	Yellow
Omnii XT15 (7545XA)	1	Application	Yellow	Yellow	Yellow
Omnii RT15 (7545XC)	1	Application	Yellow	Yellow	Yellow
EP10 (7515)	1	Application	Yellow	Yellow	Yellow

6.3 Controlling Pulses

The following terms are used to describe the behaviour of a pulsing LED:

Independent colour: On multi-colour LEDs, if the independent colour flag is set, this pulse can add to the colour being displayed by the LED.

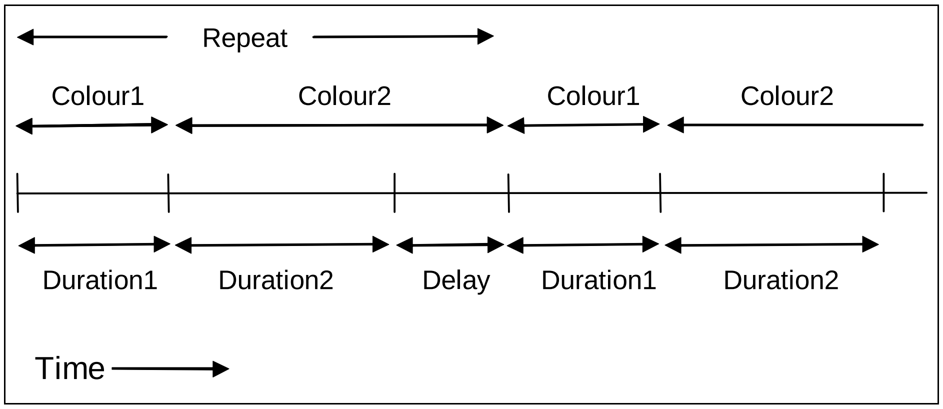
Extend current pulse: This feature only applies when the independent colour flag is also set. If the LED is in the process of performing a pulse using the same colour, the duration of this new pulse replaces the duration of the existing pulse. This can result in the duration either being extended or reduced.

Several overlapping pulses can exist. The effects depend on the settings of the independent colour flag and the extend current pulse flag.

6.4 Controlling Illumination Patterns

The Mobile Devices SDK provides the ability to display a two-colour illumination pattern on a LED.

The following diagram shows how an illumination pattern is structured:



The two colours, their duration times, the delay between repeats, and the number of repeats can be defined in the application. See the online help for your programming language for information on how to specify these values.

6.5 Getting Started with Indicators

For articles on Ingenuity Working that will guide you in getting started with working with indicators see:

community.psion.com/tags/indicators/noteDG

6.6 Code Samples for Indicators

For postings on Ingenuity Working that contain code samples that contain indicators see:

community.psion.com/tags/indicators/codeDG

6.7 Indicator API Elements

C++: The display on all Psion computers is controlled using the **PsionTeklogix::Indicators** namespace.

Java: The display on all Psion computers is controlled using the **com.teklogix.indicators** package.

.NET: The display on all Psion computers is controlled using the **PsionTeklogix.Indicators** namespace.

7 KEYBOARD AND KEYBOARD REMAPPING

7.1 Keyboard

Microsoft Windows maintains a device-independent keyboard model that enables it to support a variety of keyboards. At the lowest level, each key on the keyboard generates a scan code when the key is pressed and released. The scan code is a hardware-dependent number that identifies the physical location of the key on the keyboard. Unlike Windows-based desktop operating systems, Windows CE and Windows Mobile have no standard set of keyboard scan codes. The keyboard driver maps each scan code to a virtual key code. The virtual key code is a hardware-independent number that identifies the key to be sent to the application.

Because keyboard layouts vary between spoken languages, Windows offers only the core set of virtual key codes that are found on all keyboards. This core set includes English characters, numbers, and a few critical keys, such as the function, and arrow, keys.

In addition to mapping, the Windows keyboard driver determines which characters the virtual key generates. A single virtual key can generate different characters depending on the state of the, **BLUE**, **ORANGE**, **SYM**, **ALT**, **CTRL**, and **SHIFT**, modifier keys.

The Mobile Devices SDK provides support for the Psion-specific keys.

7.1.1 Supported Keyboards

When the keyboard type is queried through the Mobile Devices SDK, the following strings may be returned:

Computer	Keyboard Description Strings
7530 / 7535	36-Key
	37-Key
	58-Key
	63-Key
	None
8515 / 8525 / 8530	68-Key ABC
	68-Key Azerty
	68-Key Qwerty
	Unknown
	None
Ikôn (7505)	28-Key WinCE
	28-Key WM
	28-Key WM Phone
	47-Key
	47-key AZERTY
	Unknown
NEO (PX750)	26-Key
	48-Key
	Unknown

Computer	Keyboard Description Strings
Workabout Pro G1 (7525)	24 Key Keyboard
	52 Key Keyboard
Workabout Pro G2 (7527) & Workabout Pro G3 (7527)	25 key
	31 key
	48 key
	52 key
	55 key
	Unknown
Omnii (7545)	Long, 34 key, Alpha Sequence, Numeric Telephony, 12 Fn
	Long, 36 Key, Alpha Modified, Numeric Calculator, 12 Fn
	Long, 36 Key, Alpha Modified, Numeric Calculator, 12 Fn Rev1
	Long, 36 Key, Alpha Modified, Numeric Calculator, 12 Fn Rev2
	Long, 36 Key, Alpha Sequence, Numeric Telephony, 12 Fn
	Long, 36 Key, Alpha Sequence, Numeric Telephony, 12 Fn Rev1
	Long, 36 Key, Alpha Sequence, Numeric Telephony, 12 Fn Rev2
	Long, 55 Key, Phone Keys, Alpha ABC, Numeric Telephony
	Long, 55 Key, Phone Keys, Alpha ABC, Numeric Telephony Rev1
	Long, 59 Key, Alpha ABC, Numeric Telephony, 6 Fn
	Long, 59 Key, Alpha ABC, Numeric Telephony, 6 Fn Rev1
	Long, 66 key, Phone, Alpha QWERTY, Numeric Telephony, 6 Fn
	Long, 66 key, Phone, Alpha QWERTY, Numeric Telephony, 6 Fn Rev1
EP10 (7515) 30 keys + 6 side buttons	36 Key, Numeric
EP10 (7515) 46 keys + 6 side buttons	52 Key, Alpha Azerty
EP10 (7515) 46 keys + 6 side buttons	52 Key, Alpha Qwerty

7.1.2 Disabling The Keyboard

The keyboard can be disabled at the hardware level. When disabled, no key presses are recorded. Disabling the keyboard may be used to prevent user data entry while a program is performing a critical operation, such as a database transaction or a screen refresh, when a key press could cause problems.

***Important:** Take great care when disabling the keyboard. If an application terminates while the keyboard is disabled, there is no easy way to re-enable the keyboard. This can leave the computer in an unusable state; however, if the computer has a touchscreen, the touch-screen is still active.*

Some keyboard operations are still available even when the keyboard is disabled, including resets, and placing the computer into suspend mode.

7.1.3 Getting Started with Keyboards

For articles on Ingenuity Working that will guide you in getting started with working with keyboards see:
community.psion.com/tags/keyboard/noteDG

7.1.4 Code Samples for Keyboards

For postings on Ingenuity Working that contain code samples that use keyboards see:
community.psion.com/tags/keyboard/codeDG

7.1.5 Keyboard API Elements

C++: The display on all Psion computers is controlled using the **PsionTeklogix::Keyboard** namespace.

Java: The display on all Psion computers is controlled using the **com.teklogix.keyboard** package.

.NET: The display on all Psion computers is controlled using the **PsionTeklogix.Keyboard** namespace.

7.2 Keyboard Remapping

The key stroke information sent to an application when a key is pressed can be altered through a process of remapping key code values. There are two sets of key codes – scan codes and virtual key codes – which define the associations between a physical key pressed, and the key value that is sent to an application. The default associations of these key code sets characterize the normal behaviour of a particular keyboard. Keyboard remapping overrides the default behaviour of the keyboard keys.

Scan codes

A *scan code* is an integer value representing a key on a keyboard. Scan codes are keyboard dependent.

All Psion computers have non-chorded keyboards. A non-chorded keyboard is a keyboard that does not handle simultaneous key presses. Each key pressed generates a unique scan code which is not modified by the state of other keys on the keyboard.

Modifier keys

Modifier keys are keys that when pressed and released set a mode that can change the behaviour of other keys on the keyboard. The following keys are modifier keys: **BLUE**, **ORANGE**, **SYM**, **ALT**, **CTRL**, and **SHIFT**. These can change the virtual key code value generated by a subsequent scan code.

Virtual key codes

A *virtual key code* is a device-independent value defined by the keyboard driver. Virtual key codes are passed to applications. Scan codes are mapped to virtual key codes by the keyboard driver. A single scan code can map to multiple virtual key codes, dependent on the current state of the modifier keys.

Some characters do not have virtual key codes, but can be generated using shifted-key codes. For example, a **+** character is actually generated by sending a shifted **=** virtual key code (that is, the scan code is mapped to **VK_EQUAL** and the function **Function.SendShiftedCode**). These mappings can be inferred from a standard PC keyboard.

For a list of Windows CE virtual key codes see msdn.microsoft.com/en-us/library/aa926323.aspx.

For a list of Windows Mobile virtual key codes see msdn.microsoft.com/en-us/library/bb431750.aspx.

Mapping tables

The mapping between the scan codes and the virtual key codes is defined in a set of tables. There are separate tables to define the code mappings for normal operation, and for when the **SHIFT**, **ORANGE**/ **SYM** or **BLUE** modifiers are active. The **ORANGE** and **BLUE** tables can be remapped, the **SHIFT** table cannot be remapped.

There are no mapping tables for the **CTRL** and **ALT** modifier keys, so these do not change the virtual key code generated. On receiving a virtual key code, an application can detect the state of these modifiers, and change its behaviour accordingly.

If two threads or processes attempt to modify the keyboard scan code mappings at the same time, the results are undefined.

Scan code remapping enables applications to perform the following operations:

- Create one or more scan code remappings for a scan code table.
- Remove a scan code remapping from a scan code table.
- Remove all scan code remappings from a scan code table.
- Check to see if a particular scan code has been remapped.
- Convert the table to a printable string.

There are three tables where scan codes can be remapped:

- Normal—remappings for all scan codes when neither the **BLUE** nor the **ORANGE** / **SYM** keys are pressed.
- Blue—remappings for when the **BLUE** key is pressed.
- Orange—remappings for when the **ORANGE**, or the **SYM**, key is pressed.

If both the **BLUE** and **ORANGE** / **SYM** keys have been pressed (they are both in either the one-shot or locked state), the remapping for the **BLUE** key has precedence.

Functions

A *function* in keyboard remapping terminology is an operation that is performed on a scan code. This operation may modify the virtual key code generated, or cause some other effect such as changing the backlight intensity. The following types of functions are available:

- Macro—maps a scan code to a macro key, which is then mapped into a sequence of one of more virtual key codes. No virtual key code is generated (other than those defined in the macro sequence).
- Operation only—maps a scan code to some specific behaviour (e.g. backlight intensity). No virtual key code is generated.
- Modifier key mapping—causes a scan code to simulate the pressing of a modifier key, in order to correctly update the modifier key state. Normal sequence for modifier keys is: off -> one shot -> locked -> off).
- Virtual key (+modifier)—maps a scan code to a virtual key code, and may simulate the pressing of one or more modifier keys.
- Direct Unicode mapping—maps a scan code directly to a Unicode character. This enables characters to be generated which have no virtual key equivalents, such as accented characters.
- Null mapping—causes a scan code to be ignored.

A scan code mapping can involve all of these elements. A scan code can be mapped to a function, and possibly also to a virtual key, a macro, or a Unicode character value.

7.2.1 ORANGE Key and SYM Key

All Psion computers have either an **ORANGE/FN** key or a **SYM** key. The **SYM** key appears on the following:

- Omnii
- EP10

When used as a modifier key, the two keys are identical.

There is a difference when data is typed on the keyboard.

- **ORANGE/FN key:** This gives access to additional keys and system functions. These functions are colour coded in orange print on the keyboard or on the keycaps.
- **SYM key:** This gives access to additional keys and system functions. When the **SYM** key is pressed, the soft input panel (SIP) onscreen keyboard is displayed. This has the same key layout as the actual keyboard. You can select a key either by pressing the corresponding keyboard key, or tapping the onscreen symbol.

Hiding the Psion soft input panel (SIP)

Normally, each time **SYM** is pressed the SIP is displayed. This can be inconvenient if **SYM** has been used as a modifier with a remapped key.

Use the **HKEY_LOCAL_MACHINE\Init key** registry setting to disable the Psion soft input panel.

7.2.2 Keyboard Remapping Functions on Psion Computers

A **function** in keyboard remapping terminology is an operation that is performed when a particular scan code is generated by a key press. This operation may modify the virtual key code generated, or cause some other effect such as changing the backlight intensity. The following types of functions are available:

Function	Description
Skip	The remapped scan key is ignored. The virtual key is ignored.
Blue	The remapped scan key behaves like the **BLUE** key in one shot mode. The virtual key is ignored.
Orange	The remapped scan key behaves like the **ORANGE** key in one shot mode. The virtual key is ignored.
Shift	The remapped scan key behaves like the **SHIFT** key in one shot mode. The virtual key is ignored.
Control	The remapped scan key behaves the same as the **CTRL** key. The virtual key is ignored.
Alt	The remapped scan key behaves the same as the **ALT** key. The virtual key is ignored.
SendUnshiftedCode	The remapped scan key is replaced by a selected unshifted scan key. This function is keyboard dependent. It also releases all one-shots that are set for the modifier keys. This function is equivalent to selecting the **Force Unshifted** radio button on the **Remap Scancode** screen. If **A** is mapped to **B** using *Function* = **SendUnshiftedCode**, typing **ABC** results in: • With the **SHIFT** modifier key set: bBC • Without the **SHIFT** modifier key set: bbc
SendShiftedCode	The remapped scan key is replaced by a selected shifted scan key. This function is keyboard dependent. It also releases all one-shots that are set for the modifier keys. This function is equivalent to selecting the **Force Shifted** radio button on the **Remap Scancode** screen. If **A** is mapped to **B** using *Function* = **SendShiftedCode**, typing **ABC** results in: • With the **SHIFT** modifier key set: BBC • Without the **SHIFT** modifier key set: Bbc
SendCode	The remapped scan key is associated with a selected virtual key. This function is keyboard dependent. It also releases all one-shots that are set for the modifier keys. This function is equivalent to selecting the **Virtual Key** radio button on the **Remap Scancode** screen. The modifier key states change the outcome of this function. If **A** is mapped to **VK_B** using *Function* = **SendCode**, typing **ABC** results in: • With the **SHIFT** modifier key set: BBC • Without the **SHIFT** modifier key set: bbc
ContrastUp	Each press of the remapped scan key increases the screen contrast. This function also releases all one-shots that are set for the modifier keys. The virtual key is ignored.
ContrastDown	Each press of the remapped scan key decreases the screen contrast. This function also releases all one-shots that are set for the modifier keys. The virtual key is ignored.

Function	Description
VolumeUp	Each press of the remapped scan key increases the volume of the beeper/WAV device. This function also releases all one-shots that are set for the modifier keys. The virtual key is ignored.
VolumeDown	Each press of the remapped scan key decreases the volume of the beeper/WAV device. This function also releases all one-shots that are set for the modifier keys. The virtual key is ignored.
ScannerOn	While the remapped scan key is depressed, the scanner is active. The virtual key is ignored.
TerminalOff	Each press of the remapped scan key puts the mobile device into *suspend mode*. This function also releases all one-shots that are set for the modifier keys. The virtual key is ignored.
BacklightCycleUp	Each press of the remapped scan key increases the intensity of the display backlight. When the maximum intensity is reached, the intensity drops to its lowest level, and it is increased again by each succeeding key press. This function also releases all one-shots that are set for the modifier keys. The virtual key is ignored.
Macro	The remapped scan key is associated with a selected macro. This function also releases all one-shots that are set for the modifier keys. This function is equivalent to selecting the **Macro** radio button on the **Remap Scancode** screen.
SendUnicode	The remapped scan key is associated with a Unicode character.
BacklightBrighter	Each press of the remapped scan key increases the intensity of the display backlight. This function also releases all one-shots that are set for the modifier keys. The virtual key is ignored.
BacklightDimmer	Each press of the remapped scan key decreases the intensity of the display backlight. This function also releases all one-shots that are set for the modifier keys. The virtual key is ignored.
BacklightCycleDown	Each press of the remapped scan key decreases the intensity of the display backlight. When the maximum intensity is reached, the intensity is reset to its highest level, and it is decreased again by each succeeding key press. This function also releases all one-shots that are set for the modifier keys. The virtual key is ignored.
SystemPowerState	Each press of the remapped scan key suspends the computer. The virtual key is ignored.
FunctionSendDPadCode	The remapped scan key behaves like ENTER or one of the arrow keys on a PocketPC DPad.
FunctionTrigger	The remapped scan key is associated with a trigger source (see the **TriggerControl** class). The value supplied with function is the trigger source ID value.

Function	Description
FunctionWindowsMobileKey	The remapped scan key is associated with one of the following Windows Mobile virtual keys: • VK_APP1 • VK_APP2 • VK_APP3 • VK_APP4 • VK_APP5 • VK_APP6 • VK_DONE
SendArrowKey	When this function is selected, each press of an arrow key generates a virtual key code that depends on the orientation of the device in the vertical plane. For example: When this feature is selected, pressing the ARROW UP key gives the following results:

Device Orientation	Generates the virtual key code corresponding to...
Upright	ARROW UP
Rotated 90° clockwise	ARROW RIGHT
Rotated 180°	ARROW DOWN
Rotated 90° counter-clockwise	ARROW LEFT

Function	Description
FunctionUnknown	

7.2.3 Unicode Values for Psion Proprietary Keys

Psion Key	Unicode Value (Hexadecimal)
F0	E000
F1	E001
F2	E002
F3	E003
F4	E004
F5	E005
F6	E006
F7	E007
F8	E008
F9	E009
F10	E00A
F11	E00B
F12	E00C
F13	E00D
F14	E00E
F15	E00F

Psion Key	Unicode Value (Hexadecimal)
F16	E010
F17	E011
F18	E012
F19	E013
F20	E014
F21	E015
F22	E016
F23	E017
F24	E018
F25	E019
F26	E01A
F27	E01B
F28	E01C
F29	E01D
F30	E01E
...	...
F64	E040
Menu Mode	E041
View Mode	E042
Split Screen	E043
Decrement View	E044
Increment View	E045
Select First App	E046
Toggle Split Screen	E047
Accent Mode (Custom Characters)	E048
Literal Mode	E049
Reserved	E04A
Pan Left	E04B
Pan Right	E04C
Pan Up	E04D
Pan Down	E04E
Reserved (Legacy 7030 or Internal use)	E04F
Reserved (Legacy 7030 or Internal use)	E050
Reserved (Legacy 7030 or Internal use)	E051

Psion Key	Unicode Value (Hexadecimal)
Reserved (Legacy 7030 or Internal use)	E052
Reserved (Legacy 7030 or Internal use)	E053
Reserved (Legacy 7030 or Internal use)	E054
Macro 1	E055
Macro 2	E056
Macro 3	E057
Macro 4	E058
Macro 5	E059
Macro 6	E05A
Macro 7	E05B
Macro 8	E05C
Macro 9	E05D
Macro 10	E05E
…	…
Macro 30	E072
Left Arrow	E073
Right Arrow	E074
Up Arrow	E075
Down Arrow	E076
Shift Left Arrow	E077
Shift Right Arrow	E078
Shift Up Arrow	E079
Shift Down Arrow	E07A
Clear	E07B
Reserved (Legacy 7030 or Internal use)	E07C
Calculator	E07D
Keyboard Remap Toggle	E07E
Pop-up Toolbar	E07F
Reserved (Legacy 7030 or Internal use)	E080
Reserved (Legacy 7030 or Internal use)	E081
Reserved (Legacy 7030 or Internal use)	E082
Reserved (Legacy 7030 or Internal use)	E083
Reserved (Legacy 7030 or Internal use)	E084
Reserved (Legacy 7030 or Internal use)	E085
Reserved (Legacy 7030 or Internal use)	E086

Psion Key	Unicode Value (Hexadecimal)
ANSI Smart Echo Suspend	E087
TESS Reset	E088
TESS Attention	E089
TESS System Request	E08A
TESS Rollup	E08B
TESS Rolldown	E08C
TESS Help	E08D
TESS Print	E08E
TESS RBS	E08F
TESS PA1	E090
TESS PA2	E091
TESS PA3	E092
TESS Clear	E093
TESS Test Request	E094
TESS Session	E095
TESS Host Reset	E096
TESS Field Advance	E097
TESS Field Backspace	E098
TESS Field Exit	E099
TESS Field Minus	E09A
TESS Home	E09B
TESS Newline	E09C
TESS Erase Input	E09D
Reserved (Legacy 7030 or Internal use)	E09E
Tab keypress (not ASCII Tab 0009)	E09F
Select 2nd App	E0A0
Select 3rd App	E0A1
Select 4th App	E0A2
Select 5th App	E0A3
Select 6th App	E0A4
Select 7th App	E0A5
Select 8th App	E0A6
Select 9th App	E0A7

7.2.4 Windows Mobile, and Windows CE, Virtual Keys

For information on virtual key codes on Windows Mobile, and Windows CE, systems see msdn.microsoft.com/en-us/library/bb431750.aspx

7.2.5 Windows Mobile Virtual Keys on Psion Computers

Some virtual keys, that are available to applications running under Windows CE, are not passed onto applications by Windows Mobile systems. These virtual keys are captured, and interpreted, by the Windows Mobile operating system.

Function keys

All the function keys, **FN1** to **FN64**, are captured by Windows Mobile systems. On Psion computers the virtual key codes for the function keys are converted to private Unicode characters. See Section 7.2.3 Unicode Values for Psion Proprietary Keys on page 55 for a list of these Unicode characters.

For example, when **FN1** is pressed, the U+E001 character is passed to the application. This is 57345 in decimal. This results in the following string being passed to the application:

[**ALT**][**0**][**5**][**7**][**3**][**4**][**5**][**ALT**]

7.2.6 Getting Started with Key Remapping

For articles on Ingenuity Working that will guide you in getting started with key remapping see:

community.psion.com/tags/keyboard/noteDG

7.2.7 Code Samples for Key Remapping

For postings on Ingenuity Working that contain code samples that contain key remapping see:

community.psion.com/tags/keyboard/codeDG

7.2.8 Keyboard Remapping API Elements

C++: The keyboard remapping on all Psion computers is controlled using the **PsionTeklogix::Keyboard::KeyRemapper** class.

Java: The keyboard remapping on all Psion computers is controlled using the **com.teklogix.keyboard.KeyRemapper** class.

.NET: The keyboard remapping on all Psion computers is controlled using the **PsionTeklogix.Keyboard.KeyRemapper** class.

7.3 Key Insertion

Key insertion permits a command key or a modifier key, with another optional related key, to be inserted into an input field. The following command keys and modifier keys can be inserted:

- Blue
- Orange
- Shift
- Control
- Alt
- Send unshifted code
- Send shifted code
- Contrast up
- Contrast down
- Volume up
- Volume down
- Scanner on
- Terminal off
- Backlight cycle up
- Macro
- Send unicode
- Backlight brighter
- Backlight dimmer
- Backlight cycle down
- System power state
- Send DPad code
- Trigger

Before this feature is invoked, the focus must be on the relevant input field.

This feature is typically used for the following, described in further detail below:

- In application lock-down mode, displaying key presses in alpha mode.
- Reversing an accidental press of the [BLUE] key or the [ORANGE] key.
- As a keyboard wedge.

Application Lock-Down Mode

When an application is operating in lock-down mode, the Windows task bar is not visible. Normally, when a user is entering alpha characters on a computer with a numeric keyboard ([2ABC], [3DEF], etc.), the intermediate characters are displayed on the Windows task bar until the desired character is selected. Key insertion allows an application to display the intermediate alphabetic characters directly in the input field.

Reversing Accidental Key Presses

If the [BLUE] or [ORANGE] key is accidently pressed by an operator during data entry, the results can be unexpected and can cause an input error. Detecting the accidental modifier key press, and reversing it within the application, ensures that the intended data is entered.

The Mobile Devices SDK provides functions that allow the [BLUE] key and the [ORANGE] key presses to be intercepted. The key insertion feature allows the application to reverse the setting of the key.

Keyboard Wedge

A keyboard wedge inserts characters into a field that is in focus. A single virtual key can be inserted into an input field by each call to the key insertion function. A command key, such as **Send unshifted code** accompanied by a virtual key code, wedges the associated virtual key into the input field.

7.3.1 Getting Started with Key Insertion

For articles on Ingenuity Working that will guide you in getting started with key insertion see:

community.psion.com/tags/keyboard/noteDG

7.3.2 Code Samples for Key Insertion

For postings on Ingenuity Working that contain code samples that contain key insertion see:

community.psion.com/tags/keyboard/codeDG

7.3.3 Key Insertion API Elements

C++: Key insertion on all Psion Windows computers is controlled using the **PsionTeklogix::Keyboard** namespace.

Java: Key insertion on all Psion Windows computers is controlled using the **Keyboard** class in the **com.teklogix.keyboard** package.

.NET: Key insertion on all Psion Windows computers is controlled using the **Keyboard** class in the **PsionTeklogix.Keyboard** namespace.

8 PERIPHERALS

8.1 Overview

The Mobile Devices SDK enables applications to detect and control peripherals—such as docking stations, tethered devices, and cards inserted in card slots—attached to the following Psion computers:

- 753x
- 8515
- 8525 / 8530
- Workabout Pro (7525)
- Workabout Pro G2 (7527)
- Workabout Pro3 (7527)
- Ikôn (7505)
- NEO (PX750)

Docking stations and card slots for the following Psion computers are controlled through the corresponding HDKs:

- Omnii XT10 (7545XV)
- Omnii XT15 (7545XA)
- Omnii RT15 (7545XC)
- EP10 (7515)

8.2 Definition of Terms

Some terms used in the chapter have precise definitions. They are defined in this section.

Adaptor: This is a hardware component that supports the connection of the computer to a network or a peripheral device. An adaptor can be a printed circuit board, a PC card, or circuitry that is part of the mother board.

Device driver: This is a software component that permits a computer system to communicate with a device. In most cases, the driver also manipulates the hardware in order to transmit the data to the device.

Peripheral or peripheral device: A device, such as a hard drive, printer, radio or modem, that is connected to a computer and is controlled by the computer's microprocessor.

8.3 Events

The following peripheral event types are detected by the Mobile Devices SDK:

- Adaptor event
- Docking station event
- Interface event
- Tether port event

Adaptor event: Occurs when the adaptor is connected to or removed from the slot.

Docking station event: Occurs when the device is inserted into or removed from the docking station.

Interface event: Occurs when the device is connected to or removed from the slot/port.

Tether port event: Occurs when the device is connected to or removed from the tether port.

8.4 Docking Station

The Mobile Devices SDK can detect the type of docking station the Psion computer is currently resting in.

A docking station is an external hardware component. It can be one of the following:

- Portable docking module
- Battery charger
- Cradle

A docking station can include one or more additional serial ports, and USB ports.

8.5 Tether Ports

The Mobile Devices SDK can detect the type of peripheral device that is attached to the computer via an external tether port. It can also detect the attachment and removal of a tether port device.

Tether ports are available as follows:

Psion Computer	Has A Tether Port
753x	Yes
7535	Optional
8515	Yes
8525/8530	Yes
Workabout Pro (7525)	Yes
Workabout Pro G2 (7527)	Yes
Workabout Pro3 (7527)	Yes
Ikôn (7505)	Yes
NEO (PX750)	Yes
EP10 (7515)	No

The following types of device can be attached to a tether port:

- Scanners
- RFID readers
- Imagers

8.6 Getting Started with Peripherals

For articles on Ingenuity Working that will guide you in getting started with working with docking stations see:

community.psion.com/tags/docking station/noteDG

For articles on Ingenuity Working that will guide you in getting started with working with tether ports see:

community.psion.com/tags/tether port/noteDG

8.7 Code Samples for Peripherals

For postings on Ingenuity Working that contain code samples that use docking stations see:

community.psion.com/tags/docking station/codeDG

For postings on Ingenuity Working that contain code samples that use tether ports see:

community.psion.com/tags/tether port/codeDG

8.8 Peripheral API Elements in the Mobile Devices SDK

For the following Psion computers the peripherals are controlled through the Mobile Devices SDK:

- 753x
- 8515
- 8525 / 8530
- Workabout Pro (7525)
- Workabout Pro G2 (7527)
- Workabout Pro3 (7527)

- Ikôn (7505)
- NEO (PX750)

C++: The peripherals are controlled using the **PsionTeklogix::System::Peripherals** namespace.

Java: The peripherals are controlled using the **com.teklogix.system** package.

.NET: The peripherals are controlled using the **PsionTeklogix.Peripherals** namespace.

8.9 Peripheral API Elements in the Hardware Development Kits (HDK)

For the following Psion computers the peripherals are controlled through software included in the Hardware Development Kits:

- Omnii XT10 (7545XV)
- Omnii XT15 (7545XA)
- Omnii RT15 (7545XC)
- EP10 (7515)

For information, on Ingenuity Working see:

- Omnii HDK User Manual
- EP10 Hand-Held Computer HDK User Manual

9 CARD SLOTS

9.1 Card Slots

The Mobile Devices SDK provides functions that control the power status of card slots. There are situations, such as in hospitals or airports, where it is necessary to temporarily prevent radios from transmitting. Using SDK functions to disable power to the card slot containing the radio achieves this. Most Psion hand-held and vehicle-mount computers have this feature available on all card slots; however, there are some exceptions. Refer to the tables below for details.

For those card slots that cannot be powered off, the driver for the card slot is unloaded, and all further attempts by the application to communicate with the card slot are ignored; however, the card slot remains fully powered, so the outcome depends on the behaviour of the radio card under these circumstances.

The following table lists the Psion computers, their card slots, and whether the card slots can be controlled by the SDK. The "SDK Hardware Name" is the specific string used with the get / set method to identify the card slot.

7530

Card Slot Type	SDK Hardware Name	Software Control Of Power State	Cards Accepted
SDIO	SD-MMC	Yes	SD card MMC card
Compact Flash	PCMCIA Slot0	Yes	CF card

7535

Card Slot Type	SDK Hardware Name	Software Control Of Power State	Cards Accepted
SD-MMC	SD-MMC	Yes[1]	SD card MMC card
CF	PCMCIA Slot0	Yes[2]	CF card

[1]On the7535, the SD-MMC card slot cannot be powered off. The driver for the card can be unloaded and further activity on the slot is ignored, but the device is still powered and may still be active in some way (e.g. a radio may still transmit/receive).

[2]On the 7535, calls to the power state setting method for PCMCIA Slot1 are ignored.

8515

Card Slot Type	SDK Hardware Name	Software Control Of Power State	Cards Accepted
MicroSD	SD-MMC	No	MicroSD card (memory only)
Compact Flash	PCMCIA Slot0	Yes	

8525/8530

Card Slot Type	SDK Hardware Name	Software Control Of Power State	Cards Accepted
SD-MMC	SD-MMC	Yes	SD card MMC card

Card Slot Type	SDK Hardware Name	Software Control Of Power State	Cards Accepted
Compact Flash	PCMCIA Slot0	Yes	CF card
PCMCIA	PCMCIA Slot1	Yes	PCMCIA card CF card in adaptor

Workabout Pro

Card Slot Type	SDK Hardware Name	Software Control Of Power State	Cards Accepted
SD-MMC	SD-MMC	Yes	SD card (memory only) MMC card (memory only)
CF	PCMCIA Slot0	Yes	CF card
PCMCIA (upgradable on 100-pin connector)	PCMCIA Slot1[3]	Yes	PCMCIA card

[3]On the WORKABOUT PRO, when the PCMCIA slot is not installed, calls to the power state setting method for PCMCIA Slot1 throw an exception.

Ikôn (7505)

Card Slot Type	SDK Hardware Name	Software Control Of Power State	Cards Accepted
MicroSD	SD-MMC	Yes	MicroSD card
Proprietary	PCMCIA Slot0	Yes	WLAN Radio

NEO (PX750)

Card Slot Type	SDK Hardware Name	Software Control Of Power State	Cards Accepted
MicroSD	SD-MMC	Yes	MicroSD card

Omnii (7545)

Card Slot Type	SDK Hardware Name	Software Control Of Power State	Cards Accepted
MicroSD		No	MicroSD card

EP10 (7515)

Card Slot Type	SDK Hardware Name	Software Control Of Power State	Cards Accepted
MicroSD		No	MicroSD card

Workabout Pro

Card Slot Type	SDK Hardware Name	Software Control Of Power State	Cards Accepted
SD-MMC	SD-MMC	Yes	SD card (memory only) MMC card (memory only)
CF	PCMCIA Slot0	Yes	CF card
PCMCIA (upgradable on 100-pin connector)	PCMCIA Slot1[3]	Yes	PCMCIA card

[3]On the WORKABOUT PRO, when the PCMCIA slot is not installed, calls to the power state setting method for PCMCIA Slot1 throw an exception.

9.1.1 Controlling Power to the Card Slots

Power to software-controllable card slots is controlled using the following processes:

- Through the GUI Power Properties applet.
- Through application software using the SDK.
- Through application software using the HDK.

The power state can be set by either method. The most recently set state, from whichever source, applies.

9.1.1.1 Controlling Power Through the GUI

Power to the software-controllable card slots can be controlled through the GUI. Psion hand-held computers have a Power icon on the GUI. Selecting this icon opens the *Power Properties* window, which has several different tabs. Select the *Card Slots* tab. For each card slot on the hand-held computer the following are listed:

- The name of the card slot.
- One of:
  - The name of the peripheral occupying the card slot.
  - Disabled.
  - Empty Slot.
- A checkbox indicating whether the card slot is enabled or disabled.

Click on the checkbox to toggle the power state of the card slot. Changes do not take effect until you click the **Apply** button.

Refer to the user manual for the Psion hand-held or vehicle-mount computer for more details.

9.1.1.2 Controlling Power Through the SDK

Each of the API libraries has methods for the following (refer to the documentation for the relevant API library for more details):

Method Purpose	Input & Output
Set the power state	Input: <Hardware name> and <Power state>
Get the power state	Input: <Hardware name> Output: <Power state>

Where: <Hardware name> identifies the card slot. See Section 9.1 Card Slots on page 69 for valid values.

<Power state> has one of the following values:
PowerState_Off
PowerState_On
PowerState_Unknown (only valid when querying the power state)

Querying the Power State

When the power state of a card slot is queried, the result is interpreted as follows:

- PowerState_Off — returned when there is no card in the card slot, or when there is a card in the slot and the card slot is powered down.
- PowerState_On — returned when there is a card in the slot and the card slot is powered on.
- PowerState_Unknown — returned when the power state of the slot cannot be determined.

