White Paper

P900/P908

Sony Ericsson

Preface

The P900/P908 White Paper is designed to give the reader a deeper understanding of the features and applications of the P900 and P908.

In this document the term 'P900' is used to denote all models when describing general features and functions common for all versions.

When describing differences between non-Chinese and Chinese language models, the term 'standard P900' denotes all non-Chinese versions, and the term 'Chinese versions' denotes P908 and all other Chinese language models or versions of the P900.

The differences and additional features of the Chinese language models are described in more detail in the section 'Chinese Models in Detail' starting on page 100.

The paper has four main sections:

Please note that features, specification and User Interface (UI) design are subject to change.

Content

P900/P908 Overview

Key Features

- Large TFT touchscreen with 65K colours
- 5-way Jog Dial for rapid selection of many of the functions
- Office Handsfree (speaker phone) function
- Voice dial, voice answer, and 'magic word' activation
- Integrated Digital Camera for still pictures and video clip recording
- Video and audio players (including an MP3 Music Player)
- Multimedia Messaging (MMS), SMS, EMS and E-Mail
- Combined Web and WAP browser
- High speed data communications using GPRS
- Memory Stick$^®$ Duo™ Slot for up to 128 MB removable memory
- Personal Organizer with Contacts, Calendar, Tasks, Jotter for notes and sketches, Sound recorder and Calculator
- Document viewers for E-mail attachments and downloaded files
- Games with widescreen and sound capabilities
- Built-in stylus for touchscreen operation
- Support for TTY devices
- Bluetooth™, Infrared, and USB connectivity
- PC and remote synchronisation (SyncML)
- Easy personalization of appearance and tones using Themes
- M-Services & MeT (Mobile electronic Transactions)
- Corporate Telephony
- Flight mode
- Tri-band communication giving international operation
- Symbian OS 7.0 Platform: C++ and Java™ SDKs

P900 Versions

Standard Version

- Europe, Middle East, Americas, Latin Asia
- Latin characters (a, b, c…) on the flip
- Flip closed input by Multitap or T9™
- Latin character handwriting recognition

Chinese Language Versions

- Mainland China: P908
- Hong Kong, Taiwan and Singapore: P900
- Chinese Flips and T9 input method
- Chinese handwriting recognition
- Chinese dictionary
- Lunar calendar

P900 Controls and Operation

The P900 has a large touchscreen and a flip. This provides fast and convenient one-handed operation with the flip closed plus large touchscreen sophistication with the flip open.

Screen visible with the flip closed is 208 x 208 pixel

CommuniCorder key – single press access to the camera application

Browser key – single press access to the browser application

Flip

Memory Stick Duo slot (under cover)

Stylus – inserts into the body of the phone

External aerial connector (under protective cap)

Camera lens

Loudspeaker grille

Mirror for taking self-portrait

Battery cover

Stereo headset socket with cover

UP

BACKWARD   FORWARD

5-way Jog Dial   DOWN   SELECT (inwards press)

Infrared 'eye'

On/Off switch

Accessory Connector

Charger Connector

Flip Closed (FC mode)

With the flip closed, known as 'flip closed' or FC mode, the P900 can be used like a conventional mobile telephone with the added benefit of Jog Dial.

Flip Closed Views

Rotating the Jog Dial up or down takes the user through a menu of the most important applications. Pressing the Jog Dial inward or pressing the OK key will select the application, for example the Calendar.

The standby screen may be personalized with still or animated photographs. The user may also personalize the FO Application launcher background.

Pressing the Menu key brings up a set of options relevant for the active application. The Jog Dial may be used to select an operation, or the corresponding key on the flip may be pressed as a shortcut.

During a phone call, the user has access to most applications, making it possible to look up appointments, contacts, etc whilst talking on the phone.

The P900 enables Latin characters to be entered via the keys on the flip. Characters are selected by pressing the key until the required one is shown (multitap) or, if set, by using predictive text. The P908 and other Chinese language versions of the P900 supports Chinese character input using Stroke, Pinyin and Bopomofo. Refer to 'Chinese Models in Detail' on page 100 for more details.

Flip Open (FO mode)

When the flip is opened, the large touchscreen is revealed. In 'flip open' mode, the stylus may be used to navigate and enter data. The Jog Dial provides further navigation and selection capability. The User Interface is Symbian's established UIQ design, adapted for the narrower 208-pixel screen.

The stylus is used to operate the touchscreen and enter text – the stylus is stored in a slot at the top of the phone.

The illustration on the left shows the large 208 x 320 pixel colour touchscreen.
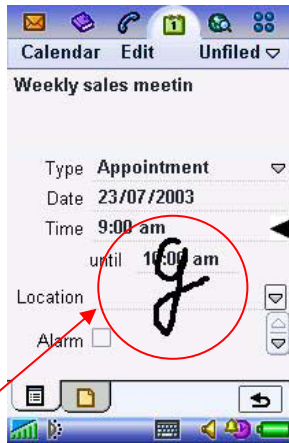
Text may be entered using natural handwriting over the whole screen. Lower case letters are entered below the ◀ symbol, uppercase in line with it and numbers above it.
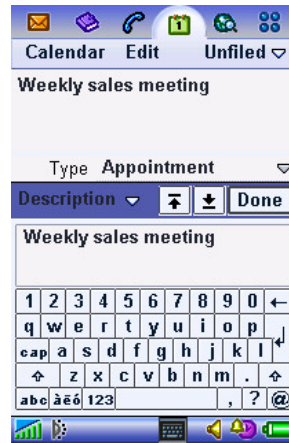
An on-screen keyboard is also available when required by tapping on the keyboard icon in the status bar. Symbol and special character keyboards may be selected when required. Cut, Copy and Paste functions are also available here.

In FO mode, the Chinese versions offers Stroke, Pinyin and Bopomofo input methods plus Chinese character recognition. Numeric and English characters can also be entered using the character recognition.

Flip Removal

The flip may be removed for operation without the key panel. In this case, the phone operates in flip open mode only, with the addition of an optional virtual flip.

User Interface Outline

P900 applications generally follow the style guidelines established for Symbian UIQ applications.
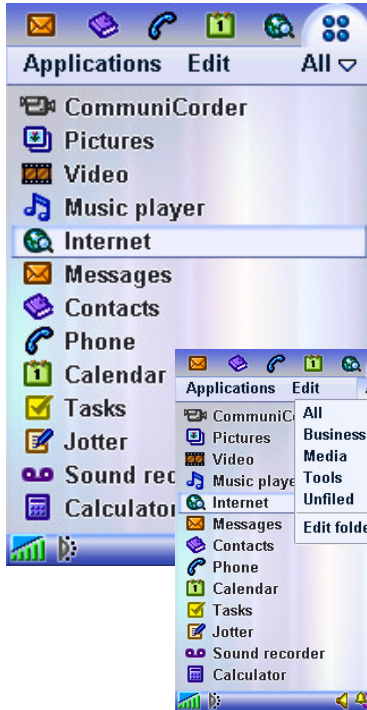
The icons across the top of the screen are used for rapid selection of five applications; the user may customize this 'application picker' strip. The sixth icon always switches to the Application Launcher.

All the available applications are listed in the Application Launcher. The user may select list view with small icons and text, or an icon display of 8 applications per page. One tap on an icon will launch (switch to) the desired application.

The Folder feature enables the user to group applications into logical folders such as 'Business' and 'Media'. This feature is carried through into many applications, enabling contacts, appointments, notes etc. to be Organized effectively.

There is no concept of starting or closing applications, but simply navigating to them. When an application is used for the first time, it will start in its default state, which is typically a list view. When the user navigates away from an application, its settings are saved ready for the reuse, e.g. type of view, current folder, etc. Data is always saved, e.g. partly composed messages are saved as a draft.

Here is an example of an application – the Music player. The music titles shown in the lower part of the screen are those available from all the folders in both the internal and external memory.

Tapping on the folder drop-down, the list can be filtered to show just one folder, for example Classical or Pop, as seen in this image:

As in the application launcher, the Jog Dial can be used to select an item. This provides a useful 'one-handed' method of operation.

This is the detail view in the Contacts application. The most important information is displayed on the first tab as a summary. Further information is organized on the other tabs; in this case notes and a picture.

A conventional menu structure is provided for tasks and actions.

Changing the folder here will re-classify this entry. Entries default to 'unfiled'.

Tapping on a telephone number will navigate to the phone application to make a call. Similarly, tapping an E-Mail address will navigate to the E-Mail application and create a new E-Mail to the contact.

Management functions such as delete, Copy to SIM or Send as are performed in detail view.

Status Bar

The status bar shows the normal items such as signal strength and battery meter. In FO mode, the icons may be tapped to see further information and access relevant settings. Tapping the keyboard icon whilst entering text enables the user to switch between handwriting recognition and on-screen keyboard. The keyboard icon is only present when using applications where text entering is possible. More icons are used to indicate temporary conditions such as Bluetooth activity, ongoing call and Internet connection status.