Changing the Power State

When a slot is in PowerState_On, it is powered down by one of the following:

- Using the SDK method for setting the power state.
- Through the GUI.

When a slot is in PowerState_Off, it is powered up by one of the following:

- Using the SDK method for setting the power state.
- Through the GUI.
- Performing a clean start of the Windows operating system (see Chapter 4: "Reset").

Events

If there is a card in the card slot when the power state is changed, the following events are generated:

- Changing the state from PowerState_On to PowerState_Off generates a card removal event.
- Changing the state from PowerState_Off to PowerState_On generates a card insertion event.

While the card slot is in PowerState_On, the following events occur:

- Inserting a card generates a card insertion event.
- Removing a card generated a card removal event.

While the slot is in PowerState_Off, no card insertion or card removal events are generated.

9.1.2 Getting Started with Card Slots

For articles on Ingenuity Working that will guide you in getting started with working with card slots see:

community.psion.com/tags/card slots/noteDG

9.1.3 Code Samples for Card Slots

For postings on Ingenuity Working that contain code samples that control card slots see:

community.psion.com/tags/card slots/codeDG

9.1.4 Card Slot Control API Elements

C++: The card slots on all Psion computers are controlled using the **PsionTeklogix::Peripherals** namespace.

Java: The card slots on all Psion computers are controlled using the **Peripherals** class in the **com.teklogix.system** package.

.NET: The card slots on all Psion computers are controlled using the **PsionTeklogix.Peripherals** namespace.

10 SERIAL PORTS

10.1 Overview

Serial ports can be dynamically added to, and removed from, Psion computers. Also, on some computers, serial ports can change their physical location. COM ports may be associated with actual physical serial ports, or they may be assigned to a device that acts like a serial port, such as an IrDA port, a USB port, or a *Bluetooth* device.

Serial ports can appear on (attach), or disappear from (detach), a Psion computer dynamically. For example, a new serial port appears when a 753x computer is placed into a charger with a port replicator attachment, or if a modem card is inserted into a card slot. These ports can then disappear if the Psion computer is removed from the charger, or if the modem card is removed from the card slot. Events are generated when serial ports attach or detach.

Bluetooth

BSP ports 1-9 can be used to add a *Bluetooth* virtual COM port. For setup instructions see the User Manual for your Psion computer.

10.2 Workabout Pro Serial Port Assignments

Table 10.1 Default Workabout Pro Serial Port Assignments

Serial Port	Default Assignment
BSP 1-9	Bluetooth virtual devices.
COM0	
COM1	On 100-pin expansion connector.
COM2	Serial port on the tether port. Workabout Pro: Adapter is required. Workabout Pro G2 and Workabout Pro3: No adaptor is required.
COM3	**Cannot be reassigned.** Internal scanner or imager.
COM4	**Cannot be reassigned.** USB client port—used by ActiveSync.
COM5	RS-232 port A on port replicator, and serial port available on USB-to-serial adaptor. This port is not available during suspend, when the USB driver is unloaded.
COM6	RS-232 port B on port replicator. This port is not available during suspend, when the USB driver is unloaded.
COM7	Bluetooth Command Interpreter (blocked) See Note 1. RS-232 port C on port replicator. This port is not available during suspend, when the USB driver is unloaded.
COM8	Virtual port—for WWAN GSM
COM9	**Cannot be reassigned.** IRCOMM port.
COM20	**Cannot be reassigned.** Internal *Bluetooth* radio.
COM21	Built-in USB-Serial adaptor port.

Note 1: For more information see
community.psion.com/knowledge/w/knowledgebase/bthatci-service-using-com-7.aspx

All COM ports can be reassigned unless indicated otherwise in Table . Reassignment is done either using the Psion COM Port Manager GUI program, or in the Windows registry.

For information on using the COM Port Manager, refer to the user manual for the Psion computer.

Workabout Pro: Only COM0: to COM9: are available.

Workabout Pro G2 and Workabout Pro3: All ports up to COM99 are available.

Serial ports on computers with user-accessible cards are assigned dynamically—at the lowest available COM port number—as the cards are inserted and removed.

On the Workabout Pro G2, the maximum baud rate is 921.6 k baud if RTS/CTS hardware flow control is enabled.

Psion Serial Endcaps

Psion supplies endcaps with serial ports for the Workabout Pro G2 computer. These endcaps use the following serial ports:

- IrDA, TTL, and RS-232 serial endcap (BR1000)—COM9:, COM0:, COM1:, and COM8:
- RS-232 serial endcap (BR1001)—COM9: and COM1:
- IrDA serial endcap (BR1002)—COM9: and COM0:

10.3 7530, 7535, 8525, and 8530 Serial Port Assignments

Table 10.2 Default 753x / 8525 / 8530 Serial Port Assignment

Serial Port	Default Assignment	
	7530 and 7535	8525 and 8530
BSP 1-9	Bluetooth virtual devices	
COM0		
COM1	Tether port—adaptor is not needed.	Tether port—adaptor is not needed.
COM2	Internal scanner or imager. This port is not visible to the SDK.	Serial port.
COM3	Console port on portable docking module.	Console port on the service cable.
COM4	USB client port—used by ActiveSync.	USB client port—used by ActiveSync.
COM5	Port replicator, port A.	
COM6	Port replicator, tether port.	

No ports can be reassigned on these computers.

Serial ports on computers with user-accessible cards are assigned dynamically—at the lowest available COM port number—as the cards are inserted and removed.

10.4 8515 Serial Port Assignments

COM1: is the only serial port on the 8515.

10.5 Ikôn Serial Port Assignments

Table 10.3 Default Ikôn Serial Port Assignment

Serial Port	Default Assignment
BSP 1-9	Bluetooth virtual devices
COM0	UMTS
COM2	GPS
COM3	Console port on portable docking module.
COM4	USB client port—used by ActiveSync.
COM5	RS-232 port on Ikôn, and serial port available on the USB port of the port replicator.

Serial Port	Default Assignment
COM6	RS-232 port A on port replicator.
COM7	Bluetooth Command Interpreter (blocked).
COM9	UMTS and GSM
COM22	Internal *Bluetooth* radio.
COM23	Internal scanner. This port is not visible to the SDK.

No ports can be reassigned on this computer.

10.6 NEO Serial Port Assignments

Table 10.4 Default NEO Serial Port Assignment

Serial Port	Default Assignment
COM3	Console port (RX and TX data only).
COM4	USB client port–used by ActiveSync.
COM5	USB Serial Port Replicator.
COM6	Port Replicator.
COM7 / BSP1-9	Port Replicator *Bluetooth* virtual devices.
COM21	Internal scanner port.
COM22	Internal *Bluetooth* radio.

No ports can be reassigned on this computer.

10.7 Omnii XT10 (7545XV), Omnii XT15 (7545XA), Omnii RT15 (7545XC) Serial Port Assignments

Table 10.5 Default Omnii Serial Port Assignments

Serial Port	Default Assignment
COM2	GPS data.
COM3	Console port on portable docking module.
COM5	Serial port on vehicle cradle.
COM6 See note 1.	RS-232 port on portable docking module. RS-232 port on snap module. RS-232 port on vehicle cradle.
COM7	
COM8	WWAN virtual serial port.
COM19	GPS hardware (private).
COM20	*Bluetooth* hardware (private).
COM24	GPS power (private).
COM30	Expansion UART1.
COM31	Expansion UART2.

Serial Port	Default Assignment
COM32	Expansion UART3.
COM33	Internal scanner port.

Note 1: Pin-9 on COM6: provides power, at 5 V DC and 1 amp, to peripherals plugged into this port on snap module (ST4005) and on vehicle cradle (ST1002). Power to Pin-9 can be enable and subsequently switched on and off using the GUI **Scanners** applet.

No ports can be reassigned on this computer.

10.8 EP10 (7515) Serial Port Assignments

Table 10.6 Default EP10 Serial Port Assignments

Serial Port	Default Assignment
COM1	USBFN Serial port ActiveSync.
COM1	
COM2	GPS data (AGPS).
COM3	
COM5	USB-Serial Dongle USB Port Replicator. RS-232 port available on USB-to-serial adaptor. RS-232 port on single dock. RS-232 port on vehicle cradle. RS-232 port on RV4001 snap-on module.
COM6	RS-232 port on portable docking module. RS-232 port on charge adapter. RS-232 port on vehicle cradle. RS-232 port on RV4002 snap-on module.
COM7	Reserved for future use.
COM8	
COM9	RIL virtual serial port (private).
COM18	GPS hardware (private).
COM19	*Bluetooth* hardware (private).
COM20	*Bluetooth* hardware (private).
COM24	GPS UART power (private).

No ports can be reassigned on this computer.

10.9 Java

Input and output through the serial ports requires the use of one of the following:

- A third party serial port SDK, such as the SerialPort product from Serialio.com.
- The JNI (Java Native Interface) serial classes.

10.10 Getting Started with Serial Ports

For articles on Ingenuity Working that will guide you in getting started with working with serial ports see:

community.psion.com/tags/serial ports/noteDG

10.11 Code Samples for Serial Ports

For postings on Ingenuity Working that contain code samples that control serial ports see: community.psion.com/tags/serial ports/codeDG

10.12 Serial Port API Elements

C++: Serial port information on all Psion computers is obtained, and serial input/output is enabled, using the standard Win32 API serial communications subset that is available for Windows. For information see:

- Windows CE and Windows Embedded: msdn.microsoft.com/en-us/library/ee488234
- Windows Mobile: msdn.microsoft.com/en-us/library/bb202722

Java: Serial port information on all Psion computers is obtained, and serial input/output is enabled, using any third party serial I/O package such as SerialPort from SERIO.COM (http://serialio.com/products/serialport/serialport.php).

.NET: Serial port information on all Psion Windows computers is obtained, and serial input/output is enabled, using the SerialPort class of .NET Framework. For information see msdn.microsoft.com/en-us/library/system.io.ports.serialport(v=vs.90).aspx.

11 PERMANENT STORAGE

11.1 Permanent Storage

A small amount of permanent storage is provided on some Psion computers. This storage is accessible through the Mobile Devices SDK, but is not accessible through the GUI. Data stored in permanent storage persists across power failure, all types of reset, and through clean starts.

There is only one permanent memory location in each device; multiple applications on the same device will not be able to use this memory for application-specific data. Typically, the permanent storage is used for assigning customized serial numbers to each device or for asset tracking purposes.

Important: ***The hardware used for permanent storage typically has a limited cycle life. Repeated write operations may cause the memory to become corrupt and unreliable. It is therefore recommended that this memory storage not be used for data that is expected to change frequently.***

The following table shows what Psion computers have permanent memory storage, and how much is available.

Computer	Permanent Memory Available
Workabout Pro	28 bytes
NEO (PX750)	32 bytes
Omnii (7545)	256 bytes
EP10 (7515)	Not available

11.2 Locking Permanent Storage

The Mobile Devices SDK provides an application with the ability to lock the permanent storage area. **There is no unlock ability.**

Warning: ***To unlock the permanent storage, the computer must be returned to the Psion repair depot. This cannot be a warranty repair.***

11.3 Getting Started with Permanent Storage

For articles on Ingenuity Working that will guide you in getting started with working with permanent storage see:

community.psion.com/tags/permanent storage/noteDG

11.4 Code Samples for Permanent Storage

For postings on Ingenuity Working that contain code samples that use permanent storage see:

community.psion.com/tags/permanent storage/codeDG

11.5 Permanent Storage API Elements

C++: Permanent storage on all Psion computers is controlled using the **PsionTeklogix::System::SystemInformation** namespace.

Java: Permanent storage on all Psion computers is controlled using the **SystemInformation** class in the **com.teklogix.system** package.

.NET: Permanent storage on all Psion computers is controlled using the **SystemInformation** class in the **PsionTeklogix.SystemPTX** namespace.

12 RAS (REMOTE ACCESS SERVICE)

12.1 Overview

A computer running one of the following operating systems can function as a RAS server that allows clients to connect to it using a WAN connection:

- Windows Mobile 2003 SE
- Windows CE .NET 4.2
- Windows CE 5.0
- Windows Embedded CE 6.0

You can use RAS in any computing environment that has a wide area network (WAN) or a virtual private network (VPN). RAS makes it possible to connect a remote client computer to a network server over a WAN or a VPN.

A Windows-based RAS server can accept connections through any Network Driver Interface Specification (NDIS) miniport in a WAN, including the Point-to-Point-Tunneling Protocol (PPTP) and AsyncMAC miniports. AsyncMAC is an NDIS WAN miniport driver that manages the sending and receiving of packets over TAPI devices. These devices include direct serial and modem connections.

The RAS server implementation supports authentication through the Password Authentication Protocol (PAP), Challenge Handshake Authentication Protocol (CHAP) and Microsoft Challenge Handshake Authentication Protocol (MSCHAP). The Point-to-Point Protocol (PPP) supports 128-bit and 40-bit encryption.

In Windows, a RAS server is configured through the registry and I/O control codes (IOCTLs). Registry settings are used for boot-time configuration, and the IOCTLs are used for dynamic information.

The Windows versions supported by Psion computers do not support server callback or multilink connections. These Windows versions also do not support user domains. In user credentials, you can specify the user name and password, but not the domain name.

12.2 Support for RAS and Windows Connection Manager on Psion Computers

Depending on the operating system, a connection can be made either through RAS or through Windows Connection Manager.

Computer	Operating System	Supports RAS	Supports Windows Connection Manager
753x	Windows CE 5.0	Yes	
8515	Windows CE 5.0	Yes	
8525 / 8530	Windows CE 5.0	Yes	
Workabout Pro (7525)	Windows CE .NET 4.2	Yes	
Workabout Pro (7525)	Windows Mobile 2003 SE	Yes	
Workabout Pro (7525)	Windows Mobile 5.0	Yes	
Workabout Pro G2 (7527)	Windows CE 5.0	Yes	
Workabout Pro G2 (7527)	Windows Mobile 6.0		Yes
Workabout Pro G2 (7527)	Windows Mobile 6.1		Yes
Workabout Pro3 (7527)	Windows CE 5.0	Yes	
Workabout Pro3 (7527)	Windows Mobile 6.1		Yes
Ikôn (7505)	Windows CE 5.0	Yes	
Ikôn (7505)	Windows Mobile 6.0		Yes
NEO (PX750)	Windows CE 5.0	Yes	
NEO (PX750)	Windows Mobile 6.1		Yes

Computer	Operating System	Supports RAS	Supports Windows Connection Manager
Omnii XT10 (7545XV)	Windows Embedded CE 6.0	Yes	
Omnii XT15 (7545XA)	Windows Embedded CE 6.0	Yes	
Omnii XT15 (7545XA)	Windows Embedded Hand-Held 6.5		Yes
Omnii RT15 (7545XC)	Windows Embedded CE 6.0	Yes	
Omnii RT15 (7545XC)	Windows Embedded Hand-Held 6.5		Yes
EP10 (7515)	Windows Embedded Hand-Held 6.5		Yes

12.3 RAS Architecture

In the Windows networking architecture, the Windows-based device functioning as a RAS server communicates directly with PPP. This corresponds with the underlying WAN miniport – either PPTP or AsyncMAC – through Transmission Control Protocol/Internet Protocol (TCP/IP). When PPP receives requests to send IP packets from TCP/IP, it passes the packet on to the AsyncMAC miniport. After receiving a packet from PPP, the AsyncMAC miniport performs the asynchronous framing, and then forwards the packet to the TAPI device by calling Microsoft Win32 serial APIs. When receiving a packet through the network, the AsyncMAC miniport strips the asynchronous framing off the packet, verifies the Cyclic Redundancy Check (CRC), and passes the packet to PPP through the NDIS layer.

In a VPN, the PPTP WAN miniport communicates directly with TCP/IP. After receiving a packet that is addressed to the private network from TCP/IP, PPP performs the framing, and then forwards the packet to the PPTP WAN miniport. The PPTP WAN miniport encapsulates the information contained in the packet header, and then reroutes the packet back to TCP/IP. IP then attaches another header that contains the address of the PPTP server to the packet, and passes the packet on to PPP. PPP forwards the packet to either the AsyncMAC WAN miniport or a local area network (LAN) adaptor, such as an NE2000 adaptor. After receiving the packet over the network, the PPTP server strips the PPTP header off the packet, and then passes the packet to PPP.

12.4 RAS on Windows Mobile (Connection Manager)

In addition to RAS, Windows Mobile devices come with a Connection Manager which some applications, such as Internet Explorer, use to determine if there is an Internet connection. If an Internet connection is made using the Mobile Devices SDK RAS API, the Connection Manager will not be aware of it, thus any applications that rely on the Connection Manager will not be able to connect to the Internet through it.

Microsoft provides an API for creating connections through the Connection Manager. For more information, visit the following URLs:

http://msdn2.microsoft.com/en-us/library/bb416435.aspx
http://msdn2.microsoft.com/en-us/library/bb840031.aspx

Applications using direct socket connections will still be able to connect using a RAS connection on both Windows CE and Windows Mobile devices.

12.5 Getting Started with RAS

For articles on Ingenuity Working that will guide you in getting started with working with RAS:

community.psion.com/tags/ras/noteDG

12.6 Code Samples for RAS

For postings on Ingenuity Working that contain code samples that use RAS see:

community.psion.com/tags/ras/codeDG

12.7 RAS API Elements

C++: The RAS server on all Psion computers is controlled using the Microsoft RAS Win32 APIs.

Java: The RAS server on all Psion computers is controlled using the **com.teklogix.ras** package.

.NET: The RAS server on all Psion computers is controlled using the **PsionTeklogix.RAS** namespace.

13 SCANNERS

13.1 Types Of Scanners

The Mobile Devices SDK enables applications to use the Psion Scanner Services. Scanner Services supports the following types of bar code scanner:

- Non-decoded Laser Scanners
- Decoded Laser Scanners
- 1D imagers
- 2D imagers (for legacy applications only, see Section below)

For a list of the scanners supported by your Psion computer, see the user manual for the computer.

Non-decoded Laser Scanners

Non-decoded laser scanners present unprocessed scan data to the computer. These scanners rely on Scanner Services to do the decoding. The Mobile Devices SDK returns the scan data as a character string to the calling program.

There is only one set of configuration parameters for non-decoded laser scanners on each computer. So, if there is more than one non-decoded laser scanner in, or attached to, a computer, they all use the same configuration.

Decoded Laser Scanners

Decoded laser scanners have built in decoders; they process the raw scan data themselves. The Mobile Devices SDK returns the scan data as an undelimited character string.

Imagers

The Mobile Devices SDK supports bar code scanning by legacy imagers; however, the Mobile Devices SDK must not be used for new applications involving recent imagers—the Imaging Services SDK supports the current imager models.

For a list of Psion devices and the SDK to use to control the imagers see community.psion.com/knowledge/w/knowledgebase/how-to-select-an-sdk-for-an-application-that-uses-an-imager-or-a-scanner.aspx

The Mobile Devices SDK does not support the capture of pictures on any imager. All picture capture must be controlled through the Imaging Services SDK.

Important: For all non-legacy imagers, the Imaging Services SDK must be used for all 2D imager applications including reading bar codes.

13.2 External Scanners

A Psion computer can have several external scanners. On the 753x, 8525, and 8530, models one of them can be a non-decoded laser scanner. On all other Psion computers, they must all be decoded scanners.

The ports that the scanners are connected to can be on one of the following:

- Psion computer
- Docking station
- Snap module

The port can be:

- USB port
- Serial port
- Tether port

See the User Manual for your Psion computer for the availability and the location of tether ports, USB ports, and serial ports.

13.2.1 Scanner connected to a USB port

This applies to decoded scanners only. These scanners must be externally configured by scanning configuration bar codes. Bar code data is received by the Mobile Devices SDK as keyboard input.

13.2.2 Scanner connected to a serial port

The serial port on some Psion computers has power available on pin 9. See the user manual for your computer to find out if this is available. If power is available on pin 9, you must check that the current and voltage are suitable for powering your scanner.

Scanner Services controls the serial port

Decoded or non-decoded scanners. These scanners must be externally configured by scanning configuration bar codes.

Scanner Services controls the serial port when the serial port is enabled on the **Ports** tab of the GUI Scanners applet. This cannot be done using the Mobile Devices SDK.

Bar codes can be read and processed by the Mobile Devices SDK using:

- **C++: PsionTeklogix::Scanner** namespace.
- **Java: com.teklogix.scanner** package.
- **.NET: PsionTeklogix.Barcode** namespace.

Scanner Services does not control the serial port

Decoded scanners only. Serial data can be sent to, and received from, the scanner. The scanner is treated in the same way as any other serial peripheral. Scanner Services plays no part in either configuring the scanner or processing bar codes. For information on using serial ports, see Chapter 10: "Serial Ports".

You can configure these scanners either by scanning configuration bar codes; or if the scanner allows it, and the devices are connected by a suitably configured serial cable, by sending configuration parameters to the scanner through the serial port.

13.2.3 Scanner Connected To The Tether Port By A Scanner Cable

On the 753x, 8525, and 8530 computers, scanners can be connected to the tether port using a proprietary Psion scanner cable.

753x, 8525, 8530 tether port behaving as Scanner Services-controlled serial port

Decoded or non-decoded scanners. These scanners must be externally configured by scanning configuration bar codes.

Scanner Services controls the serial port when the serial port is enabled on the **Ports** tab of the GUI Scanners applet. This cannot be done using the Mobile Devices SDK.

Bar codes can be read and processed by the Mobile Devices SDK using:

- **C++: PsionTeklogix::Scanner** namespace.
- **Java: com.teklogix.scanner** package.
- **.NET: PsionTeklogix.Barcode** namespace.

753x, 8525, 8530 tether port behaving as a serial port

Decoded scanners only. Serial data can be sent to, and received from, the scanner. The scanner is treated in the same way as any other serial peripheral. Scanner Services plays no part in either configuring the scanner or processing bar codes. For information on using serial ports, see Chapter 10: "Serial Ports".

You can configure these scanners either by scanning configuration bar codes; or if the scanner allows it, and the devices are connected by a suitably configured serial cable, by sending configuration parameters to the scanner through the serial port.

13.2.4 Scanner Connected To The Tether Port By A Tether Cable

Tether port behaving as a USB port:

Decoded scanners only. These scanners must be externally configured by scanning configuration bar codes. Bar code data is received by the Mobile Devices SDK as keyboard input.

Tether port behaving as a Scanner Services-controlled serial port

Decoded or non-decoded scanners. These scanners must be externally configured by scanning configuration bar codes.

Scanner Services controls the serial port when the serial port is enabled on the **Ports** tab of the GUI Scanners applet. This cannot be done using the Mobile Devices SDK.

Bar codes can be read and processed by the Mobile Devices SDK using:

- **C++: PsionTeklogix::Scanner** namespace.
- **Java: com.teklogix.scanner** package.
- **.NET: PsionTeklogix.Barcode** namespace.

Tether port behaving as a serial port

Decoded scanners only. Serial data can be sent to, and received from, the scanner. The scanner is treated in the same way as any other serial peripheral. Scanner Services plays no part in either configuring the scanner or processing bar codes. For information on using serial ports, see Chapter 10: "Serial Ports".

You can configure these scanners either by scanning configuration bar codes; or if the scanner allows it, by sending configuration parameters to the scanner through the serial port.

13.2.5 Querying an External Scanner

Querying the scanner type for an external scanner through the Mobile Devices SDK returns one of the following strings:

Scanner Type	String Returned By API
No external scanner	No external scanner
Non-decoded scanner	Non-decoded scanner
Decoded scanner	Serial scanner

13.3 Internal Scanners

An internal scanner is built into the body of the hand-held computer. Each hand-held computer can have only one internal scanner. The scanner can be one of the following:

- Non-decoded Laser Scanner
- Decoded Laser Scanner
- 1D imager or legacy imager
- Legacy RFID scanner

These scanners can be configured using the Mobile Devices SDK or the GUI **Scanners** applet. Bar codes can be read and processed using the Mobile Devices SDK.

The internal scanner is activated by the configured trigger mechanism. See the User Manual for the hand-held for information on configuring this using the **Scanners** applet. An application can configure the scanner trigger—for more information see Chapter 17: "Trigger Control".

Querying the scanner type of an internal scanner through the API returns one of the following strings:

***Important:** Support for the SX5303, SX5393, SX5400, and HHP5x80 is deprecated in the Mobile Devices SDK. You must use the Imaging Services SDK for all new development for these imagers.*

Scanner Text	Configure as...	Notes
Symbol 1200 HP	Non-decoded laser scanner	
Symbol 1200 LR	Non-decoded laser scanner	
Symbol 1200 ALR	Non-decoded laser scanner	
Symbol 1200 WA	Non-decoded laser scanner	
Symbol 1223 HP	Decoded laser scanner	

Scanner Text	Configure as...	Notes
Symbol 1223 LR	Decoded laser scanner	
Symbol 1223 ALR	Decoded laser scanner	
Symbol 1223 WA	Decoded laser scanner	
Symbol 1224 HP	Decoded laser scanner	
Symbol 1524 ER	Decoded laser scanner	
Symbol 2223	Decoded laser scanner	
Symbol 923 HP	Decoded laser scanner	
Symbol 955	Decoded laser scanner	
Symagery SX4000 ST	Imager	Deprecated
Symagery SX4000 UHD	Imager	Deprecated
Symagery SX4000 ULR	Imager	Deprecated
Symagery SX5303 ST	Imager	Do not use this API library for new development. Use the Imaging Services SDK instead.
Symagery SX5303 ULR	Imager	Do not use this API library for new development. Use the Imaging Services SDK instead.
Symagery SX5303 UHD	Imager	Do not use this API library for new development. Use the Imaging Services SDK instead.
Symagery SX5303 HD	Imager	Do not use this API library for new development. Use the Imaging Services SDK instead.
Symagery SX5303 IL	Imager	Do not use this API library for new development. Use the Imaging Services SDK instead.
Symagery SX5393	Imager	Do not use this API library for new development. Use the Imaging Services SDK instead.
Symagery IL6303	Imager	Deprecated
Symagery SX5400	Imager	Do not use this API library for new development. Use the Imaging Services SDK instead.
Rfid Sirit OEM 186	Decoded laser scanner	Deprecated
Rfid Sirit OEM 187	Decoded laser scanner	Deprecated
Intermec E1022	EV15 1D imager and E1022 1D Imager	
Intermec EV15	EV15 1D Imager and E1022 1D Imager	
HHP5x80	5x80 Imager	Do not use this API library for new development. Use the Imaging Services SDK instead.

Scanner Text	Configure as...	Notes
Unknown		
No Internal		
None		

13.4 Symbologies

1D Bar codes represent data in the widths and the spacings of parallel lines. Although 2D systems use symbols other than bars, they are generally referred to as bar codes as well. Symbologies are the rules for encoding the data in bar codes. There are many standard symbologies. Each is preferred for certain types of applications.

The following symbologies are decoded by internal scanners:

Symbology	Non-decoded	Imager	Symbol 1223 Symbol 923	Symbol 1224	Symbol 1524	Symbol 2223	Symbol 995	EV15 E1022	HHP5x80 (Deprecated)
2D Data Matrix	No	Deprecated	No	No	No	No	No	Yes	Yes
2D MaxiCode	No	Deprecated	No	No	No	No	No	Yes	Yes
2D QR Code	No	Deprecated	No	No	No	No	No	Yes	Yes
2D Aztec Code	No	Deprecated	No	No	No	No	No	No	Yes
Codabar	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Codablock	No	No	No	No	No	No	No	Yes	Yes
Code 11	Yes	No	No	No	No	No	Yes	EV15 only	Yes
Code 128	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Code 16K	No	No	No	No	No	No	No	No	Yes
Code 39	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Code 49	No	No	No	No	No	No	No	No	Yes
Code 93	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Composite Codes	No	Deprecated	No	No	No	Yes	No	Yes	Yes
Discrete 2 of 5 (Straight 2 of 5, Standard 2 of 5, Discrete 2 of 5, Industrial 2 of 5)	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EAN 13	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EAN 8	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IATA 2 of 5	Yes	No	Yes	No	No	Yes	No	No	Yes
Interleaved 2 of 5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Matrix 2 of 5	No	No	No	No	No	No	Yes	Yes	Yes

Symbology	Non-decoded	Imager	Symbol 1223 Symbol 923	Symbol 1224	Symbol 1524	Symbol 2223	Symbol 995	EV15 E1022	HHP5x80 (Deprecated)
Micro PDF417	No	Yes	No	No	No	Yes	No	EV15 only	Yes
PDF417	No	Yes	No	No	No	Yes	No	EV15 only	Yes
MSI Plessey	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PosiCode	No	No	No	No	No	No	No	No	Yes
Postal: Australian	No	Deprecated	No	No	No	No	No	No	Yes
Postal: Canadian	No	Deprecated	No	No	No	No	No	No	Yes
Postal: Chinese	No	No	No	No	No	No	No	No	Yes
Postal: Japanese	No	Deprecated	No	No	No	No	No	No	Yes
Postal: Kix	No	Deprecated	No	No	No	No	No	No	Yes
Postal: Korean	No	Deprecated	No	No	No	No	No	No	Yes
Postal: PlaNET	No	Deprecated	No	No	No	No	No	No	Yes
Postal: PostNET	No	Deprecated	No	No	No	No	No	No	Yes
Postal: Royal Mail	No	Deprecated	No	No	No	No	No	No	Yes
RSS/GS1	No	Yes	Yes	Yes	Yes	Yes	Yes	EV15 only	Yes
Telepen	No	No	No	No	No	No	No	Yes	Yes
TLC-39	No	No	No	No	No	No	No	Yes	Yes
Trioptic code	No	No	No	No	No	No	No	No	Yes
UPC A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UPC E	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UPC/EAN	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes

13.5 Configuring Scanners

Scanners are configured using the following methods:

- GUI **Scanners** applet
- Application software using the SDK
- Scanning configuration bar codes

13.5.1 Configuring Through the GUI

***Important:** If there is an internal non-decoded scanner and an external non-decoded scanner, they have the same scanner configuration, and symbology field, settings.*

Internal scanners

Scanner settings are configured using the **Scanners** applet in the GUI. Refer to the user manual for the Psion computer for instructions. Most GUI settings can also be configured by an application using the SDK. The most recently set value, from either source, applies. The SDK cannot set the Translations values, or the Ports settings.

External scanners

You cannot configure external decoded scanners using the GUI **Scanners** applet. External non-decoded scanners are configured using the GUI applet.

13.5.2 Configuring Using an SDK Application

If there is an internal non-decoded scanner and an external non-decoded scanner, they have the same scanner configuration, and symbology field, settings.

Internal scanners

All the settings that can be configured through the Windows GUI can be configured through the Mobile Devices SDK with the exception of the translation features and the ports settings.

Configuration uses APIs in:

- **C++: PsionTeklogix::Scanner** namespace.
- **Java: com.teklogix.scanner** package.
- **.NET: PsionTeklogix.Barcode** namespace.

An exception is thrown if an application attempts to set a parameter that does not apply to the scanner.

External scanners

Most external decoded scanners cannot be configured using the Mobile Devices SDK. Some external decoded scanners, when attached to a serial port can be configured using strings transmitted through the serial port. Consult the manual for your scanner to find out if this is supported and to obtain the configuration strings.

External non-decoded scanners are configured using the Mobile Devices SDK. Configuration uses APIs in:

- **C++: PsionTeklogix::Scanner** namespace.
- **Java: com.teklogix.scanner** package.
- **.NET: PsionTeklogix.Barcode** namespace.

13.5.3 Configuring by Scanning Configuration Bar Codes

Internal scanners

By default internal decoded scanners cannot be configured by the use of configuration bar codes. To enable this mode of configuration, do one of the following:

- **Using the GUI:**
  1. Select the **Scanners** applet.
  2. Select the **Barcodes** tab.
  3. Expand **Advanced Options**.
  4. Enable **Parameter Setting**.
- **By an application:**
  - Enable the **Scanner Setting** Scanner Setting Name parameter—see Section 13.6 Configuring Scanners Through the Mobile Devices SDK on page 100.

Symbol Technologies scanners

For the configuration bar codes for the Symbol Technologies decoded scanners used with Psion computers, refer to "Chapter 10, Parameter Menus", in *MiniScan MS XX04 Series Integration Guide* (Part number 72E-67134-06 Rev. A), published by Symbol Technologies. This manual can be downloaded from the Motorola website at:

Symbol MiniScan MSXX04 Series: Integration Guide

Intermec scanners EV15 & E1022

The configuration bar codes are generated by Easyset. The EV15 configuration bar codes are also used to configure the E1022. Download the latest version of the Easyset setup software as follows:

1. Navigate to the Intermec website at:
   http://www.intermec.com/products/scanev15/index.aspx
2. Select the **Downloads** tab.

External scanners

All external decoded scanners can be configured by scanning special purpose bar codes supplied by the scanner manufacturer.

13.6 Configuring Scanners Through the Mobile Devices SDK

This section describes the scanner settings that are available through the Mobile Devices SDK. Each setting is listed with its GUI equivalent. The effects of the settings are not described here as complete details are contained in the user manual for each Psion computer. The user manuals also list the internal scanner models that are available for each hand-held computer, with the symbologies supported by each scanner.

Each of the API libraries has methods for the following (refer to the documentation for the relevant API library for details):

Method Purpose	Input & Output
Set a scanner setting	Input: String, Object <scanner setting key>\<scanner setting name>, <value>
Get a scanner setting	Input: String <scanner setting key>\<scanner setting name> Output: Object <scanner setting value>
Get a scanner setting name	Input: Integer <scanner setting index> Output: String <scanner setting key>\<scanner setting name>

<**scanner setting key**> is a string identifying a group of related scanner settings

<**scanner setting name**> is a string identifying a scanner setting

<**scanner setting key**>\<**scanner setting name**> together uniquely identify a scanner setting
For example:
Scs\Scanresult
Barcode\C39\Decoded\Check Digit Verification

<**scanner setting value**> is an object (usually integer) representing the current value of the setting

<**scanner setting index**> is a unique integer that identifies each <**scanner setting key**>\<**scanner setting name**> combination. This integer is not the same for all versions of the Mobile Devices SDK.