Signal strength and GPRS availability

Keyboard

Battery status

Temporary status indicators: Bluetooth, Infrared, and New Messages shown here.
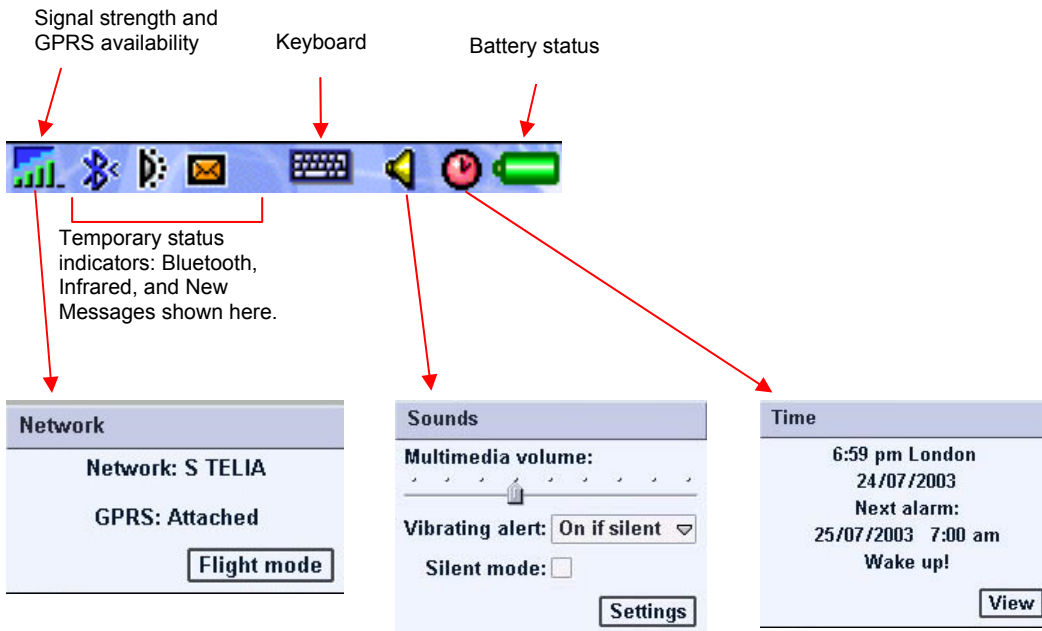
Tapping an icon in the status bar will reveal a box showing settings and information; three examples are shown above.

Features and Specification Summary

General
Size: 57 x 115 x 24 mm
Weight: 150g with battery and flip
OS: Symbian OS™ V7.0
Processor: ARM 9
User storage: Standard P900: up to 16 MB
                  Chinese versions: up to 13 MB

Memory Stick® Duo™
Slot for Memory Stick Duo
32 MB Memory Stick Duo supplied
Memory Stick Duo Adaptor supplied

Battery Life
Talk time: Up to 13 hours
Standby time: Up to 400 hours

GSM
Tri-band E-GSM 900, GSM 1800 & GSM 1900

GPRS
Slots: 4+1
Coding scheme: CS-1, CS-2, CS-3, CS-4
Downlink rate: Up to 53.6 Kbps (CS-2)
Uplink rate: Up to 13.4 Kbps (CS-2)
(CS-2 quoted as this is the fastest scheme in use today)

HSCSD
Timeslots: 2+1 at 9.6 or 14.4 Kbps
Download rate: Up to 28.8 Kbps
Upload rate: Up to 14.4 Kbps

Screen
Type: TFT
Size, flip closed: 208 x 208 pixels, 40 x 40 mm
Size, flip open: 208 x 320 pixels, 40 x 61 mm
Pixel Size: 0.192 mm
Colour depth: 16-bit (65K colours)
Surface: Touch-sensitive
Illumination: Back-light

Input – Standard P900
Flip Closed: Keypad switches; numeric/text characters using multitap or T9™ predictive text
Flip Open: Natural handwriting recognition
                  On-screen virtual keyboard
Support for TTY devices via the accessory connector

Input – Chinese versions
Flip Closed: Keypad; Numeric, Stroke, Pinyin, Bopomofo (T9™ predictive text input)
Flip Open: Chinese character recognition
                  English character recognition
                  Stroke, Pinyin, Bopomofo.
Support for TTY devices via the accessory connector

Third Party Application Support
SDKs: C++
          PersonalJava™
          J2ME™ CLDC/MIDP 2.0 with JSR-120 and JSR-82
          Microsoft Visual Basic v6

Phone
Office Handsfree (loudspeaker) function.
Voice dial, voice answer, 'magic word' activation
Picture Phone Book – picture of contact displayed.
Polyphonic ringtones capability.
Flight mode – use P900 as PDA with phone off.
SIM-AT
USSD
ALS
CSP
Corporate Telephony

Personal Organizer
Contacts (Address Book)
Calendar (Diary)
Tasks ('To-Do' list)
Jotter (Text and colour 'ink' sketches)
Sound recorder (Dictaphone)
Time (World Clock)
Calculator
(Chinese versions) English-Chinese-English Dictionary
(Chinese versions) Lunar Calendar

Integrated CommuniCorder
Image size: 640 x 480 pixels (VGA)
                  320 x 240 pixels (QVGA)
                  160 x 120 pixels (QQVGA)
Colour depth: 24 bit (16.78 million colours)
Storage format
   Still images: JPEG/EXIF (without Thumbnail); 3 quality levels
   Video Clips*: 3GPP and MPEG4
                  Video: 3 quality levels
                  AMR audio: 2 quality levels
Capacity: Depends on quality level - typically 600 VGA medium quality Pictures or 300 MMS quality Video Clips using the supplied 32 MB Memory Stick

Music player
Formats: MP3, WAV, AU, AMR, MIDI (G-MIDI level 1 with 24 voices polyphony), RMF, iMelody
Features: Playlists, Loop, Automatic pause

* For details about different video storage formats of the CommuniCorder, see table on page 128.

Features and Specification Summary (continued)

Pictures (Image Viewer)

Formats:	JPEG, BMP, GIF (inc. animated), MBM, PNG, WBMP
Sharing via:	IR, Bluetooth, MMS, e-mail, PC file transfer, Memory Stick

Video Player

File Format:	3GP, MP4
Streaming:	RTSP according to 3GPP

Messages

SMS, EMS, MMS, E-Mail (multiple accounts & PC sync)

Document Viewers

On-board:	Microsoft® Word
	Microsoft® Excel
	Microsoft® PowerPoint®
	Adobe® Acrobat® (PDF)

Approx. 20 more supplied on CD-ROM

Integrated Browser

WAP Version:	2.0
Markup HTML	3.2 (excl. JavaScript and partial support for Frames)
Languages:	WML 1.3
	WBXML
	XHTML Basic
	XHTML Mobile Profile
	cHTML
Scripting:	Compiled WML scripts
Style sheets:	WCSS
Security:	WTLS Class 1, 2, 3
	TLS/SSL
Certificates:	Pre-install & download WTLS, X.509
WIM:	WIM interface including SIM-WIM

Alternate Line Service (ALS)

Customer Service Profiles (CSP)

Corporate Telephony

M-Services

Compliant with M-Services specification, phase 1

User Personalization

Themes
Background
Screen Saver
Ringtones.
Alarm tones

Bluetooth

Specification:	Version 1.1
Coverage area:	Up to 10 metres (33 feet)
Profiles:	Generic Access Profile
	Serial Port Profile
	Generic Object Exchange Profile
	Dialup Networking Profile
	Object Push Profile
	Headset Profile
	File Transfer Profile

Infrared Port

Maximum speed: 115.2 Kbps

Remote Synchronisation

Synchronisation with SyncML compliant servers:

Data:	Contacts, Calendar, Tasks
Bearer:	HTTP
Protocol:	SyncML

Local Synchronisation

Data:	Contacts, Calendar, Tasks, Jotter text notes, E-Mail
PC Applications:	Lotus® Organizer® 5 & 6
	Lotus® Notes® 4.6, 5.0
	Microsoft® Outlook® 98, 2000, 2002
Bearer:	BluetoothTM, IrDA, USB
Protocol:	SyncML

PC Connectivity Solutions

Use the P900 as a wireless modem
2-way File transfer (e.g. pictures, documents)
Backup & Restore user data & settings
Software Installation Utility
Language Change Utility

PC Utilities

GPRS Wizard

Security

Device lock
Password generators from RSA Security and Secure Computing.
Secure Software installation with X-509 certificates supporting Symbian certification program

Remote Configuration (OTA)

Ericsson/Nokia OTA Settings Specification
WAP Forum specification
Smart Messaging

Games

Chess (including multi-player over SMS)
Solitaire

Accessories

Accessory	Product name
Advanced Car Handsfree	HCA-20
Bluetooth Car Kit	HCB-30
Bluetooth Headset	HBH-30
Bluetooth Headset	HBH-60
Bluetooth Handsfree	HBH-20
P900 Car Holder	HCH-32
Advanced Music Mute	HCH-16
Gooseneck Microphone	HCE-14
Micro Travel Charger	CMT-10
Portable Handsfree	HPB-10
Standard Battery	BST-15
Cigarette Lighter Adapter	CLA-11
System Cable	HCC-20
Travel Charger	CTR-10
Memory Stick Duo in 16 to 128 MB Capacities	
Desk stand	DSS-25
USB Cable	DCU-11
Blue Torch	IBT-20
Laser Pointer	ILP-20

HCB-30   HBH-30   CMT-10   DCU-11   Memory Stick Duo

Product comparison: P800 to P900

Summary Table of New Features

P900 New Feature	Corresponding P800 specifications
Improved Screen: 16 bit (65K) colours and 208 x 208 pixel flip closed screen size (Flip open screen size remains the same).	12 bit (4096) colours. 208 x 144 pixels flip closed screen size.
Physical size: 57 x 115 x 24 mm. Weight: 150 g.	59 x 117 x 27 mm. Weight: 158 g.
Internal Memory: 48 MB total – up to 16 MB of user memory (Chinese models up to 13 MB).	32 MB total – up to 12 MB of user memory (Chinese models up to 9 MB).
Memory Stick Duo: Enhanced Memory Stick file system support.	
Flip: A more compact flip with electrical switches.	Flip applied physical contact on to the touchscreen for its operation.
Flip Closed Text Input: T9™ predictive text input added to the standard multitap method	Multitap text input only with flip closed.
Camera: Video recording with sound. Profiles (modes) allowing the user to rapidly change settings of the camera. Link to MMS messaging.	No video recording facilities.
MMS: MMS messages may be reviewed in full screen mode. Video may be inserted in an MMS.	
Audio application: New MP3 Music Player application.	Basic audio application.
File Handler application: 'File Manager' file/folder management application added.	Storage Manager used for limited file management operations.
Personalization: User may select different Themes that change the whole appearance of the user interface and ring tones in one action. Individual items may still be personalized.	Personalization is carried out item by item.
Ring tones: MP3 files may now be used as ring tones, or alarm sound.	Used WAV format for ring tones
Digital Rights Management: OMA (Open Mobile Alliance) DRM release 1 Forward Lock added.	
CPHS compliance: - Alternate Line Service (ALS) added. - Customer Service Profiles (CSP) facilities added.	
Bluetooth transfers: FTP transfer method is added to the original OPP method.	Bluetooth transfers by OPP only.
Corporate Telephony	
Java: MIDP 2.0 + JSR 120 + JSR 82	MIDP 1.0