The following .NET code sample illustrates how to get and set scanner variables using the setting key/name methods, and also illustrates how to create a list of all scanner setting index and key/name pairs.

```
// Create an instance of a ScannerServicesDriver object
PsionTeklogix.Barcode.ScannerServices.ScannerServicesDriver myScanner =
    new PsionTeklogix.Barcode.ScannerServices.ScannerServicesDriver();

private void btnGetInfo_Click(object sender, EventArgs e)
{
    // Get Click Data and Click Time values
    // Note double backslashes due to escape sequence
    tbClickData.Text = myScanner.GetProperty("Scs\\Click Data").ToString();
    tbClickTime.Text = myScanner.GetProperty("Scs\\Click Time").ToString();

    // Cycle through all scanner settings and list the index numbers
    // and setting names in a combo box
    for (int i = 0; i < myScanner.TotalSettingsCount; i++)
       cbScanSetting.Items.Add(i.ToString() + ": "
        + myScanner.GetSettingName(i));
}

private void btnSetInfo_Click(object sender, EventArgs e)
{
    // Set Click Data and Click Time values
    myScanner.SetProperty("Scs\\Click Data", tbClickData.Text);
    myScanner.SetProperty("Scs\\Click Time", int.Parse(tbClickTime.Text));
}
```

13.6.1 Configuring Scanner Properties

The following scanner behaviours can be configured using the Mobile Devices SDK:

- Double-click settings
- Display settings
- Beep settings
- Logging settings

Double-click settings

A keyboard key and/or a grip trigger can be registered as the trigger for an internal scanner. See Section 7.2 Keyboard Remapping on page 51 for information on how to do this. The double-click time for the trigger associated with the scanner is set as described in this section.

A double-click occurs when the scanner-associated trigger is pressed twice within the period defined in the **Click Time** setting. The trigger does not have to be released after the second press within the **Click Time** in order for the double-click to register.

Double-clicking has two modes. A method exists for toggling the double-click between these modes. The modes are as follows:

- Scan a bar code.
- Send a character to the application.

Scan a bar code mode

In this mode a bar code is scanned in exactly the same way as when the scanner-associated trigger is pressed once. This is the default setting.

Send a character to the application mode

In this mode, double-clicking the scanner-associated trigger sends a single pre-selected character defined in the **Click Data** setting to the application.

These settings control this process for the internal scanner as well as for an external non-decoded scanner.

Scanner setting key = Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Click Time	0 ms	1000 ms	250 ms	Click Time
Click Data	0	0xFFFF	0	Click Data

Display, Beep, and Logging Options

These settings control how bar codes are displayed on the screen, when beeps are generated, and whether bar code scans are logged. These settings are applied to the internal scanner as well as an external non-decoded scanner.

Scanner setting key = Scs

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Scan Result	0 = off	1 = on	1		Scan Result
Scan Indic	0 = off	1 = on	1		Scan Indicator

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Result Time	0 s	20 s	0 s		Scan Result Time
Scan Good Beep	0 = off	1 = on	1		Good Scan Beep
Scan Failed Beep	0 = off	1 = on	1		Bad Scan Beep
Multiple Beep Tones[1]	0 = off	1 = on	0		Multiple Beep Tones
Good Scan Vibrates	0 = off	1 = on	0		Good Scan Vibrates
Number of Vibrates for Good Scan	1	3	1		Number of Vibrates
Duration of Vibrate for Good Scan	100 ms	600 ms	300 ms		Duration of Vibrate
Pause between Vibrates for Good Scan	50 ms	200 ms	100 ms		Pause between Vibrates
Bad Scan Vibrates	0 = off	1 = on	0		Bad Scan Vibrates
Number of Vibrates for Bad Scan	1	4	2		Number of Vibrates
Duration of Vibrate for Bad Scan	100 ms	600 ms	300 ms		Duration of Vibrate
Pause between Vibrates for Bad Scan	50 ms	400 ms	250 ms		Pause between Vibrates
Scan Log File	0 = off	1 = on	0		Scan Log File
Soft Scan Timeout	1 s	10 s	3 s		Soft Scan Timeout
Codepage	0	28591	0	0 = Default Local ASCII 28591 = ISO-8859-1 Latin 1	Codepage

Non-decoded Laser Scanner Options

Scanner setting key = NonDecoded

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Dot Time	0 ms	3000 ms	0 ms		Dot Time
Short Code	0 = off	1 = on	0		Short Code
Verify	0	15	0		Verify
Security	0	99	30		Security

Decoded Laser Scanner Options

Scanner setting key = Decoded

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Aiming Mode (deprecated)	0	2	0	0 = 0 ms 1 = 200 ms 2 = 400 ms	Dot Time
Aim Duration	0	30	0		Aim Duration
Laser On Time	5	99	50		Laser On Time
Continuous Scan[1]	0 = off	1 = on	0		Continuous Scan Mode
Scan Method[2]	0	4	0	0= Scan beam only 1 = Aim with scan: 1 trigger pull 2 = Aim with scan: 2 trigger pulls 3 = Aim with scan on trigger release 4 = Continuous scan mode	Scan Mode
Minimum Cancel Time	0 ms	500 ms	0 ms		Minimum Cancel Time
Power Mode	0	1	1	0 = Con ti nous power 1 = Low power	Power Mode
Time Delay To Low Power	0	3	0	0 = 30 s 1 = 60 s 2 = 120 s 3 = 180 s	Low Power Timeout
Parameter Scanning	0 = off	1 = on	1		Parameter Scanning
Linear Code Type Security Levels	1	4	2		Linear Security Level
Bi-directional Redundancy	0 = off	1 = on	0		Bi-direction Redundancy
Scan Angle[2]	181	182	182		Scan Angle
Scanning Mode[2]	1	7	1		Scanning Mode
Raster Height[2]	1	15	15		Raster Height
Raster Expansion Rate[2]	1	15	11		Raster Expand Rate
Transmit Code ID Character	0	2	0	0 = None 1 = Aim 2 = Symbol	Transmit Code ID Char

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Scan Data Transmission Format	0	7	0	0 = data (as is) 1 = data <S1> 2 = data <S2> 3 = data <S1> <S2> 4 = <P> data 5 = <P> data <S1> 6 = <P> data <S2> 7 = <P> data <S1> <S2>	Scan Data Format
Prefix	0	0xFF	0		Prefix <P>
Suffix 1	0	0xFF	13		Suffix <S1>
Suffix 2	0	0xFF	10		Suffix <S2>
Delete Character Set ECIs	0 = off	1 = on	0		Delete Char Set ECIs
ECI Decoder	0 = off	1 = on	0		ECI Decoder

Note 1: Omnii only.

Note 2: All Psion computers except Omnii.

EV15 1D Imager and E1022 1D Imager

Scanner setting key = ICSP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Laser On Time	1 s	10 s	4 s		Laser On Time
Continuous Scan	0 = off	1 = on	0		Continuous Scan Mode
Minimum Cancel Time	0	500	0		Minimum Cancel Time
Time Delay to Low Power	0	3	0	0 = 30 s 1 = 60 s 2 = 120 s 3 = 180 s	Low Power Timeout
Parameter Scanning	0 = off	1 = on	1		Parameter Scanning
Same Read Validate	0	10	0		Same Read Validate
Same Read Timeout	0 ms	2550 ms	300 ms		Same Read Timeout
Diff Read Timeout	0 ms	2550 ms	0 ms		Diff Read Timeout

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Add AIM ID prefix	1	2	1	1 = Disabled 2 = Enabled	Add AIM ID Prefix
Aiming Beam	0	3	0	0 = Disabled 1 = Enabled 2 = Toggle 3 = Toggle reverse	Aiming Beam
Aim Duration	0 ms	2550 ms	500 ms		Aim Duration

5x80 Imager

Scanner setting key = HHP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Laser On Time	1 s	10 s	4 s		
ContinuousScan	0 = off	1 = on	0		Continuous Scan Mode
Minimum Cancel Time	0 ms	500 ms	300 ms		
Time Delay to Low Power	30 s	180 s	30 s	30 = 30 s 60 = 60 s 120 = 120 s 180 = 180 s	
Add AIM ID prefix	0 = off	1 = on	0		
Prefix Exception 1	0	122	0		
Prefix Exception 2	0	122	0		
Prefix Exception 3	0	122	0		

Imager Options

***Important:** New applications should only use the Mobile Devices SDK for 1D imagers. The Imaging Services SDK must be used for all other imager applications including reading bar codes.*

Scanner setting key = Imager

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
TekImager Enabled[2]	0 = off	1 = on	1		TekImager Enabled
ContinuousScanMode[2]	0 = off	1 = on	0		Continuous Scan Mode
OnlyDecodeCenter	0 = off	1 = on	0		Center Barcode Only
MaxNumberBarcodes	1	6	1		Max Number Barcodes
MinNumberBarcodes	1	6	1		Barcodes Must Decode
WindowWidth[2]	128	1280	900		Window Width
WindowHeight[2]	128	1024	500		Window Height
Dot Time[2]	0 ms	3000 ms	0 ms		Dot Time
AutoExposure[2]	0 = off	1 = on	1		Auto Exposure
FastConverge[2]	0 = off	1 = on	0		Fast Converge
MaxGain[2]	357	7920	7680		Max Gain
MaxIntegration[2]	0	0xFFFF	26170		Max Integration
MaxIllumination[2]	0	7	7		Max Illumination
DefaultDevice[2]	0 = off	1 = on	0		Factory Defaults on Reboot
MinScanDuration[2]	0	6	3		Min Scan Duration
MaxCapturesPerTrigger[2]	1	32	9		Captures Per HW Trigger
AutoExposure[2]	0 = off	1 = on	1		Auto Exposure
FastConverge[2]	0 = off	1 = on	0		Fast Converge
MaxGain[2]	2	30	30		Max Gain
MaxIntegration[2]	0	43	18		Max Integration
MaxIllumination[2]	0	7	7		Max Illumination
DecoderTimeout[2]	200	800	500		Decoder Timeout
AdaptiveWindowing[2]	0 = off	1 = on	0		Adaptive Windowing
ConstantIllumination[2]	0 = off	1 = on	0		Constant Illumination

Note 2: All Psion computers except Omnii.

13.6.2 Code 39 Settings

All Scanner Types

Scanner setting key = Barcode\C39\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Non-decoded Laser Scanner

Scanner setting key = Barcode\C39

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Full Ascii	0 = off	1 = on	0	Full ASCII
Include Chk	0 = off	1 = on	0	Include Check
AIAG Strip	0 = off	1 = on	0	AIAG Strip
Err Accept	0 = off	1 = on	0	Error Accept
Mod Chk Base	0	2	0	Mod Checks
Transmit Code ID Character	0	1	0	Transmit Code ID Char

Decoded Laser Scanner

Scanner setting key = Barcode\C39\Decoded

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Trioptic	0 = off	1 = on	0	Enable Trioptic Code 39

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Convert to Code 32	0 = off	1 = on	0	Convert to Code 32
Code 32 Prefix	0 = off	1 = on	1	Code 32 Prefix
Length L1	0	55	1	Set Length L1
Length L2	0	55	55	Set Length L2
Check Digit Verification	0 = off	1 = on	0	Check Digit Verification
Transmit Check Digit	0 = off	1 = on	0	Transmit Check Digit
Full Ascii Conversion	0 = off	1 = on	0	Full ASCII
Decode Performance	0 = off	1 = on	1	Decode Performance
Decode Performance Level	1	3	1	Decode Perf. Level

EV15 1D Imager and E1022 1D Imager
Scanner setting key = Barcode\C39\ICSP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Full Ascii Conversion	0 = off	1 = on	0	Full ASCII
Reading Range	0	1	1	Reading Range
Start Stop Transmission	0 = off	1 = on	0	Start/Stop Transmit
Accepted Start Character	1	3	3	Accepted Start Char
Check Digit Verification	0	3	0	Check Digit Verification
Transmit Check Digit	0 = off	1 = on	0	Transmit Check Digit
Length L1	0	255	0	Minimum Length

5x80 Imager

Scanner setting key = Barcode\C39\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Start Stop Char	0 = off	1 = on	0	Start/Stop Transmit
Check Char	0	2	0	Check Char
Length Min	0	48	0	Minimum Length
Length Max	0	48	48	Maximum Length
Append	0 = off	1 = on	0	Append
Pharmaceutical	0 = off	1 = on	0	Pharmaceutical
Full Ascii	0 = off	1 = on	0	Full ASCII

Imager

Scanner setting key = Barcode\C39\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Full ASCII	0 = off	1 = on	0	Full ASCII
Check Digit Verification	0 = off	1 = on	0	Check Digit Verification
Include Check	0 = off	1 = on	0	Include Check

13.6.3 Trioptic Code Settings

5x80 Imager

Scanner Setting Key	Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Barcode\Trioptic\Scs	Field Size	0	1400	0	Field Size
	Minimum Size	0	1400	0	Minimum Size
	Maximum Size	0	1400	0	Maximum Size
	Prefix Char	0	0xFFFF	0	Prefix Char

Scanner Setting Key	Scanner Setting Name	Minimum	Maximum	Default	GUI Name
	Suffix Char	0	0xFFFF	0	Suffix Char
	Strip Leading	0	127	0	Strip Leading
	Strip Trailing	0	127	0	Strip Trailing
Barcode\Trioptic\HHP	Enabled	0 = off	1 = on	0	Enabled

13.6.4 Code 128 Settings

All Scanner Types

Scanner setting key = Barcode\C128\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Non-decoded Laser Scanner

Scanner setting key = Barcode\C128

Scanner Setting Name	Minimum	Maximum	Default	Value	GUI Name
Enabled	0 = off	1 = on	1		Enabled
Include Sym	0 = off	1 = on	1		Include Sym
Variant Mode	0	3	1	0 = None 1 = Standard 2 = UCC 128 3 = EAN/UCC 128	Variations
Transmit Code ID Char	0 = off	1 = on	0		Transmit Code ID Char

Decoded Laser Scanner

Scanner setting key = Barcode\C128\Decoded

Scanner Setting Name	Minimum	Maximum	Default	Value	GUI Name
Enabled	0 = off	1 = on	1		Enabled
UCC EAN 128	0 = off	1 = on	1		Enable GS1-128/GS1 US
ISBT 128	0 = off	1 = on	0		Enable ISBT 128
Decode Performance[2]	0 = off	1 = on	1		Decode Performance
Decode Performance Level[2]	1	3	1		Decode Perf. Level

Note 2: All Psion computers except Omnii.

EV15 1D Imager And E1022 1D Imager

Scanner setting key = Barcode\C128\ISCP

Scanner Setting Name	Minimum	Maximum	Default	Value	GUI Name
Enabled	0 = off	1 = on	1		Enabled
EAN 128	0 = off	1 = on	1		GS1-128
EAN 128 Identifier	0 = off	1 = on	1		GS1-128 Identifier
GTIN Compliant	0 = off	1 = on	0		GTIN Compliant
FNC1 Conversion	0	255	29		FNC1 Conversion
ISBT 128	0 = off	1 = on	0		Enable ISBT128
ISBT Concatenation Transmission	0	2	0	0 = Disabled 1 = Only concatenation 2 = Concatenation or single	ISBT Concat Transmit
ISBT Concatenate Pair	0 = off	1 = on	0		ISBT Concat Any Pair
Reading Range	0	1	1	0 = Normal 1 = Extended	Reading Range
Check Digit Verification	0	1	0	0 = Disabled 1 = French CIP	Check Digit Verification
Length L1	0	255	0		Minimum Length

5x80 Imager

Scanner setting key = Bacode\C128\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
ISBT Concatenation	0 = off	1 = on	0	ISBT Concatenation
Length Min	0	80	0	Minimum Length
Length Max	0	80	80	Maximum Length

Imager

Scanner setting key = Bacode\C128\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled

13.6.5 EAN 13 Settings

All Scanner Types

Scanner setting key = Barcode\EAN13\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Non-decoded Laser Scanner

Scanner setting key = Barcode\EAN13

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	1		Enabled
Enable Bookland	0 = off	1 = on	0		Enable Bookland EAN
Inc Country	0 = off	1 = on	1		Include Country
Include Chk	0 = off	1 = on	1		Include Check

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Addendum	0	2	0	0 = Disabled 1 = Optional 2 = Required	Addendum
Transmit Code ID Character	0 = off	1 = on	0		Transmit Code ID Char

Decoded Laser Scanner

Scanner setting key = Barcode\EAN13\Decoded

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled

EV15 1D Imager And E1022 1D Imager

Scanner setting key = Barcode\EAN13\ICSP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
ISBN Conversion	0 = off	1 = on	0	ISBN Conversion
Transmit Check Digit	0 = off	1 = on	1	Transmit Check Digit

5x80 Imager

Scanner setting key = Barcode\EAN13\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Check Digit	0 = off	1 = on	1	Check Digit
2 Digit Addendum	0 = off	1 = on	0	Addendum Add-on 2
5 Digit Addendum	0 = off	1 = on	0	Addendum Add-on 5
Addendum Required	0 = off	1 = on	0	Addendum Required
Addendum Separator	0 = off	1 = on	1	Addendum Separator
ISBN Translate	0 = off	1 = on	0	ISBN Translate

Imager
Scanner setting key = Barcode\EAN13\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Addendum[2]	0	2	0	Addendum
2 Digit Addendum[1]	0 = off	1 = on	0	Not available in the **Scanners** applet
5 Digit Addendum[1]	0 = off	1 = on	0	Not available in the **Scanners** applet
Addendum Required[1]	0 = off	1 = on	0	Not available in the **Scanners** applet

Note 1: Omnii only.

Note 2: All Psion computers except Omnii.

13.6.6 EAN 8 Settings

All Scanner Types
Scanner setting key = Barcode\C128\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Non-decoded Laser Scanner
Scanner setting key = Barcode\EAN8

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	1		Enabled
Include Chk	0 = off	1 = on	1		Include Check
Addendum	0	2	0	0 = Disabled 1 = Optional 2 = Required	Addendum
Transmit Code ID Character	0 = off	1 = on	0		Transmit Code ID Char

Decoded Laser Scanner

Scanner setting key = Barcode\EAN8\Decoded

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
EAN8 Zero Extend	0 = off	1 = on	0	EAN-8 Zero Extend

EV15 1D Imager And E1022 1D Imager

Scanner setting key = Barcode\EAN8\ICSP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Transmit Check Digit	0 = off	1 = on	1	Transmit Check Digit
Transmit as EAN-13	0 = off	1 = on	0	Convert to EAN 13

5x80 Imager

Scanner setting key = Barcode\EAN8\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Check Digit	0 = off	1 = on	1	Check Digit
2 Digit Addendum	0 = off	1 = on	0	Addendum Add-on 2
5 Digit Addendum	0 = off	1 = on	0	Addendum Add-on 5
Addendum Required	0 = off	1 = on	0	Addendum Required
Addendum Separator	0 = off	1 = on	1	Addendum Separator

Imager

Scanner setting key = Barcode\EAN8\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Addendum[2]	0	2	0	Addendum
2 Digit Addendum[1]	0 = off	1 = on	0	Not available in the **Scanners** applet

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
5 Digit Addendum[1]	0 = off	1 = on	0	Not available in the **Scanners** applet
Addendum Required[1]	0 = off	1 = on	0	Not available in the **Scanners** applet

Note 1: Omnii only.

Note 2: All Psion computers except Omnii.

13.6.7 UPC A Settings

All Scanner Types
Scanner setting key = Barcode\UPCA\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Non-decoded Laser Scanner
Scanner setting key = Barcode\UPCA

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	1		Enabled
Inc Num Sys	0 = off	1 = on	0		Include Number Sys
Include Chk	0 = off	1 = on	0		Include Check
Addendum	0	2	0	0 = Disabled 1 = Optional 2 = Required	Addendum
Transmit Code ID Character	0 = off	1 = on	0		Transmit Code ID Char

Decoded Laser Scanner

Scanner setting key = Barcode\UPCA\Decoded

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	1		Enabled
UPCA Transmit Check Digit	0 = off	1 = on	1		UPC-A Check Digit
UPCA Preamble	0	2	1	0 = None 1 = System char 2 = Country code and system char	UPC-A Preamble

EV15 1D Imager And E1022 1D Imager

Scanner setting key = Barcode\UPCA\ICSP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Transmit Check Digit	0 = off	1 = on	1	Transmit Check Digit
Transmit Number System	0 = off	1 = on	1	Transmit Number System
Transmit as EAN-13	0 = off	1 = on	0	Convert to EAN 13

5x80 Imager

Scanner setting key = Barcode\UPCA\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Check Digit	0 = off	1 = on	1	Check Digit
Number System	0 = off	1 = on	1	Transmit Number System
2 Digit Addendum	0 = off	1 = on	0	Addendum Add-on 2
5 Digit Addendum	0 = off	1 = on	0	Addendum Add-on 5
Addendum Required	0 = off	1 = on	0	Addendum Required
Addendum Separator	0 = off	1 = on	1	Addendum Separator

Imager

Scanner setting key = Barcode\UPCA\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Addendum[2]	0	2	0	Addendum
2 Digit Addendum[1]	0 = off	1 = on	0	Not available in the **Scanners** applet
5 Digit Addendum[1]	0 = off	1 = on	0	Not available in the **Scanners** applet
Addendum Required[1]	0 = off	1 = on	0	Not available in the **Scanners** applet

Note 1: Omnii only.

Note 2: All Psion computers except Omnii.

13.6.8 UPC E Settings

All Scanner Types

Scanner setting key = Barcode\UPCE\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Non-decoded Laser Scanner

Scanner setting key = Barcode\UPCE

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	1		Enabled
Exp to UPC A	0 = off	1 = on	1		Convert to UPC-A
Inc Num Sys	0 = off	1 = on	1		Include Number Sys
Include Chk	0 = off	1 = on	1		Include Check
Addendum	0	2	0	0 = Disabled 1 = Optional 2 = Required	Addendum
Transmit Code ID Character	0 = off	1 = on	0		Transmit Code ID Char

Decoded Laser Scanner
Scanner setting key = Barcode\UPCE\Decoded

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
UPCE Enabled	0 = off	1 = on	1		Enable UPC-E
UPCE1 Enabled	0 = off	1 = on	0		Enable UPC-E1
UPCE Transmit Check Digit	0 = off	1 = on	1		UPC-E Check Digit
UPCE1 Transmit Check Digit	0 = off	1 = on	1		UPC-E1 Check Digit
UPCE Preamble	0	2	1	0 = None 1 = System char 2 = Country code and system char	UPC-E Preamble
UPCE1 Preamble	0	2	1	0 = None 1 = System char 2 = Country code and system char	UPC-E1 Preamble
Convert UPCE to UPCA	0 = off	1 = on	0		Conv. UPC-E to UPC-A
Convert UPCE1 to UPCA	0 = off	1 = on	0		Conv. UPC-E1 to UPC-A

EV15 1D Imager And E1022 1D Imager
Scanner setting key = Barcode\UPCE\ICSP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
UPC-E1 Enabled	0 = off	1 = on	0	Enable UPC-E1
Transmit Check Digit	0 = off	1 = on	1	Transmit Check Digit
Transmit Number System	0 = off	1 = on	1	Transmit Number System
Transmit as UPC-A	0 = off	1 = on	0	Convert to UPC-A

5x80 Imager
Scanner setting key = Barcode\UPCE\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
UPC-E1 Enabled	0 = off	1 = on	0	Enable UPC-E1

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Expand	0 = off	1 = on	0	Expand
Check Digit	0 = off	1 = on	1	Check Digit
Number System	0 = off	1 = on	1	Transmit Number System
2 Digit Addendum	0 = off	1 = on	0	Addendum Add-on 2
5 Digit Addendum	0 = off	1 = on	0	Addendum Add-on 5
Addendum Required	0 = off	1 = on	0	Addendum Required
Addendum Separator	0 = off	1 = on	1	Addendum Separator

Imager
Scanner setting key = Barcode\UPCE\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Addendum[2]	0	2	0	Addendum
2 Digit Addendum[1]	0 = off	1 = on	0	Not available in the **Scanners** applet
5 Digit Addendum[1]	0 = off	1 = on	0	Not available in the **Scanners** applet
Addendum Required[1]	0 = off	1 = on	0	Not available in the **Scanners** applet

Note 1: Omnii only.

Note 2: All Psion computers except Omnii.

13.6.9 UPC/EAN Shared Settings

All Scanner Types
Scanner setting key = Barcode\UPC_EAN\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Decoded Laser Scanner
Scanner setting key = Barcode\UPC_EAN\Decoded

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Bookland Enabled	0 = off	1 = on	0		Enable Bookland EAN
Supplementals	0	2	0	0 = Ignore 1 = Decode 2 = Autodiscriminate	Supplementals
Supplemental Redundancy	2	20	20		Supp. Redundancy
Security Level	0	3	0		Security Level
Linear Decode	0 = off	1 = on	0		Linear Decode
UPC Half Block Stitching	0 = off	1 = on	1		UPC Half Block Stitching

EV15 1D Imager And E1022 1D Imager
Scanner setting key = Barcode\UPC_EAN\ICSP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Addendum	0	1	0		Addendum
Addendum Add-on 2	0 = off	1 = on	0		Addendum Add-on 2
Addendum Add-on 5	0 = off	1 = on	0		Addendum Add-on 5
Addendum Security	0	100	10		Addendum Security
GTIN Compliant	0 = off	1 = on	0		GTIN Compliant
Reading Range[1]	0	1	1	0 = Normal 1 = Extended	Reading Range

Note 1: Omnii only.

5x80 Imager
Scanner setting key = Barcode\UPC_EAN\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
UPC-A EAN-13 Extended Coupon Code	0 = off	1 = on	1	Extended Coupon Code

13.6.10 Codabar Settings

All Scanner Types
Scanner setting key = Barcode\CDB\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Decoded Laser Scanner
Scanner setting key = Barcode\CDB\Decoded

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Length L1	0	55	5	Set Length L1
Length L2	0	55	55	Set Length L2
CLSI Editing	0 = off	1 = on	0	CLSI Editing
NOTIS Editing	0 = off	1 = on	0	NOTIS Editing

Non-decoded Laser Scanner
Scanner Setting Key: Barcode\CDB

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
StartStopChars	0 = off	1 = on	1	Strip Start/Stop Chars
Transmit Code ID Character	0 = off	1 = on	0	Transmit Code ID Char

EV15 1D Imager And E1022 1D Imager
Scanner Setting Key: Barcode\CDB\ICSP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	0		Enabled
Start Stop Transmission	0	4	0	0 = Not transmitted 1 = a, b, c, d 2 = A, B, C, D 3 = a, b, c, d, /, t, n, *, e 4 = DC1, DC2, DC3, DC4	Start/Stop Transmit
CLSI Library System	0 = off	1 = on	0		CLSI Library System
Check Digit Verification	0 = off	1 = on	0		Check Digit Verification
Transmit Check Digit	0 = off	1 = on	0		Transmit Check Digit
Length L1	0	255	6		Set Length L1
Length L2	0	255	0		Set Length L2
Length L3	0	255	0		Set Length L3
Length Mode	0	1	0	0 = L1 minimum length 1 = L2, L3, L4 fixed length	Length Mode

5x80 Imager
Scanner Setting Key: Barcode\CDB\HHP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	1		Enabled
Start Stop Char	0 = off	1 = on	0		Start/Stop Transmit
Check Char	0	2	0	0 = None 1 = Validate only 2 = Validate transmit	Check Char
Concatenation	0	2	0	0 = Off 1 = On 2 = Required	Concatenation
Length Min	2	60	4		Minimum Length
Length Max	2	60	60		Maximum Length

Imager

Scanner Setting Key: Barcode\CDB\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.11 Code 93 Settings

All Scanner Types

Scanner Setting Key: Barcode\C93\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Non-decoded Laser Scanner

Scanner Setting Key: Barcode\C93

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Transmit Code ID Character	0 = off	1 = on	0	Transmit Code ID Char

Decoded Laser Scanner

Scanner Setting Key: Barcode\C93\Decoded

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Length L1	0	55	4	Set Length L1
Length L2	0	55	55	Set Length L2

EV15 1D Imager And E1022 1D Imager
Scanner Setting Key: Barcode\C93\ICSP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Length L1	0	255	1	Set Length L1

5x80 Imager
Scanner Setting Key: Barcode\C93\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Length Min	0	80	0	Minimum Length
Length Max	0	80	80	Maximum Length

Imager
Scanner Setting Key: Barcode\C93\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.12 Code 11 Settings

All Scanner Types
Scanner Setting Key: Barcode\C11\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Non-decoded Laser Scanner
Scanner Setting Key: Barcode\C11

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Include Chk	0 = off	1 = on	0	Include Check
Num Chk Digits	0	2	0	Check Digits
Transmit Code ID Character	0 = off	1 = on	0	Transmit Code ID Char

EV15 1D Imager
Scanner Setting Key: Barcode\C11\ICSP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	0		Enabled
Check Digit Verification	1	2	2	1 = One Check Digit 2 = Two check Digits	Check Digit Verification
Transmit Check Digit	0 = off	1 = on	1		Transmit Check Digit
Length L1	0	255	0		Minimum Length

5x80 Imager

Scanner Setting Key: Barcode\C11\HHP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	0		Enabled
Check Digits Required	0	1	1	0 = One Check Digit 1 = Two check Digits	Check Digits
Length Min	1	80	4		Minimum Length
Length Max	1	80	80		Maximum Length

13.6.13 Interleaved 2 of 5 Settings

All Scanner Types

Scanner Setting Key: Barcode\I25\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Non-decoded Laser Scanner

Scanner Setting Key: Barcode\I25

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Mod Chk Base	0 = off	1 = on	0	MOD 10 Check
ItfChk	0 = off	1 = on	0	ITF Check

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Include Chk	0 = off	1 = on	0	Include Check
Transmit Code ID Character	0 = off	1 = on	0	Transmit Code ID Char

Decoded Laser Scanner
Scanner Setting Key: Barcode\I25\Decoded

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Length L1	0	14	14	Set Length L1
Length L2	0	14	0	Set Length L2
Check Digit Verification	0 = off	1 = on	0	Check Digit Verification
Transmit Check Digit	0 = off	1 = on	0	Transmit Check Digit
Convert to EAN 13	0 = off	1 = on	0	Convert to EAN 13

EV15 1D Imager And E1022 1D Imager
Scanner Setting Key: Barcode\I25\ICSP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	0		Enabled
Reading Range	0	1	1	0 = Normal 1 = Extended	Reading Range
Check Digit Verification	0	2	0	0 = Disabled 1 = Mod 10 Check 2 = French CIP	Check Digit Verification
Transmit Check Digit	0 = off	1 = on	0		Transmit Check Digit
Length L1	0	255	6		Set Length L1
Length L2	0	255	0		Set Length L2
Length L3	0	255	0		Set Length L3
Length Mode	0	1	0	0 = L1 minimum length 1 = L1, L2, L3 fixed length	Length Mode

5x80 Imager

Scanner Setting Key: Barcode\I25\HHP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	0		Enabled
Check Digit	0	2	0	0 = None 1 = Validate only 2 = Validate transmit	Check Digit
Length Min	2	80	4		Minimum Length
Length Max	2	80	80		Maximum Length

Imager

Scanner Setting Key: Barcode\I25\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Check Digit Verification	0 = off	1 = on	0	Check Digit Verification
Include Check	0 = off	1 = on	0	Include Check

13.6.14 MSI Plessey Settings

All Scanner Types
Scanner Setting Key: Barcode\MSI\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Non-decoded Laser Scanner
Scanner Setting Key: Barcode\MSI

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
One Chk Digits	0 = off	1 = on	1	One Check Digit
Include Chk	0 = off	1 = on	0	Include Check
Transmit Code ID Character	0 = off	1 = on	0	Transmit Code ID Char

Decoded Laser Scanner
Scanner Setting Key: Barcode\MSI\Decoded

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	0		Enabled
Length L1	6	55	6		Set Length L1
Length L2	6	55	55		Set Length L2
Check Digits	0	1	0	0 = One check digit 1 = Two check digits	Check Digits

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Transmit Check Digit	0 = off	1 = on	0		Transmit Check Digit
Check Digit Algorithm	0	1	1	0 = MOD 10/ MOD 11 1 = MOD 10/ MOD 10	Check Digit Algorithm

EV15 1D Imager and E1022 1D Imager
Scanner Setting Key: Barcode\MSI\ICSP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	0		Enabled
Plessey Enabled[1]	0 = off	1 = on	0		Enable Plessey
Check Digit Verification	1	2	2	1 = MOD 10 Check 2 = Double MOD 10 Check	Check Digit Verification
Transmit Check Digit	0 = off	1 = on	1		Transmit Check Digit
Plessey Transmit Check Digit	0 = off	1 = on	0		Plessey Transmit Check Digit
Length L1	0	255	6		Minimum Length
Plessey Length L1	0	255	0		Plessey Minimum Length

Note 1: Omnii only.

5x80 Imager
Scanner Setting Key: Barcode\MSI\HHP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	0		Enabled
Plessey Enabled	0 = off	1 = on	0		Enable Plessey
Check Char	0	1	0	0 = Validate only 1 = Validate transmit	Check Char
Length Min	4	48	4		Minimum Length
Length Max	4	48	48		Maximum Length
Plessey Length Min	4	48	4		Plessey Minimum Length
Plessey Length Max	4	48	48		Plessey Maximum Length

13.6.15 Matrix 2 of 5 Settings

All Scanner Types
Scanner Setting Key: Barcode\Matrix25\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

EV15 1D Imager and E1022 1D Imager
Scanner Setting Key: Barcode\Matrix25\ICSP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Length L1	0	255	6	Set Length L1

5x80 Imager
Scanner Setting Key: Barcode\Matrix25\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Length Min	1	80	4	Minimum Length
Length Max	1	80	80	Maximum Length

13.6.16 Discrete 2 of 5 Settings

All Scanner Types
Scanner Setting Key: Barcode\D25\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Non-decoded Laser Scanner
Scanner Setting Key: Barcode\D25

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Mod Chk Base	0 = off	1 = on	0	MOD 10 Check
ItfChk	0 = off	1 = on	0	ITF Check
Include Chk	0 = off	1 = on	0	Include Check
Transmit Code ID Character	0 = off	1 = on	0	Transmit Code ID Char

Decoded Laser Scanner
Scanner Setting Key: Barcode\D25\Decoded

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Length L1	0	12	12	Set Length L1
Length L2	0	12	0	Set Length L2

EV15 1D Imager and E1022 1D Imager

Scanner Setting Key: Barcode\D25\ICSP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	0		Enabled
Standard 2 of 5 Format	0	1	0	0 = Identicaon 1 = Computer identics	Standard 2 of 5 Format
Check Digit Verification	0	1	0	0 = Disabled 1 = MOD 10 check	Check Digit Verification
Transmit Check Digit	0 = off	1 = on	0		Transmit Check Digit
Length L1	0	255	6		Set Length L1
Length L2	0	255	0		Set Length L2
Length L3	0	255	0		Set Length L3
Length Mode	0	1	0	0 = L1 minimum length 1 = L1, L2, L3 fixed length	Length Mode

5x80 Imager

Scanner Setting Key: Barcode\D25\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Length Min	1	48	4	Minimum Length
Length Max	1	48	48	Maximum Length

13.6.17 IATA 2 of 5 Settings

All Scanner Types

Scanner Setting Key: Barcode\IATA25\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Non-decoded Laser Scanner
Scanner Setting Key: Barcode\IATA25

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Mod Chk Base	0 = off	1 = on	0	MOD 10 Check
ItfChk	0 = off	1 = on	0	ITF Check
Include Chk	0 = off	1 = on	0	Include Check
Transmit Code ID Character	0 = off	1 = on	0	Transmit Code ID Char

5x80 Imager
Scanner Setting Key: Barcode\IATA25\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Length Min	1	48	4	Minimum Length
Length Max	1	48	48	Maximum Length

13.6.18 Telepen Settings

All Scanner Types
Scanner Setting Key: Barcode\Telepen\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

EV15 1D Imager And E1022 1D Imager
Scanner Setting Key: Barcode\Telepen\ICSP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	0		Enabled
Format	0	1	0	0 = ASCII 1 = Numeric	Format
Length L1	0	255	0		Set Length L1

5x80 Imager
Scanner Setting Key: Barcode\Telepen\HHP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Enabled	0 = off	1 = on	1		Enabled
Output	0	1	0	0 = Code ID AIM 1 = Original	Output
Length Min	1	60	1		Minimum Length
Length Max	1	60	60		Maximum Length

13.6.19 RSS Code Settings & GS1 DataBar Settings

All Scanner Types

Scanner Setting Key: Barcode\RSSCode\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Decoded Laser Scanner

Scanner Setting Key: Barcode\RSSCode\Decoded

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
RSS-14 Enabled[2]	0 = off	1 = on	0	Enable RSS-14
GS1 DataBar Omni Enabled[1]	0 = off	1 = on	0	Enable GS1 DataBar Omni
RSS Limited Enabled[2]	0 = off	1 = on	0	Enable RSS Limited
GS1 DataBar Limited Enabled[1]	0 = off	1 = on	0	Enable GS1 DataBar Limited
RSS Expanded Enabled[2]	0 = off	1 = on	0	Enable RSS Expanded
GS1 DataBar Expanded Enabled[1]	0 = off	1 = on	0	Enable GS1 DataBar Expanded

Note 1: Omnii only.

Note 2: All Psion computers except Omnii.

5x80 Imager

Scanner Setting Key: Barcode\RSSCode\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled[2]	0 = off	1 = on	1	Enabled
RSS Limited Enabled[2]	0 = off	1 = on	1	Enable RSS Limited
RSS Expanded Enabled[2]	0 = off	1 = on	1	Enable RSS Expanded
RSS Expanded Length Min[2]	4	74	4	Minimum Length
RSS Expanded Length Max[2]	4	74	74	Maximum Length
GS1 DataBar Omni Enabled[1]	0 = off	1 = on	1	Not available in the **Scanners** applet
GS1 DataBar Limited Enabled[1]	0 = off	1 = on	1	Not available in the **Scanners** applet
GS1 DataBar Expanded Enabled[1]	0 = off	1 = on	1	Not available in the **Scanners** applet
GS1 DataBar Expanded Length Min[1]	4	74	4	Not available in the **Scanners** applet
GS1 DataBar Expanded Length Max[1]	4	74	74	Not available in the **Scanners** applet

Note 1: Omnii only.

Note 2: All Psion computers except Omnii.

EV15 1D Imager

Scanner Setting Key: Barcode\RSSCode\ICSP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
RSS-14 Enabled[2]	0 = off	1 = on	0	Enable RSS-14
GS1 DataBar Omni Enabled[1]	0 = off	1 = on	0	Enable GS1 DataBar Omni
RSS Limited Enabled[2]	0 = off	1 = on	0	Enable RSS Limited
GS1 DataBar Limited Enabled[1]	0 = off	1 = on	0	Enable GS1 DataBar Limited
RSS Expanded Enabled[2]	0 = off	1 = on	0	Enable RSS Expanded
GS1 DataBar Expanded Enabled[1]	0 = off	1 = on	0	Enable GS1 DataBar Expanded

Note 1: Omnii only.

Note 2: All Psion computers except Omnii.

Imager

Scanner Setting Key: Barcode\RSSCode\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.20 PosiCode Settings

5x80 Imager

Scanner Setting Key	Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
Barcode\PosiCode\Scs	Field Size	0	1400	0		Field Size
	Minimum Size	0	1400	0		Minimum Size
	Maximum Size	0	1400	0		Maximum Size
	Prefix Char	0	0xFFFF	0		Prefix Char
	Suffix Char	0	0xFFFF	0		Suffix Char
	Strip Leading	0	127	0		Strip Leading
	Strip Trailing	0	127	0		Strip Trailing
Barcode\PosiCode\HHP	Enabled	0 = off	1 = on	1		Enabled
	Posicode	0	2	2	0 = AB on 1 = AB LIMA on 2 = AB LIMB on	PosiCode
	Length Min	2	80	4		Minimum Length
	Length Max	2	80	48		Maximum Length

13.6.21 Composite Codes

Decoded Laser Scanner

Scanner Setting Key: Barcode\Composite\Decoded

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
CC-C Enabled[2]	0 = off	1 = on	0	Enable CC-C

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
CC-AB Enabled[2]	0 = off	1 = on	0	Enable CC-AB
TLC-39 Enabled[2]	0 = off	1 = on	0	Enable TLC-39

Note 2: All Psion computers except Omnii.

EV15 1D Imager and E1022 1D Imager

Scanner Setting Key: Barcode\Composite\ICSP

Scanner Setting Name	Minimum	Maximum	Default	Values	GUI Name
CC-A/B Enabled	0 = off	1 = on	0		Enable CC-AB
CC-C Enabled	0 = off	1 = on	0		Enable CC-C
Linear Transmission only	0 = off	1 = on	0		Linear Transmission only
UPC and EAN composite message decoding	0	2	2	0 = Always linked 1 = Never linked 2 = AutodDiscriminate	UPC-EAN composite message decoding

5x80 Imager

Scanner Setting Key: Barcode\Composite\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
EAN-UCC Composite Enabled	0 = off	1 = on	0	GS1 128
EAN-UCC Emulation	0 = off	1 = on	0	EAN/UCC 128 Emulation
Length Min	1	2435	1	Minimum Length
Length Max	1	2435	2435	Maximum Length

Imager (Deprecated)

Scanner Setting Key: Barcode\Composite\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.22 TLC-39 Settings

All Scanner Types
Scanner Setting Key: Barcode\TLC39\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

EV15 1D Imager and E1022 1D Imager
Scanner Setting Key: Barcode\TLC39\ICSP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Linear Transmission only	0 = off	1 = on	0	Linear Transmission only
Security Level	0	100	10	Security Level

5x80 Imager
Scanner Setting Key: Barcode\TLC39\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.23 PDF417 Settings

All Scanner Types
Scanner Setting Key: Barcode\PDF417\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Decoded Laser Scanner
Scanner Setting Key: Barcode\PDF417\Decoded

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled

EV15 1D Imager
Scanner Setting Key: Barcode\PDF417\ICSP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled

5x80 Imager
Scanner Setting Key: Barcode\PDF417\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Length Min	1	2750	1	Minimum Length
Length Max	1	2750	2750	Maximum Length

Imager

Scanner Setting Key: Barcode\PDF417\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled

13.6.24 Micro PDF-417 Settings

All Scanner Types

Scanner Setting Key: Barcode\MicroPDF417\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

Decoded Laser Scanner

Scanner Setting Key: Barcode\MicroPDF417\Decoded

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled[2]	0 = off	1 = on	0	Enabled
Code 128 Emulation[2]	0 = off	1 = on	0	Code 128 Emulation

Note 2: All Psion computers except Omnii.

EV15 1D Imager

Scanner Setting Key: Barcode\MicroPDF417\ICSP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Code 128 Emulation	0 = off	1 = on	0	Code 128 Emulation

5x80 Imager

Scanner Setting Key: Barcode\MicroPDF417\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Length Min	1	366	1	Minimum Length
Length Max	1	366	366	Maximum Length

Imager

Scanner Setting Key: Barcode\MicroPDF417\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled

13.6.25 Code 16K Settings

5x80 Imager

Scanner Setting Key	Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Barcode\C16\Scs	Field Size	0	1400	0	Field Size
	Minimum Size	0	1400	0	Minimum Size
	Maximum Size	0	1400	0	Maximum Size
	Prefix Char	0	0xFFFF	0	Prefix Char
	Suffix Char	0	0xFFFF	0	Suffix Char
	Strip Leading	0	127	0	Strip Leading
	Strip Trailing	0	127	0	Strip Trailing
Barcode\C16\HHP	Enabled	0 = off	1 = on	0	Enabled
	Length Min	1	160	1	Minimum Length
	Length Max	1	160	160	Maximum Length

13.6.26 Code 49 Settings

5x80 Imager

Scanner Setting Key	Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Barcode\C49\Scs	Field Size	0	1400	0	Field Size
	Minimum Size	0	1400	0	Minimum Size
	Maximum Size	0	1400	0	Maximum Size
	Prefix Char	0	0xFFFF	0	Prefix Char
	Suffix Char	0	0xFFFF	0	Suffix Char
	Strip Leading	0	127	0	Strip Leading
	Strip Trailing	0	127	0	Strip Trailing
Barcode\C49\HHP	Enabled	0 = off	1 = on	0	Enabled
	Length Min	1	81	1	Minimum Length
	Length Max	1	81	81	Maximum Length

13.6.27 Codablock Settings

All Scanner Types
Scanner Setting Key: Barcode\Codablock\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

EV15 1D Imager And E1022 1D Imager
Scanner Setting Key: Barcode\Codablock\ICSP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Codablock A Enabled	0 = off	1 = on	0	Enable Codablock A
Codablock F Enabled	0 = off	1 = on	0	Enable Codablock F

5x80 Imager
Scanner Setting Key: Barcode\Codablock\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Length Min	1	2048	1	Minimum Length
Length Max	1	2048	2048	Maximum Length

13.6.28 2D Data Matrix Settings

All Scanner Types
Scanner Setting Key: Barcode\DataMatrix\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

5x80 Imager
Scanner Setting Key: Barcode\DataMatrix\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Length Min	1	1500	1	Minimum Length
Length Max	1	1500	1500	Maximum Length

Imager (Deprecated)
Scanner Setting Key: Barcode\DataMatrix\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Inverse Video Mode	0 = off	1 = on	0	Inverse Video Mode
Rectangular	0 = off	1 = on	1	Rectangular

13.6.29 2D QR Code Settings

All Scanner Types
Scanner Setting Key: Barcode\QRCode\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

5x80 Imager

Scanner Setting Key: Barcode\QRCode\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Length Min	1	3500	1	Minimum Length
Length Max	1	3500	3500	Maximum Length

Imager (Deprecated)

Scanner Setting Key: Barcode\QRCode\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Inverse Video Mode[2]	0 = off	1 = on	0	Inverse Video Mode

Note 2: All Psion computers except Omnii.

13.6.30 2D MaxiCode Settings

All Scanner Types

Scanner Setting Key: Barcode\MaxiCode\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

5x80 Imager

Scanner Setting Key: Barcode\MaxiCode\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Length Min	1	150	1	Minimum Length
Length Max	1	150	150	Maximum Length

Imager (Deprecated)
Scanner Setting Key: Barcode\MaxiCode\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.31 2D Aztec Settings

All Scanner Types
Scanner Setting Key: Barcode\Aztec\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

5x80 Imager
Scanner Setting Key: Barcode\Aztec\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	1	Enabled
Runes Enabled	0 = off	1 = on	0	Aztec Runes

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Length Min	1	3750	1	Minimum Length
Length Max	1	3750	3750	Maximum Length

Imager (Deprecated)
Scanner Setting Key: Barcode\Aztec\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.32 Postal - PlaNET Settings

All Scanner Types
Scanner Setting Key: Barcode\PlaNET\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

5x80 Imager
Scanner Setting Key: Barcode\PlaNET\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Check Digit	0 = off	1 = on	0	Check Digit

Imager (Deprecated)
Scanner Setting Key: Barcode\PlaNET\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.33 Postal - PostNET Settings

All Scanner Types
Scanner Setting Key: Barcode\PostNET\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

5x80 Imager
Scanner Setting Key: Barcode\PostNET\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Check Digit	0 = off	1 = on	0	Check Digit

Imager (Deprecated)
Scanner Setting Key: Barcode\PostNET\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.34 Postal - Australian Settings

All Scanner Types
Scanner Setting Key: Barcode\PostalAus\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

5x80 Imager
Scanner Setting Key: Barcode\PostalAus\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

Imager (Deprecated)
Scanner Setting Key: Barcode\PostalAus\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.35 Postal - Canadian Settings

All Scanner Types
Scanner Setting Key: Barcode\PostalCdn\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

5x80 Imager
Scanner Setting Key: Barcode\PostalCdn\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

Imager (Deprecated)
Scanner Setting Key: Barcode\PostalCdn\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.36 Postal - Japanese Settings

All Scanner Types
Scanner Setting Key: Barcode\PostalJap\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

5x80 Imager

Scanner Setting Key: Barcode\PostalJap\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

Imager (Deprecated)

Scanner Setting Key: Barcode\PostalJap\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.37 Postal - Kix Settings

All Scanner Types

Scanner Setting Key: Barcode\PostalKix\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

5x80 Imager

Scanner Setting Key: Barcode\PostalKix\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

Imager (Deprecated)
Scanner Setting Key: Barcode\PostalKix\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.38 Postal - Korean Settings

All Scanner Types
Scanner Setting Key: Barcode\PostalKor\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

5x80 Imager
Scanner Setting Key: Barcode\PostalKor\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled
Length Min	1	80	4	Minimum Length
Length Max	2	80	48	Maximum Length

Imager (Deprecated)
Scanner Setting Key: Barcode\PostalKor\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.39 Postal - Royal Settings

All Scanner Types
Scanner Setting Key: Barcode\PostalRoyal\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

5x80 Imager
Scanner Setting Key: Barcode\PostalRoyal\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

Imager (Deprecated)
Scanner Setting Key: Barcode\PostalRoyal\Imager

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled	0 = off	1 = on	0	Enabled

13.6.40 Postal - China Settings

All Scanner Types
Scanner Setting Key: Barcode\PostalChn\Scs

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Field Size	0	1400	0	Field Size
Minimum Size	0	1400	0	Minimum Size
Maximum Size	0	1400	0	Maximum Size

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Prefix Char	0	0xFFFF	0	Prefix Char
Suffix Char	0	0xFFFF	0	Suffix Char
Strip Leading	0	127	0	Strip Leading
Strip Trailing	0	127	0	Strip Trailing

5x80 Imager

Scanner Setting Key: Barcode\PostalChn\HHP

Scanner Setting Name	Minimum	Maximum	Default	GUI Name
Enabled[1]	0 = off	1 = on	0	Enabled
Length Min[1]	2	80	4	Not available in the **Scanners** applet
Length Max[1]	2	80	80	Not available in the **Scanners** applet

Note 1: Omnii only.

13.7 Reading Bar Codes

13.7.1 Initiating a Bar Code Scan

A bar code scan is initiated for an internal scanner by one of the following:

- Pressing the keyboard key that is configured as the scanner trigger.
- Using the Scan method, in the Scanner API, of the Mobile Devices SDK.

A bar code scan is initiated for an external scanner as follows:

- Pressing the trigger on the pistol grip of the external scanner.

13.7.2 Controlling a Bar Code Scan

The following timing parameters control bar code scanning for the internal scanner:

Double-click time

This parameter defines the time within which the scanner trigger must be pressed twice, if the trigger presses are to be interpreted as a double-click and not as two single-clicks. The following setting controls this for the internal scanner and an external Non-decoded Laser Scanner:

- **Scs\Click Time:** see Section 13.6.1 Configuring Scanner Properties on page 102 for details.

Dot time

For scanners with an aiming dot, this parameter defines the length of time for which the aiming dot is enabled before scanning begins. The following settings control this:

- **Non-decoded\Dot Time;** see Section Non-decoded Laser Scanner Options on page 103 for details.
- **Decoded\Aiming Mode;** see Section Decoded Laser Scanner Options on page 104 for details.
- **Imager\Dot Time;** see Section Imager Options on page 106 for details.

Scan beam on time

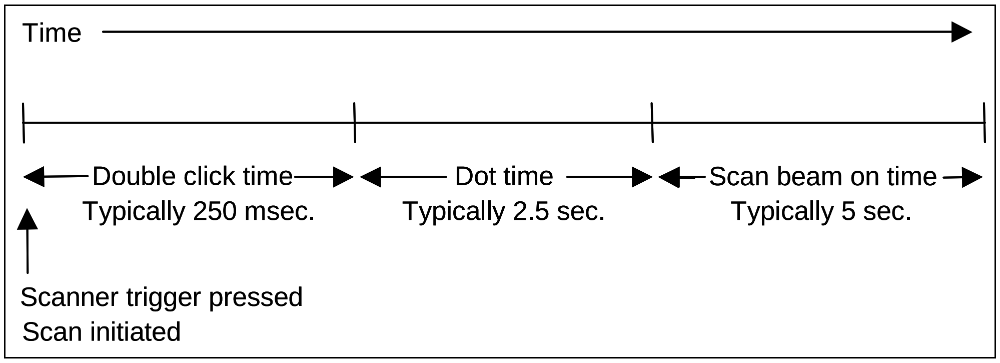
This parameter defines the maximum length of time that the scanning beam is enabled. This can only be set for decoded scanners using the following parameter:

- **Decoded\Laser On Time;** see Section Decoded Laser Scanner Options on page 104 for details.

The only way that the scanning beam can be turned off before the end of this time is by releasing the scanner trigger.

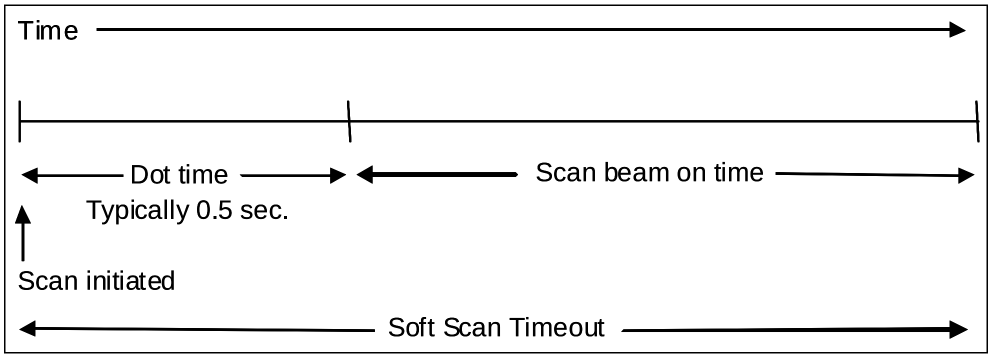
The following diagram shows the timing sequence for an operator controlled bar code scan:

Figure 13.1 Operator Controlled Scanner Timing Sequence



The following diagram shows the timing sequence for a software initiated bar code scan:

Figure 13.2 Software Initiated Scanner Timing Sequence



There are four possible outcomes for a bar code scan:

- The scan is successful.
- The scan times out.
- The scan is cancelled.
- The scan fails.

The scan is successful: The bar code is scanned and decoded before the scanner trigger is released. The decoded bar code is displayed on the screen of the hand-held computer, as well as being returned as a character string to the calling program.

The scan times out: The scan beam on time expires and the scanner beam is turned off before the bar code has been decoded. The scanner trigger must be released before another scan can be initiated. This condition can be caused by the following:

- Scanning an unsupported bar code symbology.
- Scanning a disabled bar code symbology.
- Scanning a damaged or otherwise unreadable (out of specification) bar code.
- Scanning something that is not a bar code.

The scan is cancelled: The scanner trigger is released before the bar code has been decoded.

The scan fails: No bar code data is generated by the scan. The cause is not known.

13.8 Scanner Events

The following types of scan events are generated (check the API library documentation for the name of the event and the values returned in each of the development languages):

Event Type	Generated When...	Returns
Scan complete	Scan is successful	
Scan failed	Scan is not successful	Scan cancelled Scan timed-out Scan failed

14 AUDIO

14.1 Sound Hardware

Psion computers can have beepers and/or speakers. Beepers, which are capable of providing louder sounds than speakers, are useful in environments with high background noise levels. Speakers play waveform audio. Beepers and speakers are available as follows:

Computer	Beeper	Speaker
7530	Yes	Yes
7535	Yes	No
8515	Yes	No
8525	Yes	No
8530	Yes	No
Ikôn (7505)	No	Yes
NEO (PX750)	Yes	No
Workabout Pro (7525)	No	Yes
Workabout Pro G2 (7527)	Yes	Yes
Workabout Pro 3 (7527)	Yes	Yes
Omnii XT10 (7545XV)	Yes	Yes
Omnii XT15 (7545XA)	Yes	Yes
Omnii RT15 (7545XC)	Yes	Yes
EP10 (7515)	No	Yes

14.2 Playing Beeps Using the Mobile Devices SDK

On devices that have both a beeper and a speaker, when an application plays a beep using the Mobile Devices SDK Beeper API, it is played on the beeper and no attempt is made to play it on the speaker. The Beeper API first attempts to use the Psion beeper driver. If it is not found, the tone is simulated through the speaker using the Microsoft WAVE API.

The following table defines the valid ranges for parameters that define beeps in the Mobile Devices SDK:

Parameter	Range
Frequency Range (Hz)	800 to 3000
Beep Duration (ms)	1 to 2000
Volume (% of maximum)[1]	0 to 100

[1]On devices with beepers only, this value is overridden by the volume setting in the GUI and has no effect. The volume value specified in the API call is only used on devices with waveform audio support through a speaker.

14.3 Playing WAV Audio Format Files Using the Mobile Devices SDK

The Mobile Devices SDK enables the playing of WAV audio format files on computers that have a speaker. Any valid WAV file that fits into memory can be played. Psion speakers can play all audible frequencies.

WAV files are played by specifying one of the following:

- A WAV file.
- A WAV file contained in a resource file—a JAR file or a ZIP file.

- A system sound.
- Waveform audio data contained in memory.

The following options are available when a WAV file is played:

- Asynchronous—the sound is played asynchronously and the call returns immediately after beginning the sound. To terminate an asynchronously played waveform sound before it is complete, either another waveform sound must be started, or a call must be made to an API element that stops the playing of sounds.
- Synchronous—the sound is played synchronously and the call returns when the waveform sound is complete.
- Loop—the call returns immediately after beginning the sound and the sound is played repeatedly. To terminate a looping waveform sound either another waveform sound must be started or a call must be made to an API element that stops the playing of sounds.

Warning: ***If an application terminates without stopping a looping waveform sound, the sound will continue to play. The sound is terminated when another application calls the API element that stops the playing of sounds.***

The WAV file can be located anywhere in the file system. When specifying a filename as a parameter, the full filename and path should be included in the string. If the path is not specified, the Windows default pathnames are searched.

A WAV file can be played from a memory card inserted in one of the card slots on the computer. In this case, the folder name representing the card must be included in the filename string. The filename string, in this case, will be similar to one of the following:

- sd-mmc\wavefile.wav
- hard disk\wavefile.wav
- storage card\wavefile.wav

14.4 Getting Started with the Beeper and WAV Files

For articles on Ingenuity Working that will guide you in getting started with the beeper see:

community.psion.com/tags/beeper/noteDG

For articles on Ingenuity Working that will guide you in getting started with WAV files see:

community.psion.com/tags/WAV/noteDG

14.5 Code Samples for the Beeper and WAV Files

For postings on Ingenuity Working that contain code samples that use the beeper see:

community.psion.com/tags/beeper/codeDG

For postings on Ingenuity Working that contain code samples that use WAV files see:

community.psion.com/tags/WAV/codeDG

14.6 Sound API Elements

Playing beeps

C++: The beeper is controlled using the **PsionTeklogix::Sound** namespace.

Java: The beeper is controlled using the **com.teklogix.sound** package.

.NET:. The beeper is controlled using the **PsionTeklogix.Sound.Beeper** namespace.

Playing WAV files

C++: The playing of WAV files is controlled using the **PsionTeklogix::Sound** namespace, the Microsoft Win32 APIs, or any other standard C++ WAV APIs.

Java: The playing of WAV files is controlled using the **com.teklogix.sound** package or any other standard Java WAV package.

.NET: The playing of WAV files is controlled using the **PsionTeklogix.Sound** namespace, any other standard .NET WAV APIs.

14.7 Microphone

Microphones are available on Psion computers as follows:

Computer	Built-in Microphone	Microphone Jack
7530	Yes	No
7535	No	No
8515	No	Yes
8525	No	No
8530	No	No
Ikôn (7505)	Yes	Yes
NEO (PX750)	Yes	No
Workabout Pro (7525)	Yes	Yes
Workabout Pro G2 (7527)	Yes	No
Workabout Pro 3 (7527)	Yes	No
Omnii XT10 (7545XV)	Yes	No
Omnii XT15 (7545XA)	Yes	No
Omnii RT15 (7545XC)	Yes	No
EP10 (7515)	Yes	No

14.8 Audio Input

The Mobile Devices SDK does not provide any audio input APIs. For an overview of the process for recording waveform audio see msdn.microsoft.com/en-us/library/bb545537.aspx.

14.8.1 Muting the Microphone During Voice Telephone Calls

The Mobile Devices SDK enables you to mute and unmute the microphone during telephone calls. For more information see Section 19.13.13 Audio for Voice Over WWAN on page 225.

14.8.2 Controlling Microphone Gain

You can control the microphone gain on the following computers:

- Omnii
- EP10
- Earlier computers running an operating system that includes the mixer element.

Microphone gain is used for voice recognition. You can use the Hardware Audio Mixer APIs for this. For information see msdn.microsoft.com/en-us/library/ms925312.aspx.

14.9 Audio Input API Elements

C++: Audio input is controlled using the Microsoft Win32 APIs, or any other standard C++ audio APIs.

Java: Audio input is controlled using any standard Java Audio package.

.NET: Audio input is controlled using any standard .NET Audio APIs.

15 SYSTEM INFORMATION

15.1 System Information

The Mobile Devices SDK provides Psion-specific hardware and configuration information.

All information, that can be obtained using the System Properties applet on the GUI of your Psion computer, can be obtained as a name/value pair by querying the Mobile Devices SDK.

15.2 Machine Type

The machine type is one of the following strings:

- **Psion 7505** (Ikôn)
- **Psion 7527C** (Workabout Pro G2-C or Workabout Pro 3C)
- **Psion 7527S** (Workabout Pro G2-S or Workabout Pro 3S)
- **Psion 7530**
- **Psion 7535**
- **Psion 8515**
- **Psion 8525**
- **Psion 8530**
- **Psion PX750** (NEO)

15.3 Model

This is listed on the GUI System Properties as **Terminal Model**. The Psion model is one of the following strings:

- **7505** (Ikôn)
- **7527C** (Workabout Pro G2-C or Workabout Pro 3C)
- **7527S** (Workabout Pro G2-S or Workabout Pro 3S)
- **7530**
- **7535**
- **8515**
- **8525**
- **8530**
- **PX750** (NEO)

15.4 Unique Machine Identifier

The Unique Machine Identifier (UID) is a null-terminated string. The string has the format:

- <hardware serial number>-<terminal serial number>

The hardware serial number is supplied by the board manufacturer. The terminal serial number is entered during manufacture. Both are 12 bytes in length and are returned to the caller as a **null** terminated string with a '-' separating the serial numbers.

The 753x computers have both serial number strings truncated to 10 digits to maintain compatibility with earlier releases.

15.5 Psion Build Codes

Several system information calls return Psion software versions. On the following computers these are referred to as *build codes* or *date codes*:

- 753x
- 8515
- 8525 / 8530
- Workabout Pro (7525)
- Workabout Pro G2 (7527)
- Workabout Pro3 (7527)

- Ikôn (7505)
- NEO (PX750)

These codes are constructed as follows:

1. [A-L]—a single letter representing the month of the year from January to December.
2. [01-31]—a two-digit number representing the day of the month.
3. [0-9]—a single digit representing the year.
4. [a-x]—a single letter representing the hour when the software was built.

e.g. B058n = February 05, 2008, 2:00 pm

Note: This date code refers only to the specific time that the installed software was compiled. More recent date codes do not imply more advanced or more stable software builds. This code should be used only for purposes of identifying the specific software builds and comparison against other builds on a simple equality/inequality basis.

15.6 Psion Version Numbers

Several system information calls return Psion software versions. On the following computers these are referred to as *version numbers*:

- Omnii XT10 (7545XV)
- Omnii XT15 (7545XA)
- Omnii RT15 (7545XC)
- EP10 (7515)

These codes do not contain any indication of the date on which the software was built. They are constructed as follows:

*major version***.***minor version***.***build number***.***subbuild number*

Where:

Element	Meaning
major version	The version number of the software. This number increases each time there is a major new release.
minor version	This number increases each time the software is updated between major releases. For example: 2.5.12345.0 is newer than 2.4.12345.0, and 2.5.12345.0 is newer than 1.6.12345.0
build number	This number is for Psion internal use only. It has no meaning for released software.
subbuild number	Always 0 (zero) for production released software.

15.7 Setting the Ratio of Program Memory to Storage Memory

Windows CE 5.0 and Windows Embedded CE 6.0: The Mobile Devices SDK enables the setting of the ratio of the amount of memory used for running programs to the amount of memory used for the object store. A low ratio means more memory is dedicated to programs. A high ratio reserves more memory for the object store, and less for programs. For example, setting this ratio to 40% allocates 40% of unused memory to data storage and the remaining 60% to program storage.

Both memory amounts must be at least 256 kilobytes.

15.8 Getting Started with System Information

For articles on Ingenuity Working that will guide you in getting started with working with system information see:

community.psion.com/tags/system/noteDG

15.9 Code Samples for System Information

For postings on Ingenuity Working that contain code samples that use system information see:
community.psion.com/tags/system/codeDG

15.10 System Information API Elements

C++: The system information on all Psion Windows CE computers is accessed using the **PsionTeklogix::System::SystemInformation** namespace.

Java: The system information on all Psion Windows CE computers is accessed using the **SystemInformation** class in the **com.teklogix.system** package.

.NET: The system information on all Psion Windows CE computers is accessed using the **SystemInformation** class in the **PsionTeklogix.SystemPTX** namespace.

16 WINDOWS SHELL

16.1 Windows Shell

On Psion computers, the user's level of access to the Windows shell can be restricted to prevent access to unnecessary or potentially harmful aspects of the system.

On Omnii and the EP10 this feature has been replaced by PsionVU. For information see Section 23.3 PsionVU on page 254.

The following Windows shell features can be set and queried by the Mobile Devices SDK:

- Setting Windows security
- Enabling and disabling shell access

16.2 Setting Windows Security

Psion computers have the following Windows shell security levels:

- User
- Supervisor
- Teklogix

These levels can also be controlled through the Security item on the Windows **Start** menu.

User security level: This is the most restrictive security level. When this level is set on a Psion computer, the computer can be used to run applications, but there is limited access to terminal configuration features. No password is needed to access a computer when it is in this mode.

The following restrictions apply:

- On the Windows **Start** menu, the Programs, Settings, and Run items are not available.
- If the Windows desktop is accessible, the **My Computer** and **Recycle Bin** icons are not available.

Supervisor security level: This security level allows access to most of the configuration features of the Psion computer. The supervisor password can be changed when the computer is in supervisor mode or in Teklogix mode.

Teklogix security level: This security level gives unrestricted access to the Psion computer. The Teklogix password cannot be changed.

16.3 Enabling and Disabling the Windows Shell

The Mobile Devices SDK provides applications with the ability to enable and disable the Windows shell. By default, the shell is enabled. When the shell is disabled, the following features are **not** available:

- The Windows **Start** button
- The Windows Icon Tray
- The Windows Task Manager

The shell must be enabled before the application exits. If the application terminates leaving the shell disabled, the shell can only be enabled again by a warm reset or a cold reset.

16.4 Security Level Change Event

An event is generated when the Windows security level is changed through the Mobile Devices SDK or by the user through the configuration dialog. This event is only detected while a listener for the event is registered.

16.5 System Security API Elements

C++: The system security on all Psion computers is controlled using the **PsionTeklogix::System::Security** namespace.

Java: The system security on all Psion computers is controlled using the **Security** class and the **ShellSecurityLevelChangeEvent** class in the **com.teklogix.system** package.

.NET: The system security on all Psion computers is controlled using the **Security** class in the **PsionTeklogix.SystemPTX** namespace.

17 TRIGGER CONTROL

17.1 Overview

All Psion computers have one or more keyboard [SCAN] buttons, some have [SCAN] buttons on the side, and some have the option for a pistol grip trigger. Usually, these buttons are all used to initiate a bar code scan or an RFID read cycle. The Mobile Devices SDK allows you to select any keyboard key or the pistol grip trigger as the means of controlling hardware activity. Ownership of the trigger mechanisms can be defined in the Mobile Devices SDK.

Each time a trigger is pressed or released an event is generated. The Mobile Devices SDK also enables an application to generate simulated trigger events.

17.2 Definition Of Terms

Trigger source: A trigger source causes a trigger event. A trigger source is one of the following:

- The pistol grip trigger.
- Any key on the keyboard of the Psion computer, including any [SCAN] buttons.

Trigger source ID: Each trigger source has a unique trigger source ID in the form of an integer.

Friendly name: Each trigger source can have a user-friendly name. The friendly name appears on the GUI **Manage Triggers** applet, and only trigger sources with a friendly name defined can be accessed through the applet. This name—maximum 15 characters— is the name of the keyboard key or the trigger source, for example:

- Grip Trigger
- F1
- Scan
- L. Side Scan

If your application creates a new trigger source, and you want to access the trigger source through the **Manage Triggers** applet, you must give it a friendly name.

Trigger consumer: An application that receives trigger events. Each trigger consumer is identified by its unique name—a character string.

Trigger association: A mapping between a trigger source and a trigger consumer.

Double-click time: This is the maximum length of time allowed between two successive presses of a trigger source for a double-click event to be generated. The default value is 0 (zero).

17.3 Trigger Consumer Registration

Each application that is a trigger consumer must be registered to receive the trigger events. During registration, a unique trigger consumer name must be associated with the trigger consumer. Once it is registered, it can be associated with one or more trigger sources. Deregistering a trigger consumer makes all its trigger associations inactive—they become active again when the consumer registers again.

17.4 Trigger Source IDs

A trigger source ID is associated with the pistol grip trigger or one of the keyboard keys using keyboard remapping. See Section 7.2 Keyboard Remapping on page 51 for information on how to do this.

Trigger source IDs are unique. The first 256 ID numbers (0-255) are reserved as system (non-keyboard) trigger IDs. Most system trigger IDs will not be available to applications (e.g. most external scanner triggers). The most notable exception is the pistol-grip trigger, which has the system trigger ID value of 0 (zero).