P900 New Features in Detail

Improved screen and flip

The P900 screen has an improved colour depth, i.e. 65,536 colours compared to 4,096 colours in the P800. A variable intensity backlight replaces the fixed intensity front light.

The flip has been reduced in size allowing more of the screen to be viewed in the flip closed mode. This gives a flip closed viewing size of 208 by 208 pixels compared to the P800's 208 by 144. The extra 64 pixels are equivalent to an extra three lines of text. The overall size of the screen (flip open) remains the same.

The flip now has electrical switches to give the reduced size a favourable tactile action.

Physical size

The new 57 x 115 x 24 mm size is slightly smaller than the P800, and there is a corresponding reduction in weight – now 150 g.

Internal memory

The flash memory has been increased from 32 MB to 48 MB ram and this has increased the available user memory, which is now 16 MB.

Memory Stick Duo

P900 still uses the same MMFH (multimedia file handling) system as the P800. However, the introduction of the File Manager application allows the user to access files stored outside of P900's MMFH system. For example, the File Manager can be used to move image files stored by a digital camera on a Memory Stick to a folder within the P900's MMFH system. The images can then be accessed by the P900's applications, e.g. an image may be used in a multimedia message or viewed in the Pictures application. From the Pictures application it is also possible to export images directly to a Memory Stick DCIM root directory from which they can be accessed by for instance a digital camera.

CommuniCorder

- The new MMS linking facility allows rapid addition of pictures and/or sound to MMS messages.
- The inclusion of a video recorder is a significant addition to the multimedia facilities of the P900. It uses the QCIF picture size (176 by 144 pixels) with H.263 or MPEG-4 video compression and AMR sound compression to provide an economical video clip file size of approximately 1 MB per minute.

Music player

The audio player has been redesigned to become an MP3 Music Player application. Two additional file types can be played (RMF and iMelody), but the preferred audio file type is MP3.

The Music Player user interface now displays track title, artist name, and album title taken from the MP3 file's ID3 tag.

A 'Manage Tracks' option allows tracks to be copied, moved, deleted, and ID3 information may be viewed.

File Manager application

There is a new file handling application, **File Manager**, which makes it possible to browse the MMFH structure of the internal storage as well as the Memory Stick storage space. File management operations may be carried out such as Copy, Move, Rename, View properties, Send via MMS (or Bluetooth/Infrared), Change file attributes.

A selected file may also be opened in the appropriate viewer with a simple tap.

Folders are also managed through File Manager, i.e. they may be Created, Deleted, Renamed, Properties viewed, and Attributes changed.
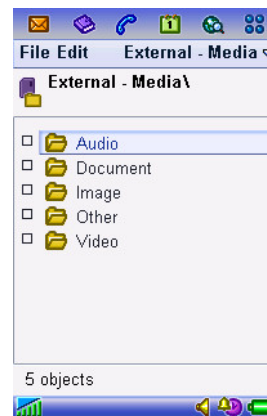
Upgraded user interface

Improvements have been made in many areas of the phone's operations. The more significant additions are outlined below.

Personalization

User may select, and customize, different Themes that change the whole appearance of the user interface and ring tones in one action. New themes may be downloaded - saving time and effort compared to downloading individual ring tones, screen savers, etc. However, individual items may still be personalized as before. MP3 files may now be used as ring tones.

T9 Predictive text input

The user has the choice of standard multitap text input or T9 predictive text. T9 text entry works by comparing sequences of key presses to a stored database of possible words, and provides significant improvements in the speed and ease of use.

Jog Dial

The Jog Dial action in flip open mode has been revised for better single-handed operations. In addition, using the stylus in one hand while operating the Jog Dial with the other creates a powerful combination. Previously (P800), pushing the Jog Dial towards or away resulted in a move from the current application to the application launcher. In the P900, all Jog Dial actions work within an application until a long push towards the front of the P900 is carried out. This summary list shows the basic operations:

Rotate up	Scrolls items in a list up/to the left, increases volume during a call, moves back a page when playing a multimedia message.
Rotate down	Scrolls items in a list down/to the right, decreases volume during a call, moves forward a page when playing a multimedia message.
Press inwards	Selects a highlighted item, dials selected phone numbers. Generally the same action as the **OK** key in Flip closed.
Press backwards	Goes back to the previous screen, dismisses dialogs and sends a busy signal to the calling party when you receive a call. It will not end a call. Always the same as action the ⮌ key in Flip closed and the ⮌ button in Flip open.
Press forwards	Flip closed: brings up the Options menu. Press and hold takes you to the Applications list. Flip open: toggles the Application, Edit and Category menus. Press and hold takes you to the Application launcher.