Keyboard trigger sources start at 256—0x100. The trigger source ID for a specific key is 256 plus the virtual key code. See Section 7.2 Keyboard Remapping on page 51 for information on virtual key codes. For example the virtual key code for the [F1] key is 40. So the trigger source ID for the [F1] key is 296; the sum of 256 and 40.

17.4.1 Virtual Key Codes

See the following for a list of virtual key codes:

C++: PsionTeklogix::Keyboard::Key enumeration

Java: com.teklogix.keyboard.VirtualKey class

.NET: PsionTeklogix.Keyboard.Key enumeration

17.5 Trigger Associations

In order to receive trigger events, a trigger consumer must be associated with one or more trigger sources. Some hardware components should not be operated simultaneously, due to their heavy power consumption. For example, an internal imager and a tethered RFID reader should not be scanning at the same time. Doing so may cause the terminal to spontaneously turn off due to insufficient power.

Before being associated with the trigger source, the trigger consumer must register to receive trigger events. Only the trigger consumers associated with a specific trigger source receive events originating with that trigger. Several consumers can be associated with the same trigger source.

When a trigger consumer is deregistered, all its trigger associations are deactivated. If the trigger consumer re-registers the associations are re-activated.

Each development language provides API elements that associate a trigger source ID with a trigger consumer.

17.5.1 Trigger Control Flags

Trigger control flags modify a trigger association. These flags are specified when a trigger association is created. Several trigger control flags can be set during one trigger association attempt.

Unless the temporary flag is set, all trigger associations are permanent and persist across both warm resets and cold resets. It is recommended that unless the application is launched at system startup, the temporary flag be set for all trigger associations.

Exclusive flag: Setting this flag ensures that only one trigger consumer is associated with a trigger source. If this flag is set during an attempt to create a trigger association, the following can occur:

- If there is no existing trigger association for the trigger source, the association is successful and all further attempts to create an association for this trigger source fail until this exclusive association is deleted.
- If there is an existing trigger association for the trigger source, this attempt to create an exclusive association fails.

Override flag: When this flag is set during an attempt to create a trigger association, all existing trigger associations for the trigger source are replaced by the new one. Even an exclusive trigger association is replaced.

Temporary flag: When this flag is set, the trigger association does not persist across either a warm reset or a cold reset. If the override flag is also set, then the previous trigger association for the trigger source is restored when this association is deleted, or the trigger consumer is deregistered. Only one temporary-plus-override flag can be in existence for each trigger source.

Ignore duplicate registration flag: When this flag is set during a trigger association attempt, if the trigger association already exists, no error is returned.

Wants-trigger-events flag: When this flag is set, the consumer receives trigger-down events and trigger-up events. It does not receive double-click events unless the wants-double-click-events flag is also set, or there are no consumers registered to receive double-click events.

Wants-double-click-events flag: When this flag is set, the consumer receives double-click events. To receive single-click events too, the wants-trigger-events flag must also be set.

17.6 Double-Clicks

A double-click occurs when the pistol grip trigger or another trigger source is pressed twice within a very short time. This time-gap is measured in milliseconds. The double-click time is the maximum time allowed between the trigger presses if a double-click event is to be generated. The default double-click time is 0 (zero).

A double-click event is generated when both the following are true:

- A trigger source is pressed and released within ½ the configured double-click time, *and*
- The trigger source is pressed a second time before the double-click time expires.

Each trigger source has its own double-click time.

The trigger that is associated with the internal scanner uses the double-click time configured for the scanner either through the GUI or through the SDK scanner namespace. See Section Double-click settings on page 102 for more information.

17.7 Events

To receive trigger events, a trigger consumer must be associated with a trigger source and registered to receive trigger events. A trigger consumer can receive events from several triggers. Each event contains the identity of the trigger source that originated it. To receive trigger events an application must complete the following steps:

1. Register as a trigger consumer.
2. Register the trigger consumer to receive trigger events.
3. Associate the trigger consumer with a trigger source ID.

A trigger consumer can deregister as a trigger consumer to stop receiving all events. It can remove the association with one, or all, trigger source IDs to stop receiving events from one, or all, trigger sources.

A trigger event is generated when the state of a trigger source changes on a Psion computer. There are two trigger states:

- Trigger-down.
- Trigger-up.

Trigger-down event: This event is generated when the pistol grip trigger or the button associated with a trigger source is pressed.

Trigger-up event: This event is generated when the trigger or button associated with a trigger source is released.

Any trigger event can have one of the following flags set:

- Single-click flag.
- Double-click flag.

Single-click flag: This flag is set when a trigger source is pressed and released within ½ the double-click time configured for that trigger source. The double-click time must be greater than 0 (zero).

Double-click flag: This flag is set when a trigger source is pressed twice within the double-click time configured for that trigger source. The double-click time must be greater than 0 (zero).

17.7.1 Simulated Events

The Mobile Devices SDK can generate a simulated trigger event. This is forwarded to the trigger driver. The trigger driver sends the event to all registered trigger consumers which also have a trigger association with the specified trigger event source.

This method generates both trigger-up and trigger-down events.

Any application that simulates trigger events using this method **must** be well behaved. A trigger-down event must always be followed by a trigger-up event. Sending out multiple trigger-down and trigger-up events in a row can result in unexpected behaviour. An application must not remove a trigger association after a trigger-down event—the associated trigger-up event must be simulated before the association is ended.

17.7.2 Single-Click Events and Double-Click Events

Single-click events and double-click events can be generated by any trigger source, if the configured double-click time for the trigger source is not 0 (zero).

Event Sequence (> = followed by)	Generated When...
Trigger-down event > trigger-up event with the single-click event flag set.	A trigger source is pressed and released within ½ the configured double-click time.
Trigger-down event > trigger-up event with the single-click event flag set > trigger-down event with the double-click flag set > trigger-up event with the double-click flag set.	A trigger source is pressed and released within ½ the configured double-click time, and it is pressed and released a second time before the double-click time expires.
Trigger-down event > trigger-up event with the single-click event flag set > trigger-down event with the double-click flag set > trigger-up event.	A trigger source is pressed and released within ½ the configured double-click time, and it is pressed a second time—but not released— before the double-click time expires.

17.8 Getting Started with Trigger Control

For articles on Ingenuity Working that will guide you in getting started with the trigger control see:
community.psion.com/tags/trigger/noteDG

17.9 Code Samples for Trigger Control

For postings on Ingenuity Working that contain code samples that use the trigger control see:
community.psion.com/tags/trigger/codeDG

17.10 Trigger Control API Elements

C++: The trigger on all Psion computers is controlled using the **PsionTeklogix::Trigger** namespace.
Java: The trigger on all Psion computers is controlled using the **com.teklogix.trigger** package.
.NET: The trigger on all Psion computers is controlled using the **PsionTeklogix.Trigger** namespace.

18 WIRELESS LOCAL-AREA NETWORKING

18.1 Wireless Local-Area Networking (WLAN)

A wireless LAN enables a device to connect to a local-area network (LAN) through a wireless radio connection. The IEEE 802.11 standards define communication protocols on WLANs. The coverage area of a WLAN is dependant on the radio wave frequency, power output and environmental factors that may reflect or absorb radio signals.

18.2 Supplicants

The Mobile Devices SDK enables the configuration and operation of wireless LAN network connections. A wireless LAN connection is established and maintained through a supplicant that is provided by the radio manufacturer. Each supplicant implements its own standards. The Mobile Devices SDK encapsulates the functionalities of the following supplicants. You do not need to load these supplicants. They are built into the image for the Psion computer. See Table 18.1 Availability of Supplicants on page 185 for a list of the supplicants that are available on specific Psion computers:

- Summit
- Wireless Zero Config (WZC)
- Easy Wi-Fi Security (previously called Devicescape Agent [DSA])

Summit

The Summit supplicant implements secure wireless networking for Summit radios.

Wireless Zero Configuration

Wireless Zero Configuration (WZC), also known as Wireless Auto Configuration, or WLAN AutoConfig is a wireless connection management utility included with Microsoft Windows operating systems as a service that dynamically selects a wireless network to connect to, based on a user's preferences and various default settings. This can be used instead of, or in the absence of, a wireless network utility from the manufacturer of the wireless networking device on the computer.

Wi-Fi Config

Wi-fi Config is the Psion implementation of Devicescape Agent (DSA). It is integrated into the Windows operating systems.

The supplicants are available as follows:

Table 18.1 Availability of Supplicants

Computer	Summit	DeviceScape Agent	Zero Config (WZC)	Default Supplicant
753x G2	Only if RA2041 radio installed	No	Yes	Summit (if installed)
8525 G2	Only if RA2041 radio installed	No	Yes	Summit (if installed)
8530 G2	Only if RA2041 radio installed	No	Yes	Summit (if installed)
Workabout Pro G2 (7527)	Only if RA2041 radio installed	No	Yes	Summit (if installed)
Workabout Pro 3 (7527)	Only if RA2041 radio installed	No	Yes	Summit (if installed)
Ikôn (7505)	Yes	No	Yes	Windows CE: Summit Windows Mobile: WZC

Computer	Summit	DeviceScape Agent	Zero Config (WZC)	Default Supplicant
NEO (PX750)	No	Yes	Yes	Windows CE: DeviceScape Agent Windows Mobile: WZC
Omnii XT10 (7545XV)	No	Yes	Yes	DeviceScape Agent
Omnii XT15 (7545XA)	No	Yes	Yes	Windows CE: Summit Windows Mobile: WZC
Omnii RT15 (7545XC)	No	Yes	Yes	Windows CE: Summit Windows Mobile: WZC
EP10 (7515)	No	Yes	Yes	WZC
8515	Only if RA2041 radio installed	No	Yes	Summit (if installed)

Note: On some computers DeviceScape Agent is called Wi-Fi Config on the user interface.

18.2.1 Namespaces

The current Mobile Devices SDK uses the WLANEx namespace. This namespace works with all recent Psion computers and on recent versions of the Windows operating systems. Some older Psion computers and operating systems require the earlier WLAN namespace which is available in earlier versions of the Mobile Devices SDK.

WLANEx Namespace Availability

The WLANEx namespace is available on the following:

Computer	Operating System
753x G2	Windows Embedded CE 5.0
Workabout Pro G2 (7527)	• Windows Embedded CE 5.0 • Windows Mobile 6.0 Classic • Windows Mobile 6.0 Professional • Windows Mobile 6.1 Classic • Windows Mobile 6.1 Professional
Workabout Pro 3 (7527)	• Windows Embedded CE 5.0 • Windows Mobile 6.1 Classic • Windows Mobile 6.1 Professional
Ikôn (7505)	• Windows Embedded CE 5.0 • Windows Mobile 6.0 Classic • Windows Mobile 6.0 Professional • Windows Mobile 6.1 Classic • Windows Mobile 6.1 Professional
NEO (PX750)	Windows CE 5.0 Core Windows CE 5.0 Professional Windows Mobile 6.1 Classic
Omnii XT10 (7545XV)	Windows Embedded CE 6.0
Omnii XT15 (7545XA)	• Windows Embedded CE 6.0 • Windows Embedded Hand-Held 6.5
Omnii RT15 (7545XC)	• Windows Embedded CE 6.0 • Windows Embedded Hand-Held 6.5

Computer	Operating System
EP10 (7515)	Windows Embedded Hand-Held 6.5
8515	Windows Embedded CE 5.0

The WLANEx namespace is not available for the following—if you are using one of these computers, you have to use the WLAN namespace in Mobile Devices SDK versions prior to version 5.0:

Computer	Operating System
753x G0/G1	Windows CE .NET 4.2
Workabout Pro G0/G1 (7525)	• Windows Mobile 2003 Second Edition • Windows CE .NET 4.2 • Windows Mobile 5.0
8525/ 8530	Windows CE .NET 4.2

18.3 Configuring WLAN Radios

You have the following options when configuring a radio and connecting to a local area network:

- Using your own application that uses APIs in the WLANEx namespace of the Mobile Devices SDK.
- Using a GUI application, supplied in the image for your Psion computer, that allows you to interact with a supplicant. This is available through a GUI applet or from the **Start** menu.
- Using a third-party application.

Using a supplicant

The supplicants that are available on your computer (see Table 18.1 Availability of Supplicants on page 185) can be accessed either through the SDK or through a GUI application.

Supplicant Name in WLANEx Namespace	Supplicant name in GUI Application	For more information see...
DSA	Wi-fi Config	
WZC	Wireless Zero Config	
Summit	Summit Client Utility, SCU	www.support-datalogic.de/Handbucher/PDC/Summit_Users_Guide_v1.03.pdfl

18.4 Authentication Modes

An authentication mode defines the procedure that the 802.11 device uses when it authenticates and associates with an access point.

Authentication modes are available through the Mobile Devices SDK as follows:

Mode	DSA	Summit	WZC
Open / None	Yes	Yes	Yes
WEP / Shared	Yes		Yes
Auto		Yes	
WPA		Yes	Yes
WPA2		Yes	Yes
WPA_PSK	Yes	Yes	Yes

Mode	DSA	Summit	WZC
WPA2_PSK	Yes	Yes	Yes
CCKM	Yes	Yes	No
802.1x	Yes		
WPA_EAP	Yes		
WPA2_EAP	Yes		

18.5 Extensible Authentication Protocol (EAP)

18.5.1 Extensible Authentication Protocol (EAP) Modes

EAP Modes Are Available Through The Mobile Devices SDK As Follows:

Mode	DSA	Summit	WZC
TLAS			Yes
PEAP			Yes
PEAP-GTC		Yes	
PEAP_MSCHAP		Yes	
PEAPV0-MSCHAPV2	Yes		
PEAPV1_MSCHAPV2	Yes		
PEAPV1_GTC	Yes		
PEAPV1_TLS	Yes		
LEAP	Yes	Yes	
MSCHAPV2			Yes
Fast		Yes	
Fast MCHAPV2	Yes		
Fast GTC	Yes		
Fast TLS	Yes		
TLS	Yes	Yes	
TTLS-MD5	Yes		
TTLS-MSSCHAPV2	Yes		
TTLS-GTC	Yes		

18.5.2 EAP Authentication - Certificates And Passwords

For Summit and Devicescape Agent you can specify a certificate for EAP authentication, or you can specify a username and password.

Summit

EAP functions take two types of certificates;

- User
- CA–trusted root certificate. This certificate is in the ROOT store or in a separate file.

EAP Mode	Can take...
TLAS	User certificate or CA certificate.
LEAP	Username and password only.
Fast	Username and password with a special *pacfilename* and *pacpassword*.
PEAP-GTC	Username and password, and a CA certificate.
PEAP_MSCHAP	Username and password, and a CA certificate.

Devicescape Agent

Certificates are specified in one of the following:

- ROOT of the device.
- USER store on the device.

The certificate hash code has to be specified by character when configuring it: For coding details see the WLANEx_Connect demo on Ingenuity Working at:

community.psion.com/downloads/developer_sdkhdk/m/sample__demo_code/1176.aspx

18.6 Encryption for Data Transmission

18.6.1 Wired Equivalent Privacy (WEP) Keys

Wired equivalent privacy (WEP) is an encryption algorithm and part of the 802.11 standard. It is a security measure to protect wireless LANs from casual eavesdropping. WEP uses a shared secret key to encrypt packets before transmission between wireless LAN devices, and it monitors packets in transit to detect attempts at modification.

WEP key length

The length of the WEP key determines the size of the encryption key:

- A 5-character text string, or a 10-character hexadecimal string, gives a 40-bit encryption key.
- A 10-character text string, or a 26-character hexadecimal string, gives a 128-bit encryption key.

WEP key index

The Mobile Devices SDK can store up to four WEP keys. The index is used to identify each key (1 to 4) when determining which key to use.

18.6.2 Encryption Modes

Encryption modes are available through the Mobile Devices SDK as follows:

Mode	DSA	Summit	WZC
WEP	Yes	Yes	Yes
WEP auto		Yes	
TKIP	Yes	Yes	Yes
TKIP-CCMP	Yes		
AES		Yes	Yes
CKIP		Yes	
CCMP	Yes		

18.7 Using WLANEx to Obtain Network Information

While the primary purpose of the WLANEx namespace is to programmatically configure and control a network connection, you can also use it to obtain network information from the surrounding access points. This information is available even when the device is not connected to the network.

Received Signal Strength Indicator—RSSI

The RSSI status of the radio changes continuously based on a number of different environmental factors, such as distance, interference, and the antenna angle. The RSSI is measured in dBm. A perfect signal is -10 dBm. An complete absence of signal is -200 dBm.

Network adaptor Name

The network adaptor name can be queried using the Mobile Devices SDK. The string returned is the same as the adaptor name returned by the GUI application on the device.

Summit Supplicant and WireLess Zero Configuration Supplicant

Using these supplicants you can obtain from the surrounding networks: their SSIDs, their RSSIs, and the encryption modes that are needed to associate with them.

DeviceScape Agent Supplicant

This supplicant can obtain more dynamic network information than the other supplicants can. The precise information depends on the access points. The most common items returned are: BSSID, SSID, frequency, flags (type of encryption), whether, or not, the device is associated with an access point.

18.8 Summit Radio Features

Radios manufactured by Summit behave differently from the other radios. Summit radios operate in one of the following modes:

- Summit mode.
- Wireless Zero Configuration mode—referred to as Third Party Config mode.

Summit Mode

When operating in this mode, the Summit radio does not appear on the list of radios controlled by the GUI ***Wireless*** applet. Instead it is controlled by the GUI ***Summit*** applet.

The preferred list of access points is not available, so the radio cannot roam between networks; however, it can roam between access points on the same network.

Wireless Zero Config Mode (WZC)

When operating in this mode, the Summit radios behave in the same way as all the other radios that are available. See Section Wireless Zero Config on page 191.

Changing Between Modes

When the operating mode of a Summit radio is changed between Summit mode and Wireless Zero Config mode, the radio must be reset by powering it down, and then powering it up.

18.9 Controlling Power on all Supplicants

18.10 Configuring WLAN Through the User Interface

The following utilities can be used to configure WLAN connections:

- Wireless Zero Config (WZC)
- Wi-fi Config
- Summit Client Utility (SCU)
- Odyssey Access Client (OAC) by Juniper Networks

Configuration utilities are available as follows:

GUI Utility	Summit Radio	RA2040	RA2041	RA2043	Motorola ab9	NEO Raptor Stingray EP10
Summit Client Utility	Yes	No		No		
Wireless Zero Config	Yes	Yes		Yes	Yes	Yes
Wi-fi Config					Yes	Yes
Odyssey Access Client	No	No		No		

Summit Client Utility

The Summit Client Utility (SCU) is an application for end users, and administrators, of mobile devices that use a radio manufactured by Summit Data Communications.

The SCU provides a graphical user interface (GUI) for access to all its functions.

The Summit 802.11 radio users' guides for Windows CE.NET and Windows Mobile are available at www.summitdatacom.com/documentation.htm

Wireless Zero Config

Wireless Zero Configuration (WZC) is the Windows service that automatically configures 802.11 wireless network devices.

WZC is a standardized set of Microsoft interfaces for wireless network cards. If the driver interfaces with WZC, it can be controlled and queried through this standardized interface, making configuration and status querying consistent–regardless of the manufacturer of the adaptor. Not all wireless cards are WZC compatible; however, all Psion-supplied radios are WZC compliant.

From the Summit Client Utility select **3rd Party Config Mode** to access WZC.

From the Wi-Fi Config select the checkbox for allowing **Windows to manage the connection** to access WZC.

Wi-fi Config

This is the Psion implementation of Devicescape agent. It makes the features of this supplicant available to users of the GUI.

Odyssey Access Client by Juniper Networks

The Odyssey Access Client by Juniper Networks (formerly Funk Software) can be used in conjunction with a RADIUS server to establish secure authentication for network connections.

18.11 Ad hoc Networks

The only supplicant that supports ad hoc networks is Wireless Zero Config.

18.12 Getting Started

For articles on Ingenuity Working that will guide you in getting started with WLAN see:
community.psion.com/tags/WLANEx/noteDG

18.13 Code Samples

For postings on Ingenuity Working that contain code samples that use WLAN see:
community.psion.com/tags/WLANEx/codeDG

18.14 WLAN API Elements

C++: WLAN on all computers is controlled using the **PsionTeklogix::WLANEx** namespace.

Java: WLAN on all computers is controlled using the **com.teklogix.wlan** package.

.NET: WLAN on all computers is controlled using the **PsionTeklogix.WLANEx** namespace.

Microsoft provides an API library for Wireless Zero Config.

19 WIRELESS WIDE-AREA NETWORKING

19.1 Wireless Wide-Area Networking (WWAN)

The Mobile Devices SDK gives access to WWAN features that are available to a computer using a radio-based network, but which are not available to, or are not needed by, a computer on a wired network.

Wireless Wide-Area Networks are wireless networks that cover large geographic areas. Wireless Wide-Area Networks are public cellular networks based on technologies such as GSM, UMTS, CDMA, or iDEN.

WWANs are also referred to as *wireless broadband* and *broadband wireless networks*.

The Mobile Devices SDK provides access to WWAN capabilities implemented by Psion. It supports voice calls and data connections, as well as SMS (Short Message Service) and also gives access to phone books resident on a SIM card or the modem.

19.2 WWAN on Devices Supported by the Mobile Devices SDK

On the most recent version of the Mobile Devices SDK, the WWAN namespace is available on the following:

Computer	Operating System
7535 G2	Windows Embedded CE 5.0
Workabout Pro G2 (7527)	• Windows Embedded CE 5.0 • Windows Mobile 6.0 Classic • Windows Mobile 6.1 Classic
Workabout Pro 3 (7527)	• Windows Embedded CE 5.0 • Windows Mobile 6.1 Classic
Ikôn (7505)	• Windows Embedded CE 5.0 • Windows Mobile 6.0 Classic • Windows Mobile 6.1 Classic
Omnii XT15 (7545XA)	• Windows Embedded CE 6.0
Omnii RT15 (7545XC)	• Windows Embedded CE 6.0

On Mobile Devices SDK versions 2.4 and earlier the WWAN namespace is available for the following:

Computer	Operating System
NetbookPro	Windows CE .NET 4.2
7535	Windows CE .NET 4.2
Workabout Pro G0/G1 (7525)	• Windows Mobile 2003 Second Edition • Windows CE .NET 4.2 • Windows Mobile 5.0

Note: For computers operating under Windows Mobile 6.x Professional, and Windows Embedded Hand-Held 6.5, WWAN capability and the APIs to access it are provided by Microsoft.

19.3 WWAN on Devices not Supported by the Mobile Devices SDK

For computers operating under Windows Mobile 6.x Professional, and Windows Embedded Hand-Held 6.5, WWAN capability and the APIs to access it are provided by Microsoft.

Computer	Operating System
Workabout Pro G2 (7527)	• Windows Mobile 6.0 Professional • Windows Mobile 6.1 Professional
Workabout Pro 3 (7527)	• Windows Mobile 6.1 Professional

Computer	Operating System
Ikôn (7505)	• Windows Mobile 6.0 Professional • Windows Mobile 6.1 Professional
Omnii XT15 (7545XA)	• Windows Embedded Hand-Held 6.5
Omnii RT15 (7545XC)	• Windows Embedded Hand-Held 6.5
EP10 (7515)	Windows Embedded Hand-Held 6.5

19.4 Supported WWAN Modems

Psion computers support a number of WWAN modems. They come in either PC, or CF, card form, or they are built-in and connect to an expansion port inside the computer. The Mobile Devices SDK makes it possible to develop applications without having a detailed knowledge of the specific WWAN modem.

The following table lists the WWAN modems that are officially supported on Psion computers.

Computer	Modems Supported
7535	Asus AGC-100[1]; Enfora ADT0110[1]
7535 G2	Asus AGC-100[1]; Enfora ADT0110[1]
Workabout Pro (7525)	CMCS NTN-000[1]; Novatel U630[1]; Cinterion MC75i
Workabout Pro G1 (7525)	Sierra Wireless AC550[1], AC555[1], AC850[1], AC860[1]; Enfora GSM0110[1]; Siemens MC75[1]; Cinterion MC75i
Workabout Pro G2 (7527)	Enfora GSM0110[1]; Siemens MC75[1], HC25, HC28; Cinterion MC75i
Workabout Pro 3 (7527)	Enfora GSM0110[1]; Siemens MC75[1], HC25, HC28; Cinterion MC75i
Ikôn (7505)	Siemens HC25, HC28, MC75[1]
Omnii XT15 (7545XA)	Cinterion MC75i; Cinterion PH8-P
Omnii RT15 (7545XC)	Cinterion MC75i; Cinterion PH8-P
EP10 (7515)	Cinterion PH8; Sierra Wireless MC5728V

Note 1: This modem is no longer available.

Other third-party WWAN modems are referenced in this chapter and may be made to work, but support for them will be limited. Consult your local Psion support representative before proceeding with development on a modem not listed here.

19.4.1 Multiplexing

Most WWAN modems have only one serial port. Some modems can operate in multiplexing mode.

While a modem without a multiplexing mode has a packet connection, it cannot provide status information to the user interface or to an application. Information such as signal strength cannot be monitored.

The WWAN driver tells a suitable modem to switch to multiplexing mode. This creates several virtual serial ports on the single physical serial port. The PPP connection is on one of the virtual ports. AT modem commands and status data can be sent through another virtual port.

19.4.2 Virtual Serial Port

The Mobile Devices SDK makes a virtual serial port available. The virtual serial port is hard-coded to COM8: on all Psion computers. It behaves like any other COM port. As soon as the WWAN modem is initialized, the WWAN driver publishes a COM port interface.

19.4.2.1 Using the Virtual Serial Port

The WWAN driver provides a virtual serial port so that other applications such as Windows CE dial-up networking can access the WWAN modem concurrently with the WWAN user interface. The main purpose is to support dial-up data connections in a more convenient manner. The virtual serial port offers a number of advantages over direct access to the serial port:

- The WWAN driver does not need to be shut down in order to establish a dial-up data connection.
- The WWAN driver and user interface provide the PIN handling.
- For all GSM/GPRS modems the APN for the virtual port can be automatically configured through the WWAN user interface.
- The WWANDbg utility can be used to analyze the AT commands sent by legacy third-party applications.

19.4.2.2 Configuration

The virtual serial port is available as COM8: with the name **Virtual WWAN port**. The port is created dynamically if a WWAN modem is present and the modem initialization was successful (including successful PIN authentication, if required). The virtual port should be configured as follows:

- Any baud rate (this setting is ignored, the correct baud rate for the modem is chosen by the WWAN driver).
- 8 data bits, no parity, 1 stop bit.
- No flow control (flow control for communication with the modem is handled by the WWAN driver).

19.4.2.3 AT Commands

The virtual serial port can be used by an application to send AT commands to the modems. Since AT command sets differ between modems, a detailed knowledge of the modem in question is required. Therefore, this use of the virtual port should be limited to legacy applications. New applications should use the Mobile Devices SDK to access the network status, SMS functions, etc.

The Option Globetrotter (v1, v2, Combo) and Sierra AC775 do not forward unsolicited AT command responses (e.g. "+CREG:" responses that were enabled with "AT+CREG=1") to the virtual port.

For the Enfora ADT0110 and GSM0110, Siemens MC75, Option Globetrotter (v1, v2, Combo), as well as Sierra AC775 it is possible to send AT commands to the modem while a packet data connection through the WWAN driver is active; however, for the Option Globetrotter (v1, v2, Combo) a transition of the emulated DTR signal on the virtual port closes that packet data connection.

When porting legacy applications, the virtual serial port together with WWANDbg utility can be used to analyze the AT commands sent by that application. With the debug level set to 6, all AT commands are shown in the log.

19.4.2.4 Entering AT Commands in Windows CE

To enter modem AT commands on a Windows CE device, you first need to create and open a console window, as described in the following steps:

1. Go to **Start > Settings > Network...**
2. Double-click on the **Make New Connection** icon.
3. Enter a name for the new console connection in the text box.
4. Click the **Next** button (leave the connection type as *Dial-Up Connection*.
5. In the **Select a modem** drop-down box, select *Virtual WWAN port*.
6. Click the **Configure** button.
7. Set **Flow Control** to *None*, and leave the other **Connection Preference** settings at their default values.
8. Check the **Use terminal window before dialing** check box.
9. Click **OK** to close the **Device Properties** window.
10. Click the **Next** button.
11. Enter an arbitrary value (e.g. *1*) for the **Phone number** text box.
12. Click the **Finish** button to complete the connection configuration.
13. Back on the **Network...** screen, double-click the icon for your newly created connection.
14. Click the **Connect** button. The terminal window will open after a few seconds.

15. Type the AT command *ATE1* followed by **ENTER** to enable command echo, which will allow you to see the subsequent commands you type.

The terminal window is now connected to the modem, allowing you to enter AT commands. When you are finished entering commands, close the terminal window.

19.4.3 Dial-up Data Connections

The following dial-up connections are available through the WWAN driver:

- GSM Networks
- UMTS Networks
- CDMA Networks
- iDEN Networks

19.4.3.1 Dial-up Data in GSM Networks

Not all GSM networks support dial-up data connections to land-line modems (e.g. Rogers in Canada has never supported dial-up data connection, Microcell Fido in Canada discontinued dial-up data connection support a few years ago). For those networks that support dial-up data connections no additional configuration should be required for a connection to an analog modem at 9.6 kbps.

Some networks allow faster dial-up connections at 14.4kbps. The AT command "+CBST=14,0,1" has to be added in the WWAN UI settings of the Wireless Manager GUI, under **Properties > Configure... > Call Options > Extra Settings** to enable this mode.

The even faster High Speed Circuit Switched Data (HSCSD) mode available on a few networks is not supported by any of the modems in Psion products.

For ISDN lines, the situation is more complex. Some ISDN modems may accept analog connections as above, while others require the protocols V.110 or V.120 to be used. These also require an additional AT command.

If an ISDN modem requires the X.75 or HDLC protocols, then no connection is possible. Also, many GSM networks do not support V.120 (e.g. Vodafone D2 in Germany) and only the Audiovox RTM-8000 and CMCS NTN-000 support V.120.

For more details on ISDN connections see D. Živadinovic, M. Winkler, *Des Surfers Bastelstunde* in c't 7/2001, page 228 (in German).

For more details on GSM AT commands see *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); AT command set for 3G User Equipment (UE), 3GPP TS 27.007* version 5.4.0 Release 5, ETSI, 09/2003.

The following table summarizes the required AT commands.

Land-line modem	Speed	Extra Settings
analog	9.6kbps	
analog	14.4kbps	+CBST=14,0,1
ISDN V.110	9.6kbps	+CBST=71,0,1
ISDN V.110	14.4kbps	+CBST=75,0,1
ISDN V.120	9.6kbps	+CBST=39,0,1
ISDN V.120	14.4kbps	+CBST=43,0,1

19.4.3.2 Dial-up Data in UMTS Networks

In general, UMTS modems should not be used for dial-up data connections.

Only the UMTS networks in Japan allow dial-up data connections. As a consequence, for modems that support both GSM and UMTS dial-up connections are not possible once the modem has switched to UMTS (which it will do whenever UMTS is available and no dial-up connection is already active).

19.4.3.3 Dial-up Data in CDMA Networks

No additional configuration is required. The modem should select the highest possible speed (9.6kbps or 14.4kbps) automatically.

19.4.3.4 Dial-up Data in iDEN Networks

The AT command "+WS46=23;+FCLASS=0" has to be added under the GUI **Properties -> Configure... -> Call Options -> Extra Settings**.

19.4.4 Packet Data

The WWAN driver should be used for packet data connections. A packet data connection through the virtual serial port is slightly less efficient and more difficult to configure. Therefore, only legacy applications that are difficult to change would use the virtual serial port for a packet data connection. The Option Globetrotter (v1, v2, Combo) and Sierra AC775 modems do not allow packet data connections through the virtual serial port. For all GSM modems, the GPRS APN is automatically preconfigured for the virtual port.

19.4.5 Summary Of Modem Differences

Modem Capability	**Enfora ADT0110, GSM0110 Siemens MC75 Cinterion MC75i**	**Option Globetrotter v1, v2, Combo Sierra AC775**	**Audiovox RTM-8000 CMCS NTN-000**	**Asus AGC-100 GTRAN GPC-6210 Motorola iM240 Novatel U520, U530, U630 Sierra AC550, AC555, AC850, AC860**	**Siemens HC25, HC28 Cinterion PH8, PH8-P**
Dial-up data through virtual port	Yes	Yes	Yes	Yes	Yes
Packet data through virtual port	Yes	No	Yes	Yes	Yes
AT commands through virtual port	Yes	Yes	Yes	Yes	Yes
Unsolicited AT command responses through virtual port	Yes	No	Yes	Yes	No
Network status available while virtual port is open	Yes	Yes	Yes	No	Yes
Packet data connection while virtual port is open	Yes	Yes	No	No	No

19.4.6 GSM Power Driver

The GSM power driver controls the power status of built-in radios on the following devices:

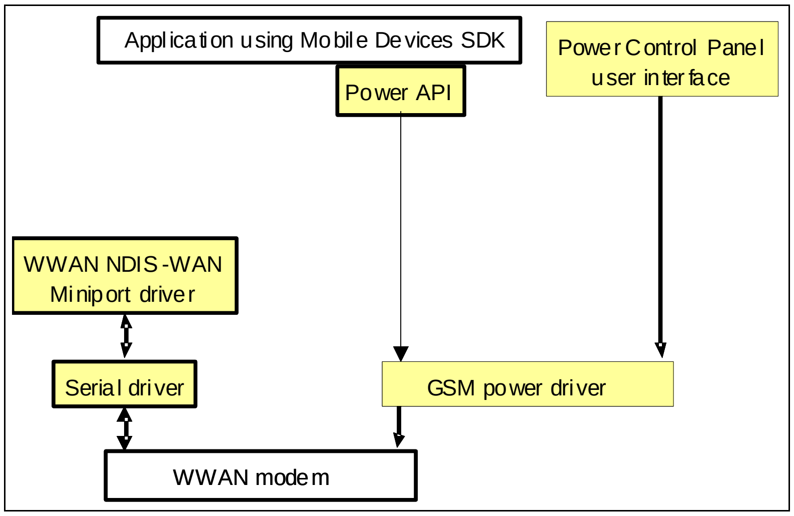
- Workabout Pro
- Ikôn
- Omnii XT15
- Omnii RT15

using the following operating systems:

- Windows Embedded CE 5.0
- Windows Embedded CE 6.0

- Windows Mobile 2003 Second Edition
- Windows Mobile Classic 6.x

It is intended that it will work with future expansion board radios.


Application using Mobile Devices SDK
Power API
Power Control Panel user interface
WWAN NDIS-WAN Miniport driver
Serial driver
GSM power driver
WWAN modem

Modems that are not controlled by the GSM power driver

The power status on the following types of modems are not controlled by the GSM driver. Refer to Chapter 9: "Card Slots" for details:

- Modems on PC cards
- Modems on CF cards

Modems on devices using the following operating systems are not controlled by the GSM power driver:

- Windows Mobile Professional 6.x
- Windows Embedded Hand-Held 6.5

19.5 Initializing WWAN

Before any of the WWAN functions can be used, you must initialize the WWAN interface.

19.5.1 Checking the Initialization Status of the WWAN Driver

Use **GetReadyState** to check the initialization status of the driver. This returns one of the following:

- **C++**: A **WWAN_READY_STATE** structure containing the WWAN driver status flags.
- **.NET**: A member of the **WWAN_READY_STATE_FLAGS** enumeration.

19.5.2 WWAN Driver Status Flags

The WWAN status flags indicate the status of the WWAN driver. This WWAN driver status depends on the status of the modem.

Many WWAN API functions depend on the modem being in the ready state. If the modem is not ready, they report an error.

There are two methods for finding the modem status. The first is to use API elements that query the modem status. The second is to register a callback for modem initialization.

This second method—using a callback— is recommended. Repeated queries of modem status can result in excessive processor activity and a consequent drain on the battery power of the computer. If there is no other activity on the hand-held computer, the processor can go into an idle state until activated by the callback.

In both cases status bits are returned that indicate which functions are available.

The WWAN driver can be in one or more of the following states:

Shutdown

This flag is set when the WWAN driver detects that the modem has been shut down. If the modem power has been removed through the GUI **Power** applet, or through the SDK then the shutdown flag is expected. In most other cases, the modem requires a repair.

Possible reasons for a modem shutdown are:

- An over voltage has occurred—Siemens, and Cinterion, modems only—this should occur only in the case of a hardware failure.
- An over temperature or under temperature has occurred—Siemens, and Cinterion, modems only.
- A **SetPinState** has resulted in the modem no longer being accessible; for example, trying to enable/disable/change the PIN too many times with the wrong PIN.

  After rebooting the modem the Personal Unblocking Key (PUK) is required.
- The serial driver has reported an error. One cause of this is that power has been removed from the modem.
- On startup the serial driver could not be opened or the modem never activates the CTS signal.

Phone book ready

This flag must be set for phone book calls to be successful.

SMS store ready

The WWAN driver can send, retrieve, or delete SMS messages. The SMS capabilities or SMS configuration of the modem can be queried. This flag must be set for the following functions to be successful:

- **ReadSms**
- **SendSms**
- **DeleteSms**
- **SetSmsConfiguation**
- **GetSmsConfiguration**

Initialized

The WWAN driver and the modem are ready to access the network. When the driver is in this state the following calls can proceed:

- **SetRegisterState**
- **SetProvisionedContexts**
- **GetAvailableNetworks**

The following functions may return incomplete data, if the driver is not initialized:

- **GetDeviceCaps**
- **GetSIMID**

No SIM

A SIM card is not detected.

Bad SIM

The SIM card is invalid. This is usually a hardware problem. Some modems set this state if the SIM card is missing.

Depending on the startup timing, this status may be returned if the SIM card has not been activated on the network.

If a PIN is entered incorrectly three times in succession, the PUK is requested. If the PUK is entered incorrectly 10 times in succession, the SIM card is permanently disabled, and it must be replaced.

Failure

The modem has failed. This occurs before the modem enters **Shutdown** status. In this state a limited number of query commands are successful. This status usually indicates a hardware failure.

This status is set if the driver cannot communicate with the modem. It is also set if an initialization command, which should always succeed, returns an error.

19.5.3 Initializing the WWAN Driver

Note: Each **Initialize** *call must be paired with a* **Shutdown** *call. See Section 19.6 Closing WWAN on page 205 for details.*

Warning: If you call Initialize several times WITHOUT calling the Shutdown method, eventually a call to Initialize will fail. Before WWAN can be initialized again, the computer must be reset; a warm reset is recommended.

The driver is initialized as follows:

1. Call **Initialize**. During initialization of the WWAN driver and the authentication of the PIN (see PIN Authentication), none of the WWAN driver status flags is set.
2. When the WWAN driver initialization is complete, the **Initialized** flag is set. This occurs even if no network is available.
3. The WWAN driver can now accept any requests except SMS and phone book requests.
4. After a few more seconds, the SMS initialization completes, and the **SMS store ready** flag is set as well as the **Initialized** flag.
5. Phone book initialization can take another minute or more to complete. The **Phone book ready** flag is set alongside any other flags that are already set.

If the SIM card has not been activated on the WWAN network, the **Bad SIM** WWAN driver status error flag may be set, depending on the startup timing.

The SIM card and the modem must wait to be informed by the network of their activation state on the WWAN network. This depends on the network coverage and the timing of messages on the network.

PIN Authentication

To determine if a password is needed, the type of password, and to obtain the password, proceed as follows:

- Call **OnPinState** or **GetPinState** to determine the password type, if the PUK attempts have not been exhausted.

Once the PUK attempts are exhausted, the SIM card can no longer be used. The **Bad SIM** WWAN driver status flag is set.

If there is no SIM card, either the **No SIM**, or the **Bad SIM**, WWAN driver status flag is set.

Problem	WWAN Driver Initialization Status Flag
PUK attempts exhausted.	Bad SIM
No SIM card.	One of the following (depending on the modem type): • No SIM • Bad SIM
The WWAN driver cannot communicate with the modem.	Failure
An initialization command failed.	Failure

Sample Code For Initializing WWAN

This example provides a safe and reliable way to ensure that the WWAN interface is initialized correctly. This example is written in C++; however, the same process can be followed for a .NET application.

```
// Use this class in the function, InitializeWWANAndWait
class WWANReadyStateListener : public PsionTeklogix::WWAN::IndicationsListener
{
public:
    WWANReadyStateListener()
    {

        // Create an event to wait on, this object signals it when WWAN is ready.
        WwanReadyEvent = CreateEvent(NULL, FALSE, FALSE, NULL);
    }
    ~WWANReadyStateListener()
    {
        if (WwanReadyEvent != 0)
        {
            CloseHandle(WwanReadyEvent);
            WwanReadyEvent = 0;
        }
    }

    HANDLE GetWwanReadyEvent(){ return WwanReadyEvent; }

    virtual void OnReadyState( const WWAN_READY_STATE &ReadyState )
    {
        if ((ReadyState.State & WWAN_READY_STATE_INITIALIZED) != 0 )
        {
            if (WwanReadyEvent != 0)
            {
                SetEvent(WwanReadyEvent);
            }
        }
    }

private:
    HANDLE WwanReadyEvent;
};

bool InitializeWWANAndWait()
{
    WWanRequestParameters params = {0};
    WWAN_READY_STATE* wwanReadyStatePtr = 0;
    WwanRequestStatus retVal;

    // See if the WWAN namespace has been initialized, and get the ready state.
    retVal = WirelessWAN::GetReadyState(params, &wwanReadyStatePtr);
    if(WwanRequestNotInitialized == retVal)
    {

        // The namespace is not initialized, attempt to do so:
        if (WwanResultSuccess != WirelessWAN::Initialize())
        {

            // Error initializing the WWAN namespace.
            return false;
        }

        // Try again.
        retVal = WirelessWAN::GetReadyState(params, &wwanReadyStatePtr);
    }

    if ( retVal != WwanRequestSuccess ||
        params.resultCode != WwanResultSuccess ||
        wwanReadyStatePtr == 0)
    {

        // Unable to get the ready state.  See return value/result code for reason.
        return false;
    }

    ULONG readyState = wwanReadyStatePtr->State;

    // Memory was allocated by "GetReadyState(...)"
    free(wwanReadyStatePtr);

    if ((readyState & WWAN_READY_STATE_INITIALIZED) != 0 )
    {

        // Already in the ready state.
        return true;
    }

    // The wwan driver (or modem) is not in a usable state yet.
    // Wait for it to become ready:

    // Create and register the listener object to receive events
    WWANReadyStateListener* myReadyStateListener = new WWANReadyStateListener();
    WirelessWAN::SetIndicationsListener(myReadyStateListener);
    WirelessWAN::SetIndicationsState(true);

    // To prevent a race condition, check to see if the event occured between the
    // time last check for the WWAN ready state and registration for the event.
    retVal = WirelessWAN::GetReadyState(params, &wwanReadyStatePtr); // Try again.
    if( retVal != WwanRequestSuccess ||
        params.resultCode != WwanResultSuccess ||
        wwanReadyStatePtr == 0)
    {

        // Unable to get the ready state.  See return value/result code for reason.
        // Remove indication registration and cleanup objects.
        WirelessWAN::SetIndicationsListener(NULL);
        WirelessWAN::SetIndicationsState(false);
        delete myReadyStateListener;

        return false;
    }

    // Check the ready state flag
    readyState = wwanReadyStatePtr->State;
    free(wwanReadyStatePtr); // Memory was allocated by "GetReadyState(...)"
    if ((readyState & WWAN_READY_STATE_INITIALIZED) != 0 )
    {

        // Already in the ready state.
        // Remove indication registration and cleanup objects
        WirelessWAN::SetIndicationsListener(NULL);
        WirelessWAN::SetIndicationsState(false);
        delete myReadyStateListener;

        return true;
    }

    // Wait up to 30 seconds for the listener object to signal ready.
    const int thirtySeconds = 30000;
    DWORD eventWait =
        WaitForSingleObject(myReadyStateListener->GetWwanReadyEvent(),
            thirtySeconds);

    // Remove indication registration and cleanup objects
    WirelessWAN::SetIndicationsListener(NULL);
    WirelessWAN::SetIndicationsState(false);
    delete myReadyStateListener;

    if (eventWait == WAIT_TIMEOUT)
    {

        // Ready event not received within 30 seconds;
        return false;
    }

    // The ready event was received.
    return true;
}
```

This example shows how to initialize WWAN without setting the indications listener.

```
private bool InitWWANandWait()
{
    WwanRequestParameters wwanParameters = new WwanRequestParameters();
    WWAN_READY_STATE wwanReadyStatePtr   = new WWAN_READY_STATE();

    WwanRequestStatus retVal = WirelessWAN.GetReadyState(wwanParameters,
        wwanReadyStatePtr);

    if (retVal == WwanRequestStatus.NotInitialized)
    {
        if (WirelessWAN.Initialize() != WwanRequestStatus.Success)
        {
            return false;
        }
    }

    int count = 60;
    while (count > 0)
    {
        Thread.Sleep(1000);

        // Get the ready state again....
        retVal = WirelessWAN.GetReadyState(wwanParameters, wwanReadyStatePtr);

        if (
            (retVal != WwanRequestStatus.Success)               ||
            (wwanParameters.resultCode != WwanResult.Success)   ||
            (wwanReadyStatePtr == null)
           )
        {
            // Unable to get the ready state.  See return value / result code for reason.
            return false;
        }

        if ((wwanReadyStatePtr.State & WWAN_READY_STATE_FLAGS.INITIALIZED) != 0)
        {
            // Already in the ready state.
            return true;
        }

        count--;
    }
    return false;
}
```

19.6 Closing WWAN

When an application has finished using the WWAN interface, the WWAN interface **must** be closed. It is essential that the interface is closed before the application exits.

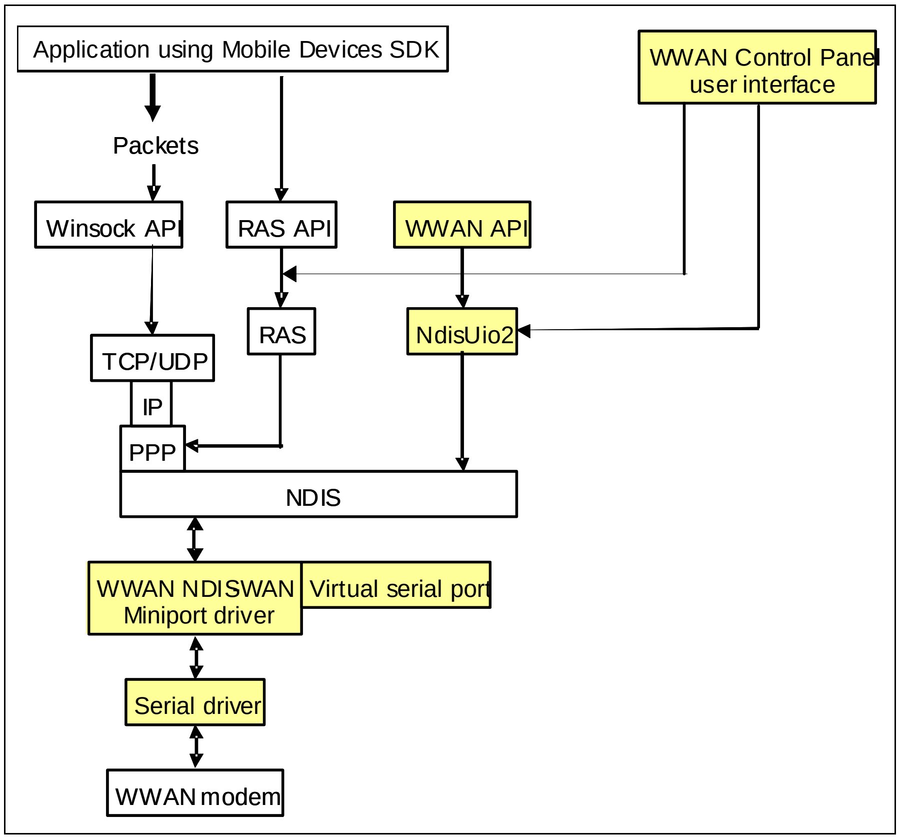
Warning: ***If a Shutdown call is not paired with each Initialize call, system resources are not released or cleaned up properly, resulting in a memory leak.***

```
// For the initialization process
// see Section 19.5.3 Initializing the WWAN Driver on page 202
if (InitializeWWANAndWait())
{
    // Do WWAN work here...

    // Shutdown the interface
    WirelessWAN::Shutdown();
}


// For the initialization process see Section 19.5.3 Initializing the WWAN Driver on page 202
if (InitializeWWANAndWait())
{
    // Do WWAN work here...

    // Shutdown (clean up) the WWAN interface
    WirelessWAN.Shutdown();
}
```

19.7 Connecting to the Internet

A WWAN modem must initiate a connection. This behaviour is similar to a dial-up connection but different from an Ethernet interface which connects automatically. When a WWAN modem is attached to a network and powered up, it detects the network, but is unable to transfer packets to the network until a packet data connection is set up.

Figure 19.1 Interaction Between Mobile Devices SDK WWAN And Windows Components



The WWAN functions in the Mobile Devices SDK provide extra features that are needed by a WWAN connection, but not by an Ethernet or dial-up connection. These features include the ability to:

- Query the radio signal strength
- Select one of several available networks

The Wireless Manager applet in the GUI allows you to configure settings for the WWAN connection. This gives access to many of the WWAN driver functions, without the necessity of writing code. This includes activities such as querying the signal strength. The Wireless Manager applet uses RAS to connect and disconnect WWAN connections.

19.7.1 Windows Embedded CE 5.0, Windows Embedded CE 6.0, Windows Mobile 2003 SE, and Windows CE .NET 4.2

The following provide the RAS (Remote Access Service) API for making Internet connections.

- Windows Embedded CE 5.0
- Windows Embedded CE 6.0

An application can use the Windows RAS API to set up and tear down a WWAN connection.

Note: You must initialize WWAN before making the connection. See Section 19.5 Initializing WWAN on page 200 for details.

See also Section 19.7.3 The DbGprs.csv File on page 209 for information that may need to be provided to complete the connection.

Note: It is recommended that the application wait for a Packet Service Status (see Section 19.7.4 Checking Packet Data Status on page 209) of **Wwan AttachStateAttached** *before attempting a connection through RAS.*

The following example uses **RasGetEntryDialParams** and **RasDial** to start a connection.

```
#include <wwan.hpp>
#include <ras.h>

using namespace PsionTeklogix::WWAN;

//
// WWANRas_Connect()
//
//  This function is called in order to establish a RAS connection through the WWAN
//  driver.
//
// Parameters:
//  entryName   Name of the RAS phone book entry.  For WWAN, this should always be
//              "Wirless WAN"
//  password    Password corresponding (if none was stored earlier)
//  hWnd        Handle of window that will receive connection state messages.  You
//              receive this via the WM_RASDIALEVENT windows message.
//
// Notes:
//  REMEMBER: Initialize WWAN interface first!
//
// Returns:
//  TRUE for success, FALSE otherwise
//
//
BOOL WWANRas_Connect(WCHAR const * entryName,
              WCHAR const * username,
              WCHAR const * password,
              HWND          hWnd)
{
    HRASCONN         hRasConn;
    RASDIALPARAMS   rasDialParams;
    BOOL            passwordSet;

    // Initialize the RASDIALPARAMS structure.
    // NOTE: When connecting to WWAN, entryName will be "Wireless WAN".
    memset (&rasDialParams, 0, sizeof (RASDIALPARAMS));
    rasDialParams.dwSize = sizeof (RASDIALPARAMS);
    wcsncpy (rasDialParams.szEntryName, entryName, RAS_MaxEntryName);

    if (RasGetEntryDialParams(NULL,
                              &rasDialParams,
                              &passwordSet) != 0)
    {
        return FALSE;
    }
    // If the password was not automatically determined, then provide it here.
    if (!passwordSet)
    {
    wcscpy (rasDialParams.szUserName, username);
        wcscpy (rasDialParams.szPassword, password);
    }

    // Connect
    if (RasDial(NULL, NULL, &rasDialParams, 0xffffffff, hWnd, &hRasConn) != 0)
    {
        if (hRasComm != NULL)
        {
            RasHangUp(hRasComm);
            hRasComm = NULL;
        }
        return FALSE;
    }
    return TRUE;
}

//
// Window's Message handler (WndProc)
//
case WM_RASDIALEVENT:
{
    RASCONNSTATE rasconnstate = (RASCONNSTATE) wParam;
    DWORD        dwError        = (DWORD) lParam;
}
return TRUE;
```

The following example uses the RAS namespace for the Mobile Devices SDK to make the Internet connection. See Chapter 12: "RAS (Remote Access Service)" for more information.

```
using PsionTeklogix.WWAN;
using PsionTeklogix.RAS;

bool returnValue = true;

// see ealier section on WWAN Initialization
if (InitWWANandWait())
{
    private Entry wwanEntry = new Entry("Wireless WAN");

wwanEntry.UserName = "ISP@CINGULARGPRS.COM";
wwanEntry.Password = "CINGULAR1";

try
{
               if (!wwanEntry.Dial(false))
            {
        returnValue = false;
            }
          }
          catch (Exception ex)
          {
             MessageBox.Show("FAIL: \r\n" + ex.Message, "RAS Dial");
         returnValue = false;
          }
}
return returnValue;
```

19.7.2 Windows Mobile and Windows Embedded Hand-Held

For Windows Mobile operating systems, Microsoft provides the Connection Manager API. This replaces RAS for making WWAN connections.

For a list of Psion computers that support Connection Manager and that support RAS see Section 12.2 Support for RAS and Windows Connection Manager on Psion Computers on page 87.

For more information on using the Connection Manager API, visit the following URLs:

http://msdn2.microsoft.com/en-us/library/bb416435.aspx
http://msdn2.microsoft.com/en-us/library/bb840031.aspx
http://msdn.microsoft.com/en-ca/netframework/dd296752.aspx

See also Section 19.7.3 The DbGprs.csv File on page 209 for information that may need to be provided to complete the connection.

Note: It is recommended to wait for a Packet Service Status (see Section 19.7.4) of **Wwan AttachStateAttached** *before attempting a connection through Connection Manager.*

The following example shows how to connect to the Internet using the Connection Manager:

```
// pinvoke region required to access native Connection
// Manager not included here.
//

const int _syncConnectTimeout = 60000; // 60 seconds
string url = "http://msdn2.microsoft.com";
int ncache = 0;

if (status == ConnMgrStatus.Connected)
   ConnMgrReleaseConnection(_connectionHandle, ncache);

Guid networkGuid = Guid.Empty;

ConnMgrMapURL(url, ref networkGuid, 0);
ConnMgrConnectionInfo info =
new ConnMgrConnectionInfo(networkGuid, ConnMgrPriority.UserInteractive);
ConnMgrEstablishConnectionSync(info, ref _connectionHandle, _syncConnectTimeout, ref status);
ConnMgrEstablishConnection(info, ref _connectionHandle);

if (status == ConnMgrStatus.Connected)
{
//
       // Success!
       //
}
```

19.7.2.1 Disconnecting from Connection Manager

On Windows Embedded hand-Held 6.5-based computers, the Connection Manager API, **ConnMgrReleaseConnection**, does not fully close the connection. for information on **ConnMgrReleaseConnection** see msdn.microsoft.com/en-us/library/bb416503.aspx.

Use **RasHangUp** to fully close the connection. For information see msdn.microsoft.com/en-us/library/aa450851.aspx.

Find the connection handle, **HRASCONN**, using **RasEnumConnections**. For information see msdn.microsoft.com/en-us/library/aa918049.aspx

19.7.3 The DbGprs.csv File

To make an Internet connection using either RAS, or the Connection Manager, a username, a password, and some other related information—such as APN, DNS, MCC, or MNC—may be needed. Psion provides this information in the **...\Windows\DbGprs.csv** file, on every computer that supports WWAN.

This file is in comma delimited format, so it can be easily read with a text editor or loaded into a spreadsheet program. When you locate your WWAN service provider in this file, the most common information types required by the provider are listed.

19.7.4 Checking Packet Data Status

If packet data is enabled for the connection to the WWAN service provider, The WWAN driver automatically configures the system so that a connection can be made using RAS or Connection Manager.

The following example shows how to check the packet data status:

```
WWanRequestParameters opts;
opts.hWaitForAsyncCompletion = 0;
WWAN_PACKET_SERVICE packetService;

if (WirelessWAN::GetPacketService(opts, packetService) == WwanRequestSuccess)
{
    if (packetService.AttachState == WwanAttachStateAttached)
    {
        // Packet data is now enabled. WWAN communication can start...
    }
    else if (packetService.AttachState == WwanAttachStateDetached)
    {
        // Packet data is NOT enabled, which means that either
        // the service provider does not have packet data enabled,
        // or the WWAN driver did not automatically select a network
        // at startup, and it must be selected manually here.
    }
}
```

19.7.5 Roaming

Typically, in your home country the home network is selected automatically, and all other networks are forbidden. There is usually no national roaming.

If you are in another country, several networks may have roaming agreements with your home network and you may want to manually select one—for example, the partner with the best tariff.

If the network is not selected manually, the WWAN modem automatically selects the network with the highest signal strength.

If you are in a border area you can manually select your home network, in order to prevent roaming to a partner network across the border with higher roaming charges.

Use **SetRegisterState** to manually select the a WWAN network. See Section 19.8 Access Flags on page 211 for information on using the Set Register State Access Flag.

19.7.6 Connecting Manually to a WWAN Network

Usually, at startup the WWAN driver selects, connects to, and registers with, the appropriate networks for the SIM card.

If you call **GetRegisterState** and the return value indicates that the connection is *deregistered*, then you must do one of the following to select the network:

- Use **SetRegisterState**, *or*
- Use the WWAN settings in the GUI **Wireless Manager** applet

See Section 19.7.3 The DbGprs.csv File on page 209 for information that must be provided to the WWAN network during connection.

19.7.7 Selecting an Access Point Name (APN)

An Access Point Name (APN) identifies an external network that is accessible from a computer. An APN has several associated attributes that define how the computer can access the external network at that point.

In most cellular networks there are two types of APNs:

- Wireless Application Protocol (WAP) APN, enabling access to the default WAP content (or the network operator's *walled garden*). This APN normally filters non-WAP content by traffic, ports, or volume.
- Internet or WEB APN, which enables access to all Internet content. This APN is normally unfiltered and often the network operator charges a higher tariff for it. This connection is needed when using applications or an HTML browser.

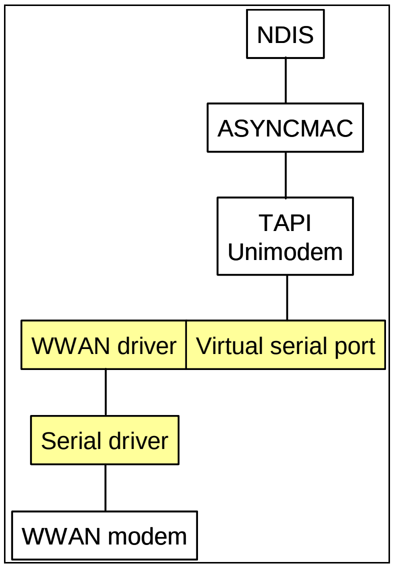
By default, the user interface (WWANUI) sets up the correct packet data context, including the Internet APN. You may want to configure more APNs, if you have arranged with your service provider to use more than one SIM card, or to grant your SIM card access to several APNs. Use **SetProvisionedContexts** to make these APN changes.

User name, password, and authentication method have to be set through RAS; however, applications must also fill in *AuthenticationType*, *UserName*, and *Password* when calling **SetProvisionedContexts**.

19.7.8 Connecting to a VPN

A VPN (Virtual Private Network) can be used to connect a WWAN modem to a corporate network. Some third-party VPN clients work correctly only in conjunction with the Microsoft ASYNCMAC driver. In the standard Mobile Devices SDK implementation of WWAN, ASYNCMAC is not used. Psion proprietary modules complete the communication between NDIS and the WWAN modem.

When using a third-party VPN client, in the Wireless Manager applet WWAN configuration screen, select **Use virtual serial port**. This gives access to ASYNCMAC through the virtual serial port. This is shown in the following diagram:



19.8 Access Flags

The GUI **Wireless Manager** applet and the Mobile Devices SDK are able to read and set the same WWAN settings. The access flags prevent conflicts between values manipulated by the Wireless Manager interface and by the Mobile Devices SDK. Most of the WWAN settings can be queried through both access methods; however, the following four activities can be carried out by both access methods, and should be carried out by an SDK application only after setting the corresponding access flag:

- Set the network register state
- Set the PIN
- Set provisioned contexts
- Set suppress call notifications

The Mobile Devices SDK can set an access flag corresponding to each of these settings. While the access flag is set, the Wireless Manager applet user interface cannot change the corresponding setting. While one of these access flags is enabled, the application must handle everything associated with the associated activity: The user interface is locked out until the access flag is disabled.

Set Register State Access Flag

When a GSM radio modem is roaming, there are two courses of action. The first option is that either the user or the software application selects a network. The second option is that the radio automatically selects a network. An application that explicitly selects a network must set this flag.

When the set register access flag is enabled, the user is prevented from selecting the network though the GUI. The **Tools** -> **Network** menu is not available in the Wireless Manager applet WWAN UI settings screen.

If this flag is set during driver initialization, and the startup registration mode for the modem is **WwanRegisterModeDeregister**, then the user interface does not automatically select a network at startup—this is the case for Workabout Pro expansion boards with Chi Mei modems. In this case, the network must be explicitly selected through the user interface or via the application.

Set PIN Access Flag

When the **Set PIN access flag** is enabled, the PIN cannot be entered through the GUI.

If this flag is set during driver initialization, then the user interface does not prompt the user for a PIN or a PUK. The initialization progress status remains at **Initializing modem** until the application that set the flag handles the PIN initialization.

Set Provisioned Contexts Access Flag

If this flag is set during driver initialization, the user interface is not used to set up the data configuration profile for the driver. As a result, even though the status is shown as **Ready to connect**, the [CONNECT DATA] button is not available. The application that set this flag is responsible for setting up the data configuration before establishing a packet data connection through RAS.

Set Suppress Call Notifications Access Flag

When this flag is set, the WWAN GUI program does not notify the user of the computer when there is an incoming call. When this flag is not set, the WWAN program always notifies the user of incoming calls—see the user manual for your computer for further details.

This flag works with version 1.10047 and later of the WWANUI GUI program, accessed through the Wireless Manager applet.

19.8.1 Controlling the Interaction with the GUI

The following code samples show how the access flags are manipulated using the Mobile Devices SDK. The process is as follows:

1. Save the current access flag settings
2. Change the access flag settings

```
DWORD currentAccessFlags = 0;
WirelessWAN::GetCurrentAccessFlags(currentAccessFlags);
currentAccessFlags |= AccessFlags_SuppressCallNotifications;
WirelessWAN::SetCurrentAccessFlags(currentAccessFlags);
```

```
AccessFlags accessFlags = 0;
if (WirelessWAN.GetCurrentAccessFlags(ref accessFlags) == WwanRequestStatus.Success)
{
    accessFlags |= AccessFlags.SuppressCallNotifications;
    if (WirelessWAN.SetCurrentAccessFlags(accessFlags) != WwanRequestStatus.Success)
    {

        // Failure!
    }
}
```

Warning: ***Before the application closes, control of the access flags must be returned to the WWAN GUI program.***

```
// Re-enable the Control Panel notifications:
DWORD currentAccessFlags = 0;
WirelessWAN::GetCurrentAccessFlags(currentAccessFlags);
currentAccessFlags &= ~AccessFlags_SuppressCallNotifications;
WirelessWAN::SetCurrentAccessFlags(currentAccessFlags);
```

19.9 RSSI (Received Signal Strength Indicator)

The RSSI status of the radio changes continuously, due to various environmental factors. There is no **get** function for RSSI in the Mobile Devices SDK. The signal strength can only be obtained by registering a callback function. A **SetSignalSuggestion** feature is implemented which indicates to the driver how often the signal strength should be measured. Often signal strength is reported using a bar graph. A callback is only necessary when the increment to the next graphed level is reached. Callbacks prevent excessive activity on the processor and the modem.

The signal strength can only be obtained by registering a callback function, **OnSignalStrength** in the **IndicationsListener** class, as shown here:

```
class MyRssiListener : public PsionTeklogix::WWAN::IndicationsListener
{
public:
    MyRssiListener()
    {
    }
    ~MyRssiListener()
    {
    }

    virtual void OnSignalState(const WWAN_SIGNAL_STATE &signalState)
    {
    //
    // Process RSSI here
    //
    }
};

//
// Later in the code.
//

MyRssiListener *rssi = new MyRssiListener();
WirelessWAN::SetIndicationsListener(rssi);
WirelessWAN::SetIndicationsState(true);
```

For more refined control over when the RSSI signal strength is measured, use the **SetSignalSuggestion**. This causes the WWAN driver to invoke **OnSignalStrength** whenever the signal strength changes by more than the *RssiThreshold* value. The *RssiInterval* (in seconds) value determines how often the WWAN driver queries the modem for the signal strength. This is shown in the following:

```
WWanRequestParameters params;
params.hWaitForAsyncCompletion = 0;
WWAN_SIGNAL_STATE signalState;
signalState.RssiInterval  = 10;  // 10 second interval
signalState.RssiThreshold = 2;   // 2 dbm change

if (WirelessWAN::SetSignalSuggestion(params, signalState) == WwanRequestSuccess)
{
if( params.resultCode == WwanResultSuccess )
    {
            // Settings successfully changed.  You'll now start getting
            // signal strength indications via OnSignalStrength
    }
}
```

19.10 WWAN API Elements

C++: WWAN on Windows CE-based computers is controlled using the **PsionTeklogix::WWAN** namespace.

Java: Not available.

.NET: WWAN on Windows CE-based computers is controlled using the **PsionTeklogix.WWAN** namespace.

19.11 Using SMS (Short Message Service)

SMS (Short Message Service) is available on GSM networks. It allows text messages of up to 160 characters to be sent and received through the network operator's SMS gateway. If the receiver is powered off or out of range, messages are stored in the network and delivered at the first opportunity.

On Psion systems, SMS messages are stored on a SIM card, or in the WWAN modem. At startup, initialization of the SIM card takes more time than initialization of the modem.

When callbacks are used to track initialization, typically the application is notified of the ready status of the modem, and then some time later it is notified of the ready status of the SIM card. Only then are the SMS functions available. Some modems do not support SMS; in these cases the SMS ready status never occurs.

Incoming SMS messages are stored on one or several mailboxes. The mailbox is a logical entity. The mailboxes are numbered sequentially—the mailbox index—starting from 0 (zero) for the first mailbox. Within each mailbox the messages are numbered sequentially—the message index.

Some mailboxes are writable, this means that sent messages can be stored in the mailbox.

When SMS functions are called, an SMS location structure is passed in as a parameter. The SMS location structure holds the mailbox index and the message index within the mailbox.

If a callback is registered for incoming SMS messages, a location structure is returned by the callback that specifies the mailbox index and the message index. This location structure can be passed to subsequent SMS calls that process the incoming SMS message. It is recommended that applications query the location of each message, and not make assumptions about where the modem put the message.

Most modems have only one mailbox that is stored on the SIM card. A few modems have a second mailbox that is stored in the modem itself. The Mobile Devices SDK provides information on the number and structure of the mailboxes. Normally, the modem automatically selects the mailbox for an incoming message. When one mailbox is full, the modem starts filling the next one. To make mailboxes portable between hand-held computers, an application can force a mailbox to be on the SIM card.

19.11.1 SMS API Elements

C++: SMS on Windows CE-based computers is controlled using the **PsionTeklogix::WWAN** namespace.

Java: Not available.

.NET: SMS on Windows CE-based computers is controlled using the **PsionTeklogix.WWAN** namespace.

19.12 WWAN Supplementary Services

Some WWAN networks support supplementary services. These services can complement both voice calls and data services. Setting and querying each supplementary service takes between 30 and 60 seconds, as the computer must contact the WWAN network and wait for a reply. The Mobile Devices SDK provides access to the following supplementary services, if they are supported by your WWAN network:

Incall Supplementary Services

Call Hold

This service enables the subscriber to interrupt an ongoing call and then subsequently re-establish the call. The call hold service is only applicable to normal telephony.

Call Waiting

This service allows the mobile subscriber to be notified of an incoming call during a call. The subscriber can answer, reject, or ignore the incoming call. Call waiting is applicable to all GSM telecommunications services using a circuit-switched connection.

Multiparty Service (Conference Calls)

The multiparty service enables a mobile subscriber to establish a multiparty conversation—that is, a simultaneous conversation between from three to six subscribers. This service is only applicable to normal telephony.

Explicit Call Transfer

This service allows a subscriber who has two calls to connect the other parties in those calls, and at the same time disconnect themselves from the call. This service is only supported by the HC25 modem.

Other Supplementary Services

Call Forwarding

This service gives the subscriber the ability to forward incoming calls to another number if the called mobile unit is not reachable, if it is busy, if there is no reply, or if call forwarding is allowed unconditionally.

Calling Line Identification Presentation/Restriction (Caller ID)

These services supply the called party with the integrated services digital network (ISDN) number of the calling party. The restriction service enables the calling party to prevent the presentation of the number. The restriction overrides the presentation.

Call Barring

This service allows a subscriber to restrict selected types of calls. Typically these calls are: all incoming calls; all incoming calls when roaming; all outgoing calls; or, all outgoing international calls.