MMS

After taking a still picture or a video clip the Send as MMS option becomes active. When this is selected the Multimedia messaging application is automatically opened and the picture or video clip is automatically added ready for sending as an MMS message.

Video may now be inserted in to MMS messages. This may be video recorded with the built-in CommuniCorder, or video downloaded to the P900 from elsewhere. The P900 can also view MMS messages that contain video or streamed video.

By default, an MMS message is viewed in full screen view; the whole of the screen is used while maintaining the aspect ratio. The user may change the default setting to play received and preview composed messages in message edit view, i.e. with access to for instance menus and play and stop buttons.

The MMS application has new Smart templates. These allow faster creation of messages, by automatically launching the CommuniCorder, Sound recorder or Image editor for content acquisition.

Bluetooth transfers

P800 uses the OPP (Object Push Profile) method for transfer of files between devices, and while the P800 can exchange any type of item using this method, other devices may not. Typically, other devices may be restricted to exchanging only vCards by OPP. The P900 has, in addition to OPP, the FTP method of transfer, which opens up wider possibilities. Personal Computers and PDA devices often support the Bluetooth FTP transfer method.

Corporate Telephony

The P900 may be used as a replacement for the traditional office desk telephone or DECT telephone. Please refer to 'Corporate Telephony' on page 28 for more information.

Alternate Line Service (ALS)

ALS (Alternate line service) allows the user to have more than one line (more than one telephone number) allocated to a single SIM subscription. The user can select which line will be used for an outgoing call, while incoming calls can be received on either line at any time. However, the second line may only be used for speech calls.

If the user is not subscribed to the ALS service, then all of the ALS settings dialogs are hidden and are never shown.

Customer Service Profiles (CSP) facilities added

A CSP held on a SIM card is able to automatically adjust the features provided by the phone so that particular features are not shown, typically by removing items from menus. However, some actions that are hidden may still be carried out using Service strings – the CSP does not prevent the user from doing this. For details of which features can be controlled by CSP in the P900 refer to 'Customer Service Profile (CSP)' on page 73.

Key Technologies and Functions in Detail

Data Storage Locations

The P900 is divided into two parts:

- A GSM phone part, having flash memory. This is very similar to a conventional mobile phone such as the T610.
- An 'Organizer' part running Symbian OS and having a large amount of flash and RAM memory plus a Memory Stick slot and ability to exchange files with a PC.

Note: The 'Phone' application, which provides the phone MMI, exists on the Symbian OS part of the P900; the GSM stack resides in the GSM phone part.

Important: The rest of this chapter describes the standard P900. Chinese versions have a slightly different memory organization. For more information about Chinese models, see 'Chinese Models in Detail' on page 100

The diagram below shows the memory organization of a standard P900:
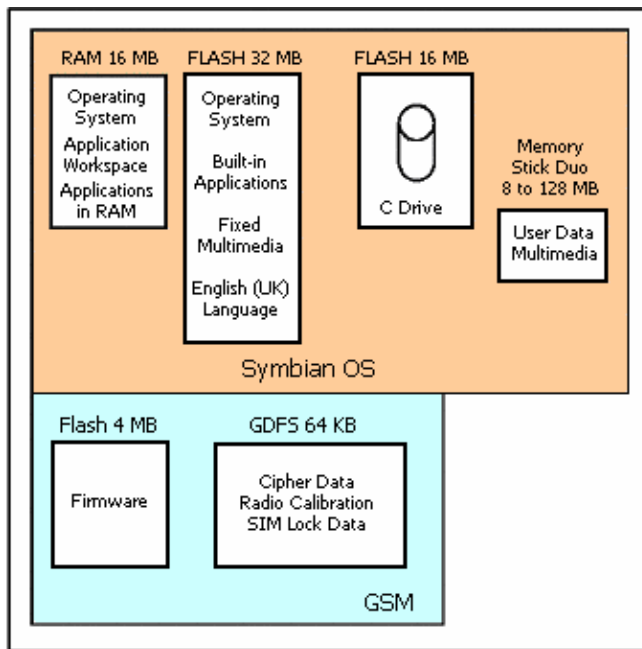
The RAM (Random Access) memory is controlled by the Symbian OS operating system and is not used to store any user or program data. All use is dynamic and managed by the OS. The RAM is totally re-initialised when the P900 is started.