This service is not supported by the Mobile Devices SDK; however, it is available through the Control Panel.

19.12.1 Voice Service States

These states can apply to several of the supplementary services; however, in this implementation, only call forwarding, call waiting and call barring use them.

Enabled
The service is fully enabled.

Disabled
The service is fully disabled.

Some Enabled
Some of the service is enabled. For example, if call forwarding is enabled only when the line is busy and disabled for all other reasons; then when the status for *All Reasons* is requested, *Some Enabled* is returned.

Unknown
Unable to retrieve the status of the service.

19.13 Voice Calls on a WWAN

Voice calls are supported on the following operating systems:

Operating System	Support
Windows Embedded CE 5.0 Windows Embedded CE 6.0	The Mobile Devices SDK supports voice calls on a WWAN for: • Workabout Pro G2 • Workabout Pro 3 • Ikôn • Omnii XT15 • Omnii RT15

Operating System	Support
Windows Mobile 6.x Professional Windows Embedded Hand-Held 6.5	The Mobile Devices SDK does not support these operating systems. For more information on voice calls on the following, see MSDN (http://msdn.microsoft.com/en-us/library/bb416512.aspx): • Workabout Pro G2 • Workabout Pro 3 • Ikôn • Omnii XT15 • Omnii RT15 • EP10

19.13.1 Initializing WWAN

Before initializing voice over WWAN, initialize the WWAN connection following the instructions in Section 19.5 Initializing WWAN on page 200.

19.13.2 Initializing Voice Over WWAN

Follow these steps to initialize voice over WWAN:

1. Instantiate an instance of the **VoiceCallManager** class –this class controls most of the voice call functions.
2. Create a **VoiceCallManager Listener** object—this makes **OnIncomingCallEvent** available to handle all incoming calls.
3. Use **RegisterListener** to install and register the listener.
4. If the application—not the GUI applet—is to handle notifications for incoming voice calls, set the suppress call notifications access flag. See Section 19.8 Access Flags on page 211 for details.

The following sample code shows how to do this:

```
using namespace PsionTeklogix::WWAN;

class MyVoiceCallManagerListener : public VoiceCallManager::Listener
{
public:

     // OnIncomingCallEvent
     //
     // Description:
     //    This method is invoked by a VoiceCallManager object when there is an incoming
     //    voice call (including waiting calls). In this implementation, all new VoiceCalls
     //    are added to the voiceSharedData.myVoiceCalls list. A MessageBox is then
     //    displayed asking the user if the call should be answered.  The new status is
     //    displayed in the event window in the dialog.
     //
     // Parameters:
     //    incomingCall    - The new incoming call.
     //
    void OnIncomingCallEvent(VoiceCall incomingCall)
    {
       // Add functions for acting on incoming calls here....
    }
};

class CallListener : public VoiceCall::Listener
{

public:

    void OnStatusChangedEvent(VoiceCall         &changedCall,
                VoiceCallStatus    newStatus,
                VoiceCallFlags        newFlags)
    {
        switch(newStatus)
        {
            case VoiceCallStatus_Active:
```

```
            break;
                case VoiceCallStatus_Held:
            break;
        case VoiceCallStatus_Dialing:
            break;
        case VoiceCallStatus_Alerting:
            break;
        case VoiceCallStatus_Incoming:
            break;
        case VoiceCallStatus_Waiting:
            break;
        case VoiceCallStatus_NoAnswer:
            break;
        case VoiceCallStatus_NoCarrier:
            break;
        case VoiceCallStatus_Busy:
            break;
        case VoiceCallStatus_SupplementaryAccepted:
            break;
        case VoiceCallStatus_NormalTermination:
            break;
                default:
            break;
        }
        if ( (newFlags & VoiceCallFlags_LastEvent) != 0 )
        {

            // This voice call is finished.  Its now safe to deallocate
         // the VoiceCall object, instantiated earlier and referenced
            // by changedCall).
        //
 }
    }
};

static VoiceCallManager        *callManager  = NULL;
static MyVoiceCallManagerListener    *incomingCall = NULL;
static CallListener            *callStatus   = NULL;

bool InitWwanVoiceApi()
{
    // Initialize the WWAN namespace and wait for the driver/modem to be ready.
    // (see previous example of this function at the beginning of WWAN API
    // documentation).
    if(InitializeWWANAndWait())
    {
// Create an instance of the VoiceCallManager object
        callManager = new VoiceCallManager();
    // Create the listener
        incomingCall = new MyVoiceCallManagerListener();
    // Register for call manager events (Namely incoming call notification).
    callManager->RegisterListener(*incomingCall);
    // Create a listener for phone calls (general).
    callStatus = new CallListener();

        // The PsionTeklogix WWAN UI application will generate notifications to
        // the user about incoming voice calls.  To suppress the notifications
        // the following access flag should be set.  (works on WWAN UI versions
        // 1.10047 and later)
        DWORD currentAccessFlags = 0;
        WirelessWAN::GetCurrentAccessFlags(currentAccessFlags);
        currentAccessFlags |= AccessFlags_SuppressCallNotifications;
        WirelessWAN::SetCurrentAccessFlags(currentAccessFlags);

    return true;
    }
    return false;
}
```

19.13.3 Closing Voice Over WWAN

The following steps close voice over WWAN:

1. Free all allocated resources.
2. If the application has been controlling the call notifications, return control to the GUI applet. See Section 19.8 Access Flags on page 211 for details.
3. Call **Shutdown**.

```
void DeInitWwanVoiceApi()
{
    if (callManager != NULL)
    {
        // make sure there are no active voice calls since you will lose
        // control of them after deleting the objects.
        callManager->HangUpAll();

        delete callManager;
        callManager = NULL;
    }

    // Delete the VoiceCallManager object before the listener, or deregister
    // the listener object first (just in case an event is generated).
    if (incomingCall != NULL)
    {
        delete incomingCall;
        incomingCall = NULL;
    }

    // Re-enable the WWAN UI notifications:
    DWORD currentAccessFlags = 0;
    WirelessWAN::GetCurrentAccessFlags(currentAccessFlags);
    currentAccessFlags &= ~AccessFlags_SuppressCallNotifications;
    WirelessWAN::SetCurrentAccessFlags(currentAccessFlags);

    // Shutdown WWAN namespace (assuming no other code is using it)
    WirelessWAN::Shutdown();
}
```

19.13.4 Making a Phone Call

Use **DialNumber** to initiate a phone call.

```
// NOTE: GetComboEntry is NOT part of the Mobile Devices SDK WWAN API, but is a
// fictional function designed to get a Phonebook entry object
// from a fictional combo box.

PhonebookEntry *entry = GetComboEntry();
VoiceCall *newCall = new VoiceCall(VoiceCall::DialNumber(entry->GetPhoneNumber()));
newCall->RegisterListener(*callStatus);
```

DialNumber returns a **VoiceCall** object in dialing state. Continue as follows:

1. Create a new object, to ensure persistence, by passing this **VoiceCall** object to a copy constructor. This is necessary if this call is within a Windows procedure.
2. Immediately, use **RegisterListener** to register a listener to monitor the state of the phone call. See Section 19.13.5 Voice Call States on page 219 for definitions.

```
class CallListener : public VoiceCall::Listener
{

public:

    void OnStatusChangedEvent(VoiceCall         &changedCall,
                VoiceCallStatus    newStatus,
                VoiceCallFlags        newFlags)
    {
        switch(newStatus)
        {
            case VoiceCallStatus_Active:
            break;
                case VoiceCallStatus_Held:
            break;
        case VoiceCallStatus_Dialing:
            break;
        case VoiceCallStatus_Alerting:
            break;
        case VoiceCallStatus_Incoming:
            break;
        case VoiceCallStatus_Waiting:
            break;
        case VoiceCallStatus_NoAnswer:
            break;
        case VoiceCallStatus_NoCarrier:
            break;
        case VoiceCallStatus_Busy:
            break;
        case VoiceCallStatus_SupplementaryAccepted:
            break;
        case VoiceCallStatus_NormalTermination:
            break;
                default:
            break;
        }
        if ( (newFlags & VoiceCallFlags_LastEvent) != 0 )
        {
            //
            // This voice call is finished.  Its now safe to deallocate
         // the VoiceCall object you instantiated earlier ( referenced
            // by changedCall).
        //
 }
    }
};
```

19.13.5 Voice Call States

These voice call states describe the state of a voice connection between the computer and the WWAN network. Contact your WWAN network provider to determine which of these services they support.

The status can change at any time for reasons that are outside the control of the application. Instead of polling this method, it is recommended that an application creates an event handler.

A typical outbound voice call passes through several of these states, for example:

1. Dialing
2. Alerting
3. Active
4. NormalTermination

An application may not detect all the states that the call passes through.

When the voice call is terminated, the last **Voicecall** event received has its voice call flag set to **last event**. Once this event is received, free the **VoiceCall** object that you created immediately after invoking **DialNumber**. See **Section 19.13.4 Making a Phone Call on page 218**.

A typical inbound call passes through several states, for example:

1. Incoming
2. Active
3. Normal Termination

Voice calls on Psion computers use the GSM standard. This standard allows a subscriber to have the following calls, at the same time:

- One active call
- One held call
- One waiting call

Either the active call or the held call can be a multiparty call with up to five participants.

Active

Applies to: incoming and outgoing calls

The computer is connected to another party over the WWAN network: end-to-end conversation is possible.

Held

Applies to: incoming and outgoing calls

Only available if the WWAN provider supports this feature.

The computer has temporarily suspended the voice call. End-to-end conversation is not possible. The conversation can be reestablished later.

Dialing

Applies to: outgoing calls

The WWAN network is in the process of contacting the called party.

Alerting

Applies to: outgoing calls

The called party is being notified that there is an incoming voice call. Typically this means that the called phone is ringing.

Incoming

Applies to: incoming calls

This state applies to an incoming voice call when there is no active voice call. See Section 19.13.13 Audio for Voice Over WWAN on page 225 for instructions on creating a ring tone.

Waiting

Applies to: incoming calls

Only available if the WWAN provider supports this feature.

This state applies to an incoming call when there is an active voice call, or a previous call in the incoming state.

No Answer

Applies to: outgoing calls

The called party did not answer the call within a specified, network defined, time.

This state is not often returned as many calls are automatically answered by switchboards and answering systems.

No Carrier

Applies to: outgoing calls

The computer could not connect to the WWAN network.

Busy

Applies to: outgoing calls

The called party is busy and does not answer the call.

This state is not often returned as many calls are automatically answered by switchboards and answering systems.

Supplementary Accepted

Applies to: outgoing calls

Supplementary services can be configured using codes entered on the keypad of a telephone. These codes are numerals preceded by *#. An application can insert these codes into a dialing string. This status indicates that the network accepted one of these codes.

For a list of supplementary services see Section 19.12 WWAN Supplementary Services on page 214. For a list of codes, consult your network provider.

Normal Termination

Applies to: incoming, and outgoing, calls

The voice call terminated. This is returned by any call where the modem detects that a call, that has been active, no longer exists.

19.13.6 Receiving a Phone Call

The **VoiceCallManager** object is responsible for answering incoming phone calls through the listener that was registered during initialization—see Section 19.13.2 Initializing Voice Over WWAN on page 216 for details. An incoming call generates an incoming call event that is processed by the **VoiceCallManager** object.

The following example shows how to receive incoming phone calls:

1. Play a ring tone.
2. Ask if the user wants to answer the call—includes displaying the caller ID of the incoming phone call.
3. Either activate the incoming call or reject it.

```
class MyVoiceCallManagerListener : public VoiceCallManager::Listener
{
public:

     // OnIncomingCallEvent
     //
     // Description:
     //  This method is invoked by a VoiceCallManager object when there is an incoming
     //  voice call (including waiting calls).  A MessageBox is then displayed asking the
     //  user if the call should be answered.  The new status is displayed in the event
     //  window in the dialog.
     //
     // Parameters:
     //  incomingCall    - The new incoming call.

    void OnIncomingCallEvent(VoiceCall incomingCall)
    {
    //
    // Instantiate a new VoiceCall object, and register a listner.
    // The listener is responsible for determining when/how to
    // free up this memory.
    //
    VoiceCall *newCall = new VoiceCall(incomingCall);
    newCall->RegisterListener(*callStatus);

        try
        {
            try
            {
                // Play a ring tone to notify the user of an incoming call.
                // From PsionTeklogix::Sound namespace.
                PlayRepeatingWave(std::wstring(L"\\windows\\ring.wav"), 3000 );
            }
            catch(std::runtime_error ex)
            {
                /* unable to play the ringtone, does the file exist? */
            }

            // Ask the user if they want to answer the call.
            WCHAR messageBuffer[1024];
            wsprintf(messageBuffer,
        L"Answer incoming call from: \"%s\"?\r\nPress NO to reject the call.",
         incomingCall.GetOtherPartyCallerId().c_str());

 // Please note: It is not recomended that you block this thread,
            // the next event will not be received untill this handler returns.
            // This blocking message box is here to keep this demo app simple.
            int rc = MessageBox(0, messageBuffer, L"Incoming Call",
                (MB_YESNOCANCEL | MB_TOPMOST | MB_SETFOREGROUND));

            // The user responded, don't need to play the ring tone any more.
            // From the PsionTeklogix::Sound namespace.
            StopRepeatingWave();

            if (rc == IDYES)
            {
        // answer the incoming call
                incomingCall.AnswerIncoming();
            }
         else if (rc == IDNO)
            {
        // reject the incoming call
                incomingCall.RejectIncoming();
            }
         else
            {
                // call was ignored
            }
        }
        catch(std::runtime_error&)
        {
            // If we are here, the call was probably terminated before the user responded
            // to the messagebox, the object is no longer valid.
        }
    }
};
```

19.13.7 Processing Voice Calls

This section outlines the voice call states.

Incoming Call

An incoming call generates a **VoiceCallManager** incoming call event with a voice call state of **Incoming** if it is the **only** call being received.

Call Waiting

Call waiting must be available from the WWAN network provider and enabled on the computer before an incoming call can be placed in this state. Use **GetCallWaitingEnabled** to check this status. If call waiting is not already enabled, use **SetCallWaitingEnabled** to enable call waiting.

An incoming call generates a **VoiceCallManager** incoming call event with a voice call state of **Call waiting** if another call is in the voice call state of **Active**. There can be only one call at a time in the call waiting state.

Placing The Active Call On Hold And Answering The Waiting Call

If there is an active call, use **AnswerIncoming** to place the active call on hold, and to answer the waiting call.

If there is one or more calls on hold, then the active call joins them on hold. The held calls can converse in a multiparty call excluding you. The incoming call becomes the new active call. If you do not want this to happen either the active call or the held call must be disconnected before **AnswerIncoming** is called.

Placing The Active Call On Hold And Answering The Held, Or The Waiting, Call

Use **SwapHeldAndActive**. This function does one of the following:

- Places the active call on hold, and makes the held call active, *or*
- Places the active call on hold, and makes the waiting call active.

This function fails if there is both a held call and a waiting call.

Holding Calls

The Mobile Devices SDK supports holding calls; although, holding calls are only available when the computer is associated with a WWAN network that provides a held calls service.

A held call is a call that has been active, but is temporarily interrupted. It can be resumed, made active, again.

Multiparty Calls (Conference Calls)

The Mobile Devices SDK supports multiparty calls; although, multiparty calls are only available when the computer is associated with a WWAN network that provides a multiparty calling service. Up to five calls can be joined into a conference call.

Use the **VoiceCallManager** function **RetrieveHeld** to join together the active call with all the held calls. All the calls are now active, and all the parties can communicate with each other.

The behaviour of **RetrieveHeld** depends on the WWAN modem. For example, this call is successful with the MC75 modem when there is one held call and no active calls, while it fails with the HC25 modem if there is not at least one active call and at least one held call.

Adding A Call To A Multiparty Call

If an incoming call event is received, with a voice call state of *Call waiting*, use the **VoiceCall** function **ActivateAndHoldOthers** to make this the active call and place all the other calls on hold. This function fails if there is already a call on hold.

Use the **VoiceCallManager** function **RetrieveHeld** to join together the active call with all the held calls. All parties, including the new call, can now communicate with each other.

Use the **VoiceCallManager** function **HoldActive** to place all the active calls on hold. Then one of the following occurs:

- If there is a waiting call, it becomes the active call, *or*
- If there is a call on hold, but there is no waiting call, the held call becomes the active call, *or*
- If there is both a held call and a waiting call, the command is rejected.

19.13.8 Terminating Voice Calls

Rejecting an Incoming Call

While processing the incoming call event, use **RejectIncoming** to reject the call. See Section 19.13.6 Receiving a Phone Call on page 221.

Terminating Active Calls

Terminating One Active Call

Use **HangUp** or **HangUpActive** to terminate a single active call.

Terminating all Active Calls

Use **HangUpActive** to terminate all active calls.

If there is a call in the call waiting state, it becomes active after the active calls are terminated.

If there is no call in the call waiting state, then the held calls becomes active.

Terminating all Held Calls

Use **HangUpHeld** to terminate all held calls.

If there is a waiting call, this function fails. So, use **RejectIncoming** on all the waiting call before calling **HangUpHeld**.

Terminating all Active and Held Calls

Use **HangUpAll** to terminate all calls in the active state and all calls in the held state. If there is a waiting call, it becomes active.

Terminating One Selected Call

Use the **VoiceCall** function **HangUp** to terminate one selected call. The behaviour of **HangUp** depends on the WWAN modem. The MC75 terminates a call in any state. The HC25 terminates calls in the active and held states.

19.13.9 Call Forwarding

The Mobile Devices SDK supports call forwarding; although, call forwarding is only available when the computer is associated with a WWAN network that provides a call forwarding service.

Conditional Call Forwarding

Conditional call forwarding has one of the following settings:

- **Busy:** An incoming call is forwarded if there is already an active call.
- **No answer:** An incoming call is forwarded if it is not answered within a specified time.
- **Not reachable:** An incoming call is forwarded when the WWAN network cannot reach the computer.

Unconditional Call Forwarding

Unconditional call forwarding forwards all incoming calls. Unconditional forwarding takes precedence over any conditional forwarding settings that are in force at the same time.

19.13.10 Dual-Tone Multifrequency (DTMF)

DTMF is a tone signalling scheme often used for control purposes on a telephone network. For example, it can be used for the remote control of an answering machine, to control voice mail, or to dial an extension.

For example, to dial an extension number of 1234, there are two options:

- Call **SendDTMF** with the string **1234**, *or*
- Call **SendDTMF** four times. The first time set the string to **1**, the second time set the string to **2**, then to **3**, then to **4**.

You can use **SendDTMF** for any touch-tone service.

19.13.11 Blocking Inbound and Outbound Calls

To ensure that the application has control of the call notifications, set the suppress call notifications flag before blocking calls. See Section 19.8 Access Flags on page 211 for details.

Blocking (Rejecting) Inbound Calls

While processing the **VoiceCallManager** incoming call event, use **GetOtherPartyCallerId** to get the caller ID. If the caller ID is recognized as one that should be blocked, use **RejectIncoming** to reject the call.

If the incoming call has its caller ID blocked, **GetOtherPartyCallerId** returns an empty string. Also, in the **Voicecall** status changed event, the voice call flag is *withheld incoming number*.

Blocking Outbound Calls

To prevent phone calls to selected phone numbers, monitor the **Voicecall** status changed events. While the outbound call is in the *alerting* state, use **HangUp** to block the call.

19.13.12 Blocking Caller ID on Outgoing Calls

Use **SetOutgoingCallerIdEnabled** to block caller ID on outgoing calls. Use **GetOutgoingCallerIdEnabled** to query the state of the outgoing caller ID.

19.13.13 Audio for Voice Over WWAN

Playing A Ring Tone

Use **PlayRepeatingWave**, in the **Sound** namespace, to play a repeating tone. This is shown in the following example:

```
try
{
    // Play a ring tone to notify the user of an incoming call.
    // From PsionTeklogix::Sound namespace.
    PlayRepeatingWave(std::wstring(L"\\windows\\ring.wav"), 3000);
}
catch(std::runtime_error ex)
{
    // Unable to play the ringtone, does the file exist?
}
```

Use **StopRepeatingWave** to stop playing the tone. This is shown in this example:

```
// The user responded, don't need to play the ring tone any more.
// From the PsionTeklogix::Sound namespace.
StopRepeatingWave();
```

Setting the Speaker Volume

Use **SetSpeakerVolume** to control the volume of the speaker on the computer. 0 (zero) is the minimum volume of the speaker on the computer, and 100 is the maximum volume of the speaker. The sound level is hardware dependent; on different Psion computers the same setting gives different apparent sound levels. Zero volume does not turn the speaker off; it is the lowest sound level available.

The volume can take one of the following values: 0, 20, 40, 60, 80, 100. Setting any other value results in rounding to the nearest valid value.

In order to set the speaker volume, there must be an active call when the volume is set.

Configuring the Microphone

At this time (April 2008), the only available microphone operation is muting.

Muting the Microphone

Use **SetMicrophoneMute** to mute the microphone on the computer. When mute is enabled, the other parties cannot hear you even if the call is in the active state: You can still hear the other parties.

Use **GetMicrophoneMute** to check the mote status of the microphone.

In order to mute the microphone, there must be an active call when mute is set.

19.13.14 Voice Over WWAN Events

19.13.14.1 Voice Call Status Changed Event

A voice call status changed event is generated when one of the following changes for a voice call:

- The voice call state. See Section 19.12.1 Voice Service States on page 215 for details.
- The voice call flag.

Voice Call Flags

The voice call flags define the type of voice call.

Incoming

This is an incoming call. Another party initiated this voice call.

Conference

This call is part of a multiparty call. See Section Multiparty Calls (Conference Calls) on page 223.

Last Event

The voice call is terminated—no more events will be generated for this call. See Section 19.13.8 Terminating Voice Calls on page 223 for details.

Withheld Incoming Number

This is an incoming call where the caller withheld the phone number. See Section 19.13.12 Blocking Caller ID on Outgoing Calls on page 224 for details.

19.13.14.2 Voice Call Manager Incoming Call Event

A voice call manager incoming call event is generated when a new voice call is received. Events are processed in the order that they are received. The application does not receive the next event until the handler returns from the previous one. For this reason, it is recommended that there is a lightweight handler that returns quickly.

19.13.15 Voice Over WWAN API Elements

C++: The phone book on all Psion computers is controlled using the **VoiceCall** class and the **VoiceCallManager** class in the **PsionTeklogix::WWAN** namespace.

Java: Not available.

.NET: WWAN on all Psion computers is controlled using the **VoiceCall** class and the **VoiceCallManager** class in the **PsionTeklogix.WWAN** namespace.

19.14 Phone Books

The Mobile Devices SDK allows an application to access and manipulate the phone books built into a SIM card or WWAN modem.

Each phone book entry consists of one name and one phone number. The maximum number of bytes for a name and for a phone number is determined by the network provider. The number of characters that can be stored depends on the alphabet used for the entry. 16-bit alphabets allow fewer characters to be stored in the available space than do 7-bit, and 8-bit alphabets. A name entry that is too long for the allocated space is automatically truncated. The number can only contain the following characters: 0 (zero) to 9, *, #, and +. Hyphens and brackets are automatically stripped from numbers before they are stored.

Reading Phone Book Entries

Use the following steps to read the entries from a phone book:

1. Get a list of all phone books—on both SIM cards and the modem—using **GetPhonebooks**.
2. Get the entries in a phone book using **GetPhonebookEntries**.

```
if (!InitWwanVoiceApi())
{
    return false;
}

Phonebook[] phonebooks = Phonebook.GetPhonebooks();
foreach (Phonebook phonebook in phonebooks)
{
    if (phonebook.StoredOnSim)
    {
        PhonebookEntry[] entries = phonebook.GetPhonebookEntries();

        foreach (PhonebookEntry entry in entries)
        {

            // Some phonebook entries are duplicates, or
            // they have zero length names. This example filters these out.
            if (
                (!number_combo.Items.Contains(entry.GetName())) &&
                (entry.GetName().Length > 0)
               )
            {
                number_combo.Items.Add(entry.GetName());
            }
        }
    }
}


if (number_combo.Items.Count > 0)
{
    number_combo.SelectedIndex = 0;
}
```

Writing Phone Book Entries

To create a new phone book entry:

- Use the **AddPhonebookEntry** method for the selected **Phonebook** object. A **PhonebookEntry** object representing the new phone book entry is returned.

Volatile

A phone book is *volatile* if its content can change at any time. Modems change this type of phone book, as well as the Mobile Devices SDK. *Dialled Calls*, *Received Calls*, and *Missed Calls* phone books are volatile; however, *Regular*, *Service Numbers*, *Own Numbers*, and *Voicemail Access Number* phone books are never volatile. If you want to make sure that you never miss a change in a volatile phone book, then you must re-read them whenever a call is disconnected.

Writable/Modifiable

Depending on the types of entries stored in a phone book, it may be writable or it may be read-only. See Section 19.14.2 Phone Book Types on page 227 for more information.

19.14.1 Data Coding Schemes for Phone Book Entries

The data coding scheme for a phone book entry determines how many characters can be stored in the entry. For example, you can store approximately twice as many characters using an 8-bit alphabet as you can with a 16-bit alphabet.

A phone book can contain entries that use different alphabets.

The following alphabets can be used to store phone book entries:

- SMS Default
- SMS GSM 7-bit
- SMS ASCII 8-bit
- SMS Unicode 16-bit
- SMS Binary 8-bit
- SMS GSM PDU

Unicode entries must be stored in a 16-bit alphabet.

SIM cards can only store entries in SMS GSM 7-bit and SMS Unicode 16-bit.

The SMS Default uses the driver default algorithm for selecting the alphabet for an entry. The driver examines the characters used in the name, and the driver selects the alphabet that stores the maximum number of characters in the space available for the entry.

19.14.2 Phone Book Types

A SIM card or WWAN modem usually has several phone books stored on it, each containing a specific type of phone number. Each SIM or modem has a subset of the possible phone books. The following phone books types are identified and processed by the Mobile Devices SDK:

Phone Book	Type	Description
Regular	Writable	Features depend on the SIM or the modem.
Services	Not writable	Network provider numbers such as numbers for technical assistance.

Phone Book	Type	Description
Mailboxes	Writable	Numbers for contacting voice mail. Overwriting these numbers is not advisable.
Own Numbers	Writable	The phone number for the computer. This is for display purposes only—the usable number is stored on the network.
Dialed Calls	Not writable, volatile	Automatically updated by the modem.
Received Calls	Not writable, volatile	Automatically updated by the modem.
Missed Calls	Not writable, volatile	Automatically updated by the modem.
White List	Read only	For future use.
Black List	Read only	For future use.
Emergency	Read only	Built-in emergency numbers.

19.14.3 Phone Book API Elements

C++: The phone book on all Psion computers is controlled using the **Phonebook** class and the **PhoneBookEntry** class in the **PsionTeklogix::WWAN** namespace.

Java: Not available.

.NET: WWAN on all Psion computers is controlled using the **Phonebook** class and the **PhoneBookEntry** class in the **PsionTeklogix.WWAN** namespace.

19.15 Resource Materials

European Telecommunications Standards Institute (ETSI): Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Alphabets and language-specific information (3GPP TS 23.038 version 6.1.0 Release 6).

European Telecommunications Standards Institute (ETSI): Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Technical realization of Short Message Service (SMS) (3GPP TS 23.040 version 6.5.0 Release 6).

European Telecommunications Standards Institute (ETSI): Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); AT command set for 3G User Equipment (UE), 3GPP TS 27.007 version 5.4.0 Release 5, ETSI, 09/2003; Available at webapp.etsi.org/key/queryform.asp

ETSI reports are available at www.etsi.org.

D. Živadinovic, M. Winkler, "Des Surfers Bastelstunde" in c't 7/2001, page 228 (in German).

20 REGISTRY-BASED WWAN API

20.1 Overview

The registry-based WWAN API described here can be used without having to install a Psion SDK.

You can use this API to query many static, and dynamic, properties of the WWAN modem and the WWAN network; however, you cannot use it to control the WWAN modem—communication goes only one way, from the WWAN modem to the application.

It is available on the following mobile devices:

- EP10 (7515)
- Omnii XT15 (7545XA)
- Omnii RT15 (7545XC)
- Ikôn (7505)
- Workabout Pro G2 (7527)
- Workabout Pro 3 (7527)
- Non-Psion devices that fulfil the other criteria

It is available on these operating systems:

- Windows Embedded CE 6.0
- Windows Mobile 6.x Professional
- Windows Embedded Hand Held 6.5

20.2 Phone State Registry Settings

The information in this chapter is based on observation of the effects of these settings on Psion computers. It differs in places from that in MSDN. The MSDN information is available for Windows Embedded Hand Held 6.5 at msdn.microsoft.com/en-us/library/bb154491.aspx. This is also reached using the following path: Mobile and Embedded Development > Windows Mobile > Windows Mobile 6.5 > Windows Mobile Features (Native) > Core OS Services > State and Notifications Broker.

20.2.1 General Status

HKEY_LOCAL_MACHINE\System\State\Phone

Value Name	Value Type
Status	REG_DWORD

Hardware Status

Bitmask	When set...
0x00000020	a WWAN modem is installed in the device.
0x00000010	the installed WWAN modem is turned off.

SIM Status

Bitmask	When set...
0x00000002	no SIM is installed in the device (this bit is not set if the installed WWAN modem does not require a SIM).
0x00000004	the installed SIM is invalid.
0x00000008	a PIN or PUK must be entered in order to unblock the SIM.
0x00000001	the SMS storage on the SIM is full.

Network Status

The following bits are mutually exclusive—only one of them can be set at a time.

Bitmask	When set...
0x00200000	the WWAN modem is not registered on any network.
0x00400000	the WWAN modem is currently searching for a network.
0x00800000	the WWAN modem is currently registered on its home network.
0x00000200	the WWAN modem is currently registered on a roaming network.

Packet Data Status

Bitmask	When set...
0x00100000	the GPRS packet data service for the GSM family of networks is available (this includes GPRS, EGPRS / EDGE, UMTS, HSDPA, and HSPA).
0x10000000	the 1xRTT packet data service for the CDMA family of networks is available (this includes 1xRTT, 1xEV-DO Rev. 0, and 1xEV-DO Rev. A).
0x00001000	the modem has an active packet data connection.

Voice Call Status

Bitmask	When set...
0x00010000	there is an incoming call (ringing), or a waiting call, that has not yet been accepted by the user.
0x00020000	an outgoing call is being dialled, and it has not been accepted by the other party.
0x20000000	there is an active voice call.
0x00004000	there is a call on hold.
0x00008000	there is a conference call in progress.
0x00000040	the ring tone for incoming calls is disabled.

20.2.2 Phone State Bitmask in Numerical Order

Bitmask	Windows Mobile Definition Name (snapi.h)	When set...
0x00000001	SN_PHONESIMFULL_BITMASK	the SMS storage on the SIM is full.
0x00000002	SN_PHONENOSIM_BITMASK	no SIM is installed in the device (this bit is not set if the installed WWAN modem does not require a SIM).
0x00000004	SN_PHONEINVALIDSIM_BITMASK	the installed SIM is invalid.
0x00000008	SN_PHONEBLOCKEDSIM_BITMASK	a PIN or PUK must be entered in order to unblock the SIM.
0x00000010	SN_PHONERADIOOFF_BITMASK	the installed WWAN modem is turned off.
0x00000020	SN_PHONERADIOPRESENT_BITMASK	a WWAN modem is installed in the device.
0x00000040	SN_PHONERINGEROFF_BITMASK	the ring tone for incoming calls is disabled.
0x00000200	SN_PHONEROAMING_BITMASK	the WWAN modem is currently registered on a roaming network.

Bitmask	Windows Mobile Definition Name (snapi.h)	When set...
0x00001000	SN_PHONEACTIVEDATACALL_BITMASK	the modem has an active packet data connection.
0x00004000	SN_PHONECALLONHOLD_BITMASK	there is a call is on hold.
0x00008000	SN_PHONECONFERENCECALL_BITMASK	there is a conference call in progress.
0x00010000	SN_PHONEINCOMINGCALL_BITMASK	there is an incoming call (ringing), or a waiting call, that has not yet been accepted by the user.
0x00020000	SN_PHONECALLCALLING_BITMASK	an outgoing call is being dialled, and it has not been accepted by the other party.
0x00100000	SN_PHONEGPRSCOVERAGE_BITMASK	the GPRS packet data service for the GSM family of networks is available (this includes GPRS, EGPRS / EDGE, UMTS, HSDPA, and HSPA).
0x00200000	SN_PHONENOSERVICE_BITMASK	the WWAN modem is not registered on any network.
0x00400000	SN_PHONESEARCHINGFORSERVICE_BITMASK	the WWAN modem is currently searching for a network.
0x00800000	SN_PHONEHOMESERVICE_BITMASK	the WWAN modem is currently registered on its home network.
0x10000000	SN_PHONE1XRTTCOVERAGE_BITMASK	the 1xRTT packet data service for the CDMA family of networks is available (this includes 1xRTT, 1xEV-DO Rev. 0, and 1xEV-DO Rev. A).
0x20000000	SN_PHONECALLTALKING_BITMASK	there is an active voice call.

20.2.3 Network Status

See also Network Status on page 232.

HKEY_LOCAL_MACHINE\System\State\Phone

Value Name	Value Type	Description
Signal Strength Raw	REG_DWORD	Signal strength expressed as a percentage of the maximum signal strength.
Current Operator Name	REG_SZ	Name of the current mobile network.
Service Provider Name	REG_SZ	Name of the home network (if stored on the SIM).

20.2.4 Packet Data Status

See also Packet Data Status on page 232.

HKEY_LOCAL_MACHINE\System\State\Phone

Value Name	Value Type	Description
Cellular System Available	REG_DWORD	Bitmask that indicates the packet data service to which the WWAN modem is attached (and to which it can connect).

Bitmask	Windows Mobile Definition Name (snapi.h)	When set...
0x00000001	SN_CELLSYSTEMAVAILABLE_GPRS_BITMASK	GSM / GPRS
0x00000002	SN_CELLSYSTEMAVAILABLE_1XRTT_BITMASK	CDMA / 1xRTT
0x00000004	SN_CELLSYSTEMAVAILABLE_1XEVDO_BITMASK	CDMA / 1xEV-DO (including Rev. 0 and Rev. A)
0x00000008	SN_CELLSYSTEMAVAILABLE_EDGE_BITMASK	GSM / EDGE
0x00000010	SN_CELLSYSTEMAVAILABLE_UMTS_BITMASK	UMTS
0x00000040	SN_CELLSYSTEMAVAILABLE_HSDPA_BITMASK	UMTS / HSDPA (including HSPA)

HKEY_LOCAL_MACHINE\System\State\Phone

Value Name	Value Type	Description
Cellular System Connected	REG_DWORD	Bitmask that indicates the packet data service to which the WWAN modem is attached (and to which it can connect).