The available 48 MB flash memory is split into 32 MB for operating purposes and 16 MB (13 MB for Chinese models) for storage of user data (files for audio, visual, documents, etc), additional languages and settings such as the active theme. Flash memory retains data even with no power applied. Unlike some PDA devices, the P900 does not require a small 'memory backup' battery. Data stored on the P900 is therefore not subject to loss due to such a battery running down. User data may be backed up to a PC using the Sony Ericsson Deskstand DSS-25.

The first bank is used like a ROM. It stores the Symbian OS (UIQ) operating system, the built-in applications and some essential multimedia information like a default ring tone. It also stores the language files for UK English. This is the default language of the P900.

Note: The extensive MMI of the P900 means that it is impractical to hold many languages inside the phone, as is done for some other models.

Part of the flash memory provides a 'C:' drive of up to 16 MB capacity. This behaves just like a normal disk drive. The folders can even be viewed and managed from the File manager application or from a connected PC. For Chinese versions, the 'C:' drive has a capacity of up to 13 MB.

User Storage

The user storage space (C: drive) is shared across applications without any imposed restrictions, apart from the whole space becoming full. For example, one user might use the entire user storage space for photographs, in which case over 200 can be stored. Another user might load a third party street map application and a number of street maps. In this case, the application will take up some of the storage space and so will each map. When space becomes limited, the user can choose to remove some maps or applications.

Unlike a PC, the user does not need to be aware of the underlying filing system. Applications will always make sensible choices and store information automatically, simplifying management of data. Third party applications may implement more complex file management solutions where required.

Additional storage space is available by using Memory Stick Duo. A 32 MB Memory Stick Duo is included with the P900 and Memory Sticks up to 128 MB capacity are supported. Any number of Memory Stick Duos may be used for storage; for example, a number of Memory Stick Duos may be used to store an MP3 music collection. Memory Sticks may be used to exchange data with other devices. See Memory Stick® Duo on page 47 for more information.

Depending on the application, data can be beamed, mailed, uploaded to the web or transferred over the link to a PC or using a Memory Stick in order to archive and create free user space on the P900 – see Synchronisation & Data Transfer on page 91.

User Storage configuration in a new P900

Applications and information are placed in the internal storage of the P900 in the factory. This provides sample demonstration, educational, multimedia and fun content so that the P900 can be used directly out of the box. Much of this can be deleted by the user in order to make the space available for personal use.

This section describes the case for a standard, generic (non-customized) P900.

Example showing Storage content for a new P900

**C: drive
16 MB
Total**

User Data (7.4 MB)

14.3 MB

Sony Ericsson Multimedia Content
and
Demo application
(5.4 MB)

Additional language (1.5 MB)

1.7 MB   File system (0.4 MB), settings and applied theme (1.3 MB)

Empty and available for user data

Populated with data files in the factory; user can delete these files

Additional language besides UK English, if used

Area used for file system and settings

User Data
This space is initially empty. Normal uses are:

- User-data associated with built-in applications (e.g. Messages, Contacts)
- Applications installed by the user
- Multimedia content added by the user

Sony Ericsson Multimedia Content
Sound, pictures, video, Demo application and other files chosen to convey the capabilities of the P900. This is described in more detail in Personalization and Customization on page 81.

Language Files
The generic P900 is prepared for different markets. A 'Load Module' is constructed containing the languages for a given market. Therefore, a number of load modules are specified for the P900 to cover all required markets.

When the P900 is first started, the user is prompted to select a language as part of the initialisation procedure. The P900 is then restarted. The selected language file is retained on the C: drive and the other language files are deleted. UK English is stored on the ROM.

Action at Master Reset

Master Reset will delete everything on the C: drive except for Languages and (if selected by the user) user-installed applications. Data can be restored as follows:

If the user has previously backed up the P900 using the PC Suite, then the C: drive can be restored to the condition it was in when the backup was made. The exception is DRM protected files which cannot be transferred to other media and therefore not backed up.

Otherwise, data can be re-loaded from the following locations:

- P900 Multimedia CD-ROM (Sony Ericsson Multimedia Content and Demo)
- Sony Ericsson web site

Since Multimedia content is easily transferable using Memory Stick, infrared or Bluetooth wireless technology beaming, it is simple to restore favourite content from someone else's P900.

Folder View of Internal Storage

This section explains in more detail how the data is organized on the C: drive.

Note: The actual file and folder structure on the P900 is not exactly as shown in this document.

When viewed from a PC using PC Suite for P900, the 'C:' drive is named 'Phone Memory', but only a subset of the folders is accessible from the PC.

Multimedia is stored in a structure beneath the **Media Files** folder. There is a folder for each media type: audio, video and image. Documents (such as Microsoft Word files) are stored under the **Document** folder. An 'Other' folder provides a place for files that do not fit into the other categories.