Bitmask	Windows Mobile Definition Name (snapi.h)	When set...
0x00000001	SN_CELLSYSTEMCONNECTED_GPRS_BITMASK	GSM / GPRS
0x00000002	SN_CELLSYSTEMCONNECTED_1XRTT_BITMASK	CDMA / 1xRTT
0x00000004	SN_CELLSYSTEMCONNECTED_1XEVDO_BITMASK	CDMA / 1xEV-DO (including Rev. 0 and Rev. A)
0x00000008	SN_CELLSYSTEMCONNECTED_EDGE_BITMASK	GSM / EDGE
0x00000010	SN_CELLSYSTEMCONNECTED_UMTS_BITMASK	UMTS
0x00000040	SN_CELLSYSTEMCONNECTED_HSDPA_BITMASK	UMTS / HSDPA (including HSPA)
0x80000000	SN_CELLSYSTEMCONNECTED_CSD_BITMASK	circuit-switched data call (CSD)—not supported by Windows CE

20.2.5 Voice Call Status

See also Voice Call Status on page 232.

The caller names in the following table are not available if their corresponding phone numbers are known, but these numbers are not found in any phonebook or on the contacts list (for Windows Mobile).

If the phone number is unknown, then the name is set to the localized string **Unknown**.

If the phone number has been withheld by the calling party, then the name is set to the localized string **Private**.

HKEY_LOCAL_MACHINE\System\State\Phone

Value Name	Value Type	Description
Active Call Count	REG_DWORD	Current number of phone calls (regardless of their state).
Incoming Caller Number	REG_SZ	Phone number of the current incoming, or waiting, call. This value remains available when the incoming, or waiting, call becomes an active, or held, call. A waiting call overwrites the previous incoming call. This value is deleted when the call is terminated.

Value Name	Value Type	Description
Incoming Caller Name	REG_SZ	Caller name of the current incoming, or waiting, call. This value remains available when the incoming, or waiting, call becomes an active, or held, call. A waiting call overwrites the previous incoming call. This value is deleted when the call is terminated.
Last Incoming Caller Number	REG_SZ	Phone number of the most recent incoming, or waiting, call. This value remains available even after the call is terminated. A waiting call overwrites the previous incoming call.
Last Incoming Caller Name	REG_SZ	Caller name of the most recent incoming, or waiting, call. This value remains available even after the call is terminated. A waiting call overwrites the previous incoming call.
Caller Number	REG_SZ	Phone number of the currently dialing, or active, call. This value is deleted when the active call becomes a conference call, or when the call is terminated.
Caller Name	REG_SZ	Caller name of the currently dialing or active call. This value is deleted when the call is terminated. When the active call becomes a conference call, this value is set to the localized string **Conference**.

20.3 Phone State Registry Settings in Alphabetical Order

HKEY_LOCAL_MACHINE\System\State\Phone

Value Name	Value Type	Description
Active Call Count	REG_DWORD	Current number of phone calls.
Caller Name	REG_SZ	Caller name of the currently dialing, or active, call.
Caller Number	REG_SZ	Phone number of the currently dialing, or active, call.
Cellular System Available	REG_DWORD	Bitmask that indicates the packet data service to which the WWAN modem is attached. For details see Packet Data Status on page 232.
Cellular System Connected	REG_DWORD	Bitmask that indicates the data service to which the WWAN modem is currently connected. For details see Packet Data Status on page 232.
Current Operator Name	REG_SZ	Name of the current mobile network.
Incoming Caller Name	REG_SZ	Caller name of the current incoming, or waiting, call.
Incoming Caller Number	REG_SZ	Phone number of the current incoming, or waiting, call.
Last Incoming Caller Name	REG_SZ	Caller name of the most recent incoming, or waiting, call.
Last Incoming Caller Number	REG_SZ	Phone number of the most recent incoming, or waiting, call.
Service Provider Name	REG_SZ	Name of the home network.
Signal Strength Raw	REG_DWORD	Signal strength.
Status	REG_DWORD	General status.

20.4 System Properties Registry Settings

The values described in this section are only available on Psion devices. Windows Mobile 6 Professional does not support these values.

HKEY_LOCAL_MACHINE\SOFTWARE\PsionTeklogix\SystemProperties\Hardware\WWAN\WWAN ESN

Value Name	Value Type	Description
Value	REG_SZ	The Electronic Serial Number (ESN) for CDMA modems in hexadecimal format. The ESN uniquely identifies the CDMA WWAN modem (it is a hardware serial number).

HKEY_LOCAL_MACHINE\SOFTWARE\PsionTeklogix\SystemProperties\Hardware\WWAN\WWAN Firmware

Value Name	Value Type	Description
Value	REG_SZ	The firmware revision of the WWAN modem.

HKEY_LOCAL_MACHINE\SOFTWARE\PsionTeklogix\SystemProperties\Hardware\WWAN\WWAN IMEI

Value Name	Value Type	Description
Value	REG_SZ	The International Mobile Equipment Identity (IMEI) for GSM and UMTS modems in decimal format. The IMEI uniquely identifies the GSM / UMTS WWAN modem (it is a hardware serial number).

HKEY_LOCAL_MACHINE\SOFTWARE\PsionTeklogix\SystemProperties\Hardware\WWAN\WWAN IMSI

Value Name	Value Type	Description
Value	REG_SZ	The International Mobile Subscriber Identity (IMSI) in decimal format. The IMSI uniquely identifies the mobile subscriber.

HKEY_LOCAL_MACHINE\SOFTWARE\PsionTeklogix\SystemProperties\Hardware\WWAN\WWAN SIM ID

Value Name	Value Type	Description
Value	REG_SZ	The SIM card identifier in decimal format. The SIM ID uniquely identifies a particular SIM card. The SIM ID is also called ICCID (Integrated Circuit Card IDentifier).

20.5 Sample Source Code

As well as reading the registry values, your application can execute a function when a registry value changes. The following C++ sample source code works for both Windows Mobile and Windows CE. Windows Mobile has a better selection of APIs than Windows CE. For details on these APIs see the State and Broker documentation on MSDN. These APIs are not supported by Windows CE 6.0 R3. The following code looks for changes of **Status**:

```
DWORD ThreadProc(LPVOID lpParam)
{
    HKEY    key;
    HANDLE  regEvent;
    DWORD   previousStatus = 0;

    if (RegCreateKeyEx(HKEY_LOCAL_MACHINE, L"System\\State\\Phone", 0, 0, 0, 0, 0, &key, 0)
        != ERROR_SUCCESS)
    {
        // can't create key
        return 1;
    }
    regEvent = CeFindFirstRegChange(key, FALSE, REG_NOTIFY_CHANGE_LAST_SET);
    if (regEvent == INVALID_HANDLE_VALUE)
    {
        // can't set up notification
        RegCloseKey(key);
        return 1;
    }
    while (true)
    {
        DWORD   status, type, size;

        if (WaitForSingleObject(regEvent, INFINITE) != WAIT_OBJECT_0)
        {
            // wait failed
            break;
        }
        size = sizeof(status);
        if (RegQueryValueEx(key, L"Status", 0, &type, (LPBYTE)&status, &size) ==
            ERROR_SUCCESS)
        {
            // the registry change event is triggered if any value under
            // HKEY_LOCAL_MACHINE\System\State\Phone has changed - verify if the Status
            // value is different
            if (status != previousStatus)
            {
                previousStatus = status;
                // yes, Status has changed - this is the place to do "stuff" with it
            }
        }
        CeFindNextRegChange(regEvent);
    }
    CeFindCloseRegChange(regEvent);
    RegCloseKey(key);
    return 0;
}
```

The following more complicated sample shows how to process all changes to values below a selected registry key. This sample is based on a blog post[1]. The Microsoft documentation of **CeFindFirstRegChange()** is incomplete, while the documentation of **CeRegGetNotificationInfo()** is inaccurate.

[1] geekswithblogs.net/BruceEitman/archive/2009/08/25/windows-ce-cereggetnotificationinfo-works-sort-of-part-3.aspx

```
DWORD ThreadProc(LPVOID lpParam)
{
    HKEY    key;
    HANDLE  regEvent;

    if (RegCreateKeyEx(HKEY_LOCAL_MACHINE, L"System\\State\\Phone", 0, 0, 0, 0, 0, &key, 0)
        != ERROR_SUCCESS)
    {
        // can't create key
        return 1;
    }
    regEvent = CeFindFirstRegChange(key, FALSE, FILE_NOTIFY_CHANGE_CEGETINFO |
                                                      REG_NOTIFY_CHANGE_LAST_SET);
    if (regEvent == INVALID_HANDLE_VALUE)
    {
        // can't set up notification
        RegCloseKey(key);
        return 1;
    }
    while (true)
    {
        DWORD   bytesAvailable, bytesReturned;
        BYTE *  infoBuf = 0;
        BYTE *  infoBufPtr;
        REG_NOTIFY_INFORMATION const *    regNotify;

        if (WaitForSingleObject(regEvent, INFINITE) != WAIT_OBJECT_0)
        {
            // wait failed
            break;
        }
        if (CeRegGetNotificationInfo(regEvent, 0, 0, 0, &bytesReturned, &bytesAvailable) !=
            ERROR_SUCCESS)
        {
            // no notification info size
            continue;
        }
        if (bytesAvailable == 0)
        {
            // notification info size: 0
            continue;
        }
        infoBuf = new BYTE[bytesAvailable];
        memset(infoBuf, 0, bytesAvailable);
        if (CeRegGetNotificationInfo(regEvent, 0, infoBuf, bytesAvailable, &bytesReturned,
                                     &bytesAvailable) != ERROR_SUCCESS)
        {
            // no notification info buffer
            delete[] infoBuf;
            infoBuf = 0;
            continue;
        }
        infoBufPtr = infoBuf;
        do
        {
            WCHAR   valueName[MAX_PATH];

            regNotify = reinterpret_cast(infoBufPtr);
            if (regNotify->RegNameLength == 0)
            {
                // value name length: 0
                break;
            }
            if (bytesReturned < regNotify->RegNameLength + sizeof(REG_NOTIFY_INFORMATION) -
sizeof(WCHAR))
            {
                // not enough data left
                break;
            }
            memcpy(valueName,
                   regNotify->RegName,
                   regNotify->RegNameLength);
            valueName[regNotify->RegNameLength / sizeof(WCHAR)] = L'\0';
            if (regNotify->Action == FILE_ACTION_REMOVED)
            {
                // Handle the removal of valueName here
            }
            else if (regNotify->Action == FILE_ACTION_ADDED  ||
                     regNotify->Action == FILE_ACTION_MODIFIED)
            {
                DWORD   type, size;

                if (RegQueryValueEx(key, valueName, 0, 0, 0, &size) == ERROR_SUCCESS)
                {
                    if (size > 0)
                    {
                        BYTE *  valueBuf = new BYTE[size];

                        if (RegQueryValueEx(key, valueName, 0, &type, valueBuf, &size) ==
                            ERROR_SUCCESS)
                        {
                            switch (type)
                            {
                            case REG_SZ:
                                // the string in valueName has been changed to valueBuf
                                break;
                            case REG_DWORD:
                                // the DWORD in valueName has been changed to
                                // *((DWORD *)valueBuf)
                                break;
                            default:
                                // handle other value types here
                                break;
                            }
                        }
                        delete[] valueBuf;
                    }
                }
            }
            else
            {
                // Unknown action
            }

            infoBufPtr += regNotify->NextEntryOffset;
            bytesReturned -= regNotify->NextEntryOffset;
        }
        while(regNotify->NextEntryOffset != 0);
        delete[] infoBuf;
        infoBuf = 0;
        CeFindNextRegChange(regEvent);
    }
    CeFindCloseRegChange(regEvent);
    RegCloseKey(key);
    return 0;
}
```

21 GPS

21.1 Support for GPS on Psion Computers

21.1.1 Built-in GPS

Computer	Availability	Chip Type	Baud Rate
Ikôn (7505) (Windows CE 5.0, Windows Mobile 6)	All	SiRF starIII	9600
Omnii XT10 (7545XV) (Windows Embedded CE 6.0)	Optional	SiRF III	4800
Omnii XT15 (7545XA) (Windows Embedded CE 6.0, Windows Embedded Hand-Held 6.5)	Optional	SiRF III	4800
Omnii RT15 (7545XC) (Windows Embedded CE 6.0, Windows Embedded Hand-Held 6.5)	Optional	SiRF III	4800
EP10 (7515) (Windows Embedded Hand-Held 6.5)	All	SiRF starIV	4800

21.1.2 End-cap GPS

The following GPS are available from Psion as end-caps:

Computer	GPS unit	CAB file	Chip Type	Data Port
Workabout Pro	uBlox	UBLOX_COM5.cab	Antaris 4	Serial: COM3: USB: COM5[1]
Workabout Pro G2	uBlox	UBLOX_COM5.cab	Antaris 4	
Workabout Pro 3	uBlox	UBLOX_COM5.cab	Antaris 4	

Note 1: For other options see the installation instructions on Ingenuity Working at community.psion.com/cfs-file.ashx/__key/CommunityServer.Discussions.Components

21.1.3 External GPS

You can use external GPS units with Psion computers. You can use any device that communicates with the Psion computer through a serial port, a card slot, or over *Bluetooth*. In these cases, you must also provide software that configures the GPS, communicates with the GPS and processes the data from the GPS.

21.2 Mobile Devices SDK Support for GPS

The Mobile Devices SDK provides APIs that support the built-in GPS units.

The Mobile Devices SDK does not get GPS data, nor does it interpret it.

GpsHelperI Class

This class supports the GPS hardware as follows:

- Control and configure the GPS receiver.
- Power-on and power-off the GPS receiver.
- Enable and disable GPS reception.
- Select the GPS profile.
- Select the suspend mode for the GPS.

The options available through the Mobile Devices SDK, on a specific computer, are the same as those available through the GUI applet on the computer. See the user manual for your computer for descriptions of the options.

AGpsHelperI Class

This class supports AGPS (Assisted Global Positioning System). AGPS reduces Time To First Fix (TTFF) and increases the likelihood of finding and keeping a fix in poor coverage areas. An overview of this feature is available in the user manual for your computer. For more detailed information on implementing and using AGPS on Psion computers see Ingenuity Working.

21.3 GPS Configuration

For an overview of GPS configuration, see the following on Ingenuity Working community.psion.com/knowledge/w/knowledgebase/689.ikon-gps-settings.aspx.

This process applies to all Psion GPS units, not just that on the Ikôn.

For guidance on selecting a GPS profile see community.psion.com/knowledge/w/knowledgebase/configuring-the-correct-gps-profile.aspx and community.psion.com/knowledge/w/knowledgebase/ik-244-n-gps-automobile-profile-scenarios.aspx

21.4 Processing GPS Data

After the GPS hardware is configured:

1. Open the PGS program port.
   This is a virtual COM port that can be selected through the GPS applet on the GUI.

***Important:** Do not open the GPS hardware port. If your application opens the hardware port, the port cannot be shared with other applications.*

2. Read the NMEA data from the GPS program port.
3. Parse the NMEA data.

Parsing GPS data

You have the following options:

- Parse the raw data in your application. See www.gpsinformation.org/dale/nmea.htm
- For Windows CE 6-based, and Windows Mobile 6-based, systems you can use Microsoft GPS Intermediate Driver. For information see msdn.microsoft.com/en-us/library/bb158708.aspx

21.5 Getting Started with GPS

For articles on Ingenuity Working that will guide you in getting started with the GPS feature see the following:

community.psion.com/tags/gps/noteDG

21.6 Code Samples for GPS

For postings on Ingenuity Working that contain code samples that use the GPS feature see:

community.psion.com/tags/gps/codeDG

21.7 GPS API Elements

C++: GPS hardware on all computers with built-in GPS is controlled, and configured, using the **PsionTeklogix::GPS** namespace.

.NET: GPS on all computers with built-in GPS is controlled, and configured, using the **PsionTeklogix.GPS** namespace.

Reading and parsing NMEA (National Marine Electronics Association) data: Microsoft GPS Intermediate Driver. For details see MSDN at msdn.microsoft.com/en-us/library/bb202086.aspx.

22 SENSORS

22.1 Introduction

The following sensors are available on Psion computers:

- Accelerometer
- Gyroscope
- Digital Compass
- Light sensor
- Proximity Sensor

The Mobile Devices SDK includes APIs for reading data from these sensors, but not for configuring them. They also cannot be configured through the GUI.

22.2 Accelerometer

A accelerometer measures linear acceleration.

The following Psion computers have an accelerometer that measures acceleration on three linear axes:

- Omnii XT15 (7545XA)
- Omnii RT15 (7545XC)
- EP10 (7515)

Default sensitivity

This is set to ±8 G

Default sampling rate

This is set to ~50 Hz

Mobile Devices SDK

The Mobile Devices SDK provides APIs that enable an application to make a single reading of the accelerometer output, or to register a callback for repeated readings.

22.2.1 Getting Started with the Accelerometer

For articles on Ingenuity Working that will guide you in getting started with the accelerometer see the following:

community.psion.com/tags/accelerometer/noteDG

22.2.2 Code Samples for the Accelerometer

For postings on Ingenuity Working that contain code samples that use the accelerometer see:

community.psion.com/tags/accelerometer/codeDG

22.2.3 Accelerometer API Elements

C: Accelerometer hardware on all computers with an accelerometer is read, using the **Accelerometer** group.

.NET: Accelerometer hardware on all computers with an accelerometer is read, using the **PsionTeklogix.Sensors.Accelerometer** class.

22.3 Gyroscope

A gyroscope is a device for measuring orientation. It measures angular velocity.

The following Psion computers have a gyroscope that measures angular acceleration on three axes:

- EP10 (7515)

Range

The maximum range is set to 250 degrees per second

Default sensitivity

At 250 degrees per second this is ±9 milli-degrees per second

Default sampling rate

This is set to 100 Hz. The GUI applet samples at ~50 Hz.

Mobile Devices SDK

The Mobile Devices SDK provides APIs that enable an application to make a single reading of the gyroscope output, or to register a callback for repeated readings.

22.3.1 Getting Started with the Gyroscope

For articles on Ingenuity Working that will guide you in getting started with the gyroscope see the following:

community.psion.com/tags/gyro/noteDG

22.3.2 Code Samples for the Gyroscope

For postings on Ingenuity Working that contain code samples that use the gyroscope see:

community.psion.com/tags/gyro/codeDG

22.3.3 Gyroscope API Elements

C: Gyroscope hardware on all computers with a gyroscope is read, using the **Gyroscope** group.

.NET: Gyroscope hardware on all computers with an accelerometer is read, using the **PsionTeklogix.Sensors.Gyroscope** class.

22.4 Digital Compass (Magnetometer)

A magnetometer is a device for measuring the strength of the ambient magnetic field. The most common use is as a compass.

The following Psion computers have an magnetometer that measures on three axes (heading, pitch and roll):

- EP10 (7515)

Note: Magnetometer readings should not be taken while the built-in laser scanner is in use. The laser scanner generates a strong local magnetic field.

Default sensitivity

This is set to ±4 gauss

Default sampling rate

This is set to ~15 Hz

Mobile Devices SDK

The Mobile Devices SDK provides APIs that enable an application to make a single reading of the magnetometer output, or to register a callback for repeated readings.

Recalibration

DeviceOrientationCalibrate launches the calibration process through the GUI. Calibration must be done manually by the device operator.

22.4.1 Getting Started with the Magnetometer

For articles on Ingenuity Working that will guide you in getting started with the magnetometer see the following:

community.psion.com/tags/compass/noteDG

22.4.2 Code Samples for the Magnetometer

For postings on Ingenuity Working that contain code samples that use the magnetometer see:

community.psion.com/tags/compass/codeDG

22.4.3 Magnetometer API Elements

C: Magnetometer hardware on all computers with an magnetometer is read, using the **DeviceOrientation** group.

.NET: Magnetometer hardware on all computers with an accelerometer is read, using the **PsionTeklogix.Sensors.DeviceOrientation** class.

22.5 Light Sensor

The light sensor measures the intensity of the light falling on the face of a Psion computer.

The following Psion computers have a light sensor:

- EP10 (7515)

Default sampling rate

This is set to ~10 Hz.

Mobile Devices SDK

The Mobile Devices SDK provides APIs that enable an application to make a single reading of the light sensor output, or to register a callback for repeated readings.

The Mobile Devices SDK provides APIs that enable an application to control the keyboard backlight and the display backlight based on the output of the light sensor.

22.5.1 Getting Started with the Light Sensor

For articles on Ingenuity Working that will guide you in getting started with the light sensor see the following:

community.psion.com/tags/light sensor/noteDG

22.5.2 Code Samples for the Light Sensor

For postings on Ingenuity Working that contain code samples that use the light sensor see:

community.psion.com/tags/light sensor/codeDG

22.5.3 Light Sensor API Elements

C: Light sensor hardware on all computers with a light sensor is read, using the **AmbientLight** group.

C: The keyboard backlight and the display backlight on all computers with a light sensor is controlled using the **Backlight** group.

.NET: Light sensor hardware on all computers with an accelerometer is read, using the **PsionTeklogix.Sensors.LightSensor** class.

.NET: The keyboard backlight and the display backlight on all computers with a light sensor is controlled using the **PsionTeklogix.Backlight.BacklightSettings** class.

22.6 Proximity Sensor

The proximity sensor detects an object that is close to the face of the Psion computer.

The following Psion computers have an proximity sensor:

- EP10 (7515)

Default sampling rate

This is set to ~10 Hz.

Automatic locking and unlocking

Psion computers that have a proximity sensor have the ability to automatically lock, and unlock, features as follows:

- Lock the display during a phone call, and unblock it at the end of the call.
- Suspend the device when it is placed face-down on a surface for more than 3 seconds.
- Lock the touchscreen and the keyboard when the device is placed on a holster or a pocket.
- Lock the device when resuming from suspend.

Mobile Devices SDK

The Mobile Devices SDK provides APIs that enable an application to make a single reading of the proximity sensor output, or to register a callback for repeated readings.

The Mobile Devices SDK provides APIs that control the auto-lock feature based on the output of the proximity sensor.

Interaction between the SDK settings and the GUI settings for the proximity sensor

For an overview of this see
community.psion.com/downloads/developer_sdkhdk/m/mobile_devices_sdk/32745.aspx

22.6.1 Getting Started with the Proximity Sensor

For articles on Ingenuity Working that will guide you in getting started with the proximity sensor see the following:

community.psion.com/tags/proximity/noteDG

22.6.2 Code Samples for the Proximity Sensor

For postings on Ingenuity Working that contain code samples that use the proximity sensor see:

community.psion.com/tags/proximity/codeDG

22.6.3 Proximity Sensor API Elements

C: Proximity sensor hardware on all computers with a proximity sensor is read, using the **Proximity** group.

.NET: Proximity sensor hardware on all computers with an accelerometer is read, using the **PsionTeklogix.Sensors.ProximitySensor** class.

23 OTHER FEATURES

23.1 Vibration

Some Psion computers can be made to vibrate. The vibration feature is available as follows:

Computer	Vibration
7530	No
7535	No
8515	No
8525	No
8530	No
Ikôn (7505)	Yes
NEO (PX750)	No
Workabout Pro (7525)	No
Workabout Pro G2 (7527)	Yes
Workabout Pro 3 (7527)	Yes
Omnii XT10 (7545XV)	Yes
Omnii XT15 (7545XA)	Yes
Omnii RT15 (7545XC)	Yes
EP10 (7515)	Yes

23.1.1 Getting Started

For articles on Ingenuity Working that will guide you in getting started with the vibration feature see:
community.psion.com/tags/vibration/noteDG

23.1.2 Code Samples

For postings on Ingenuity Working that contain code samples that use the vibration feature see:
community.psion.com/tags/vibration/codeDG

23.1.3 Vibration API Elements

C++: Vibration is controlled using the Microsoft Win32 APIs, or any other standard C++ vibration APIs.

Java: Vibration is controlled using any standard Java vibration package.

.NET: Vibration is controlled using any standard .NET vibration APIs.

23.2 Disabling Modules and Components on the EP10

The EP10 computer has the ability to disable specific modules or components at the BooSt level. This ensures that features which are not intended to be used can be securely turned off. For information see community.psion.com/tags/boost EP10/noteDG

23.3 PsionVU

PsionVU allows the administrator to tailor how the Psion computer operates and the options the user can access. Note that the look of the **Today** screen will change from icons that are finger accessible to a list of items that is best accessed using a stylus.

23.3.1 Availability of PsionVU

PsionVU is available on the following computers:

- Omnii XT10
- Omnii XT15
- Omnii RT15
- EP10

23.3.2 Downloading PsionVU Settings with Total Recall

If you configured PsionVU on a device that you use to create a Total Recall profile, the PsionVU settings are included in the profile. On Total Recall 5.0 and later, PsionVU is automatically changed from administrator mode to user mode before the profile is restored. This Total Recall profile can be uploaded to A.R.C. for distribution to other devices in the same way as any other Total Recall profile.

23.3.3 Downloading only PsionVU Settings

If you only want to propagate the PsionVU settings to other devices, this is what you do:

1. Configure PsionVU on the master device.
2. Export the PsionVU configuration as an XML file.

   When the PsionVU configuration is later imported on another device, it is always imported in *user mode*.
3. Upload the PsionVU configuration file to the desktop computer containing the A.R.C. Server.
4. Upload the PsionVU Command Line Utility executable to the desktop computer containing the A.R.C. Server.

   The PsionVU Command Line Utility executable is available on Ingenuity Working at community.psion.com/support/f/17/p/441 9/17969.aspx#17969.
5. Build a sequence of A.R.C. tasks as follows:
   i. Download the PsionVu configuration file using a **Generic File Deployment** task.
   ii. Download the PsionVu Command Line Utility executable file using a **Generic File Deployment** task.
   iii. Run the PsionVu Command Line Utility using a **File and Folder Activities** task.

   You must set the runtime parameters as part of this task.

A APPENDIX: RESOURCES

A.1 Manuals and URLs

Psion USB Setup Utility

Ingenuity Working:
community.psion.com/downloads/firmwaresoftware__demos/m/software_downloads/15905.aspx

Microsoft Windows CE & Windows Mobile

Microsoft Inc.:
http://msdn.microsoft.com/en-us/library/ms376734.aspx

Psion SDKs

Psion. 2010. Psion Imaging Services SDK Developers Guide
(Part number 8100153)

Psion. 2009. Psion Mobile Devices SDK Developers Guide
(Part number 8100016)

Psion HDKs

Psion. 2010. Psion Omnii HDK User Manual
(Part number 8100210)

Omnii HDK User Manual

Psion. 2009. Psion EP10 Hand-Held Computer HDK User Manual
(Part number 8000255)

EP10 Hand-Held Computer HDK User Manual

7535 Hand-held Computer

Psion. 2007. Psion 7535G2 Hand-Held Computer User Manual
(Part number 8100075)

7530 Hand-held Computer

Psion. 2006. 7530G2 Hand-Held Computer User Manual
(Part number 8100081)

8515 Vehicle-mount Computer

Psion. 2007. Psion Teklogix 8515 Vehicle-Mount Computer User Manual
(Part number 8100132)

8525/8530 Vehicle-mount Computer

Psion. 2007. Psion Teklogix 8525/8530 G2 Vehicle-Mount Computer User Manual
(Part number 8100083)

Ikôn Hand-held Rugged PDA

Psion. 2009. Ikôn Rugged PDA (Windows CE 5.0) User Manual
(Part number 8100147)

Psion. 2009. Ikôn Rugged PDA (Windows Mobile 6.0) User Manual
(Part number 8100149)

Psion. 2009. Ikôn Rugged PDA (Windows Mobile 6.1) User Manual
(Part number 8100181)

NEO Hand-held Computer

Psion. 2008. NEO Hand-Held Computer User Manual
(Part number 8100157)

Workabout Pro G2

Psion. 2007. Workabout Pro Hardware Development Kit User Manual (Part number 8100057)

Psion. 2007. Workabout Pro G2 Windows Embedded CE 5.0 User Manual
(Part number 8100140).

Psion. 2007. Workabout Pro G2 Windows Mobile 6 User Manual
(Part number 8100144).

Psion. 2009. Workabout Pro G2 Windows Mobile 6.1 User Manual
(Part number 8100182).

Omnii Hand-Held Computer

Psion. 2010. Omnii XT10 Hand-Held Computer User Manual
(Part number 8100190)

Psion. 2011. Omnii Hand-Held Computer User Manual (Windows Embedded Hand-Held 6.5)
(Part number 8000225)

EP10 Hand-Held Computer

Psion. 2011. NEO Hand-Held Computer User Manual
(Part number 8000227)

Development Environment / Compilers

Microsoft Visual Studio 2005/2008

http://msdn.microsoft.com/en-us/vstudio/default.aspx

Java Utilities

J2SDK:
http://java.sun.com/products/archive/

IBM J9 JVM (WebSphere Everyplace Micro Environment):
http://www-01.ibm.com/software/wireless/weme/.

Scanners

Symbol Technologies Inc. MiniScan scanner manuals: www.symbol.com/serv-
ices/manuals/scanner/miniscan.html

PSC Inc. (PowerScan scanners): http://www.psc.com

Symbol Decoded Scanner Configuration Codes

http://support.symbol.com/support/search.do?cmd=displayKC&docType=kc&externalId=6713406apdf&slic
eId=&dialogID=209350046&stateId=1 0 209340738

BSQARE JEM-CE JVM

Psion. 2005. BSQUARE JEM-CE Java Virtual Machine For Psion Teklogix Computers (Part number
8100054).

Windows CE programming

Microsoft. Programming Microsoft Windows CE .NET. Douglas Boling.

Wireless Wide-area Networking

European Telecommunications Standards Institute (ETSI): Digital cellular telecommunications system
(Phase 2+); Universal Mobile Telecommunications System (UMTS); Alphabets and language-specific infor-
mation (3GPP TS 23.038 version 6.1.0 Release 6).

European Telecommunications Standards Institute (ETSI): Digital cellular telecommunications system
(Phase 2+); Universal Mobile Telecommunications System (UMTS); Technical realization of Short Message
Service (SMS) (3GPP TS 23.040 version 6.5.0 Release 6).

European Telecommunications Standards Institute (ETSI): Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); AT command set for 3G User Equipment (UE), 3GPP TS 27.007 version 5.4.0 Release 5, ETSI, 09/2003; Available at http://webapp.etsi.org/key/queryform.asp.

ETSI reports are available at http://www.etsi.org.

Summit Radios

Summit Data Communications Inc. Summit User's Guide; Available at: http://www.summitdatacom.com/documentation.htm.

Help File Registration

The Helpware Group. H2Reg available at: http://helpware.net http://www.summitdatacom.com/documentation.htm.

B APPENDIX: REGISTRY KEYS

B.1 Workabout Pro Registry Keys

B.1.1 Registry Settings For Controlling VGA

The Workabout Pro VGA settings are located in the following registry subkey:

HKEY_LOCAL_MACHINE\Drivers\Display\NVDDI

Registry Values

QVGA mode (REG_DWORD)

00 = VGA

non-zero = QVGA

Note: This value is only available for the Workabout Pro G2.

B.1.2 Registry Settings For Controlling Scanner Power

This registry key is in effect as long as there is no scanner or imager configured. It applies to the following:

- Workabout Pro–5 volt scanner only.
- Workabout Pro G2–3.3 volt, and 5 volt, scanners.

The scanner power settings are located in the following registry subkey:

HKEY_LOCAL_MACHINE\Drivers\PsionTeklogix\Scanner

Registry Values

QVGA mode (REG_DWORD)

00 = no effect (default)

non-zero = scanner power is always on while the computer is powered up.

Note: This value is only available for the Workabout Pro G2.

B.1.3 Registry Settings For Serial Ports

The Workabout Pro serial settings are located in the following registry subkey:

HKEY_LOCAL_MACHINE\Drivers\PsionTeklogix\Serial

Note: These setting are specific to the platform and should be modified with care.

Registry Values

HardwareFlowBaud (REG_DWORD)

Setting this value enables hardware RTS/CTS on the FFUART of the Workabout Pro G2.

non-zero = the minimum baud rate where hardware flow control is enabled. The maximum rate is 921.6 k baud.

00 = enable all baud rates.

Note: This value is only available for the Workabout Pro G2.

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Setting this value moves the COM port to a different location.

B.1.4 Registry Settings For Psion Device Drivers

The Workabout Pro device driver settings are located in the following registry subkey:

HKEY_LOCAL_MACHINE\Drivers\PsionTeklogix\Expansion Slot

Registry Values

FFUART (REG_DWORD)

Setting this value enables hardware RTS/STS on the FFUART of the Workabout Pro G2. If the key is absent, the FFUART COM1: port is not enabled.

1 = enables the full-function UART (FFUART) using the standard serial driver as COM1:.

0 = the FFUART COM1: port will not be enabled. (Default)

PCMCIA (REG_DWORD)

1 = enables the PCMCIA socket on the 100-pin connector—socket 1. The PCMCIA pins become unavailable for other uses. The pins defined for this slot have predefined meanings and must be adhered to in the hardware design.

0 = the PCMCIA socket is not be enabled. (Default)

USB (REG_DWORD)

1 = enables the USB hub and the 100-pin connector USB power control.

0 = neither the USB hub nor the USB power control signal will be enabled for the100-pin connector. (Default)

Note: If the USB value is absent or has a value of 0, the expansion module USB power control can still be controlled by the HDK API library.

B.1.5 Registry Settings For Non-Psion Device Drivers

All non-Psion device drivers must have a registry entry. These device driver entries are formatted as follows:

HKEY_LOCAL_MACHINE\Drivers\PsionTeklogix\Expansion Slot\*EEPROM*

Where: *EEPROM* is the name of the device driver. This is the contents of the **Manufacturer/Model** field in the expansion module EEPROM. For details see the *Workabout Pro HDK Developers Manual*.

B.1.5.1 Loading Non-Psion Drivers

At system startup the following process is used to load non-Psion device drivers:

1. The contents of the **Manufacturer/Model** field in the expansion module EEPROM are appended to the registry key
   HKEY_LOCAL_MACHINE\Drivers\PsionTeklogix\Expansion Slot\
   For example, if the **Manufacture/Model** field contains:
   ACME gizmo
   then the following driver is loaded:
   HKEY_LOCAL_MACHINE\Drivers\PsionTeklogix\Expansion Slot\ACME gizmo
2. The **DriverActivate()** function uses this registry key to activate the driver.

No driver is loaded if:

- The **Manufacturer/Model** field is not valid, or it is empty.
- The derived registry key does not exist.

Note: If multiple device drivers are required for the same device, subkeys are defined. Only the first driver is automatically activated. The application must load and activate all additional device drivers.

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