Beneath each media type and documents, the material on the P900 is broken into Folders. For each named folder in the related P900 application, a folder is created beneath the applicable media type. For example if the user creates a 'My MP3' folder in the Music player application, a 'My MP3' subfolder is created beneath the audio folder. **Unfiled** folders are created in the initial folder structure and all material is placed in the **unfiled** folder by default. Sony Ericsson Multimedia Content is stored in 'Sony Ericsson' subfolders. A typical folder structure is shown below as seen on a connected PC.
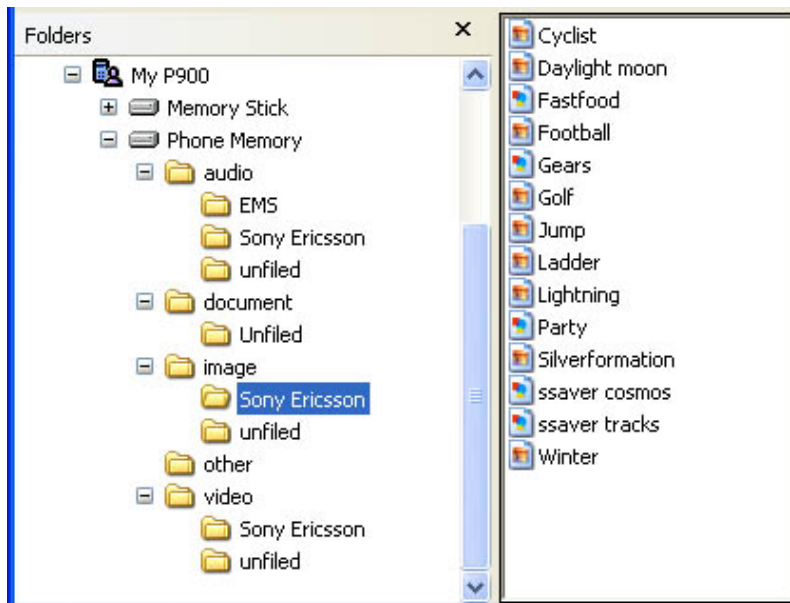
P900 C: drive folder structure (simplified)

File and Folder Management

File Manager Application

File Manager allows the user to explore and manage the files and folders held on both the internal flash memory and the Memory Stick Duo.

A straightforward graphical interface allows exploration of the folders. The example shown on the right shows the sequence of screens as the contents of '\Audio\Pop' is explored. Two audio files are located in the selected folder.

The internal memory is shown, but the same facilities are provided when external media is selected.

The File Manager Menu Options
The following operations may be carried out on folders:

- Create
- Delete
- Rename
- View properties which includes the total size of files contained in the folder and its subfolders
- Change the Read Only and Hidden attributes

The following operation may be carried out on files:

- Delete
- Rename
- Move
- Copy
- View properties
- Open - if they belong to an application installed on the P900
- Send as – file may be sent using E-mail, Bluetooth, etc
- Send to another device using Bluetooth or Infrared
- Change the Read Only and Hidden attributes

The two images on the right illustrate the File Manager menu and viewing of a selected file's properties.
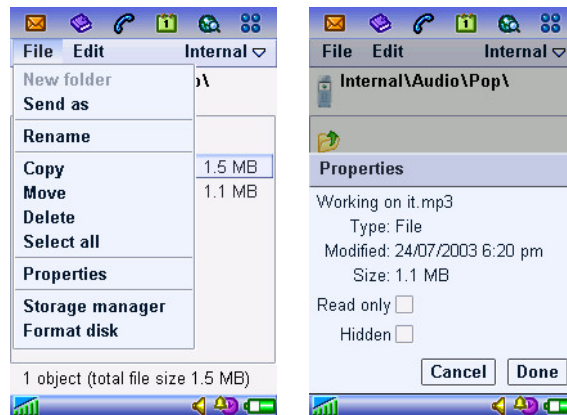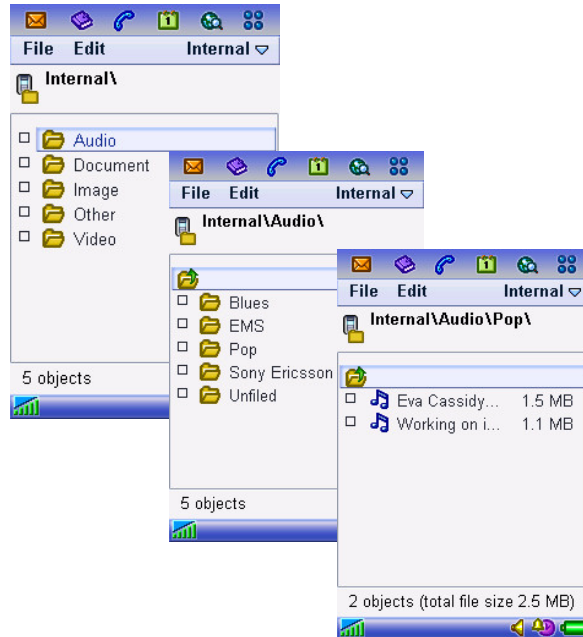
If File Manager is used to browse a Memory Stick that has been used by another device, e.g. a digital camera, additional folders may be visible. The illustration below shows the folders that may be present on such a Memory Stick.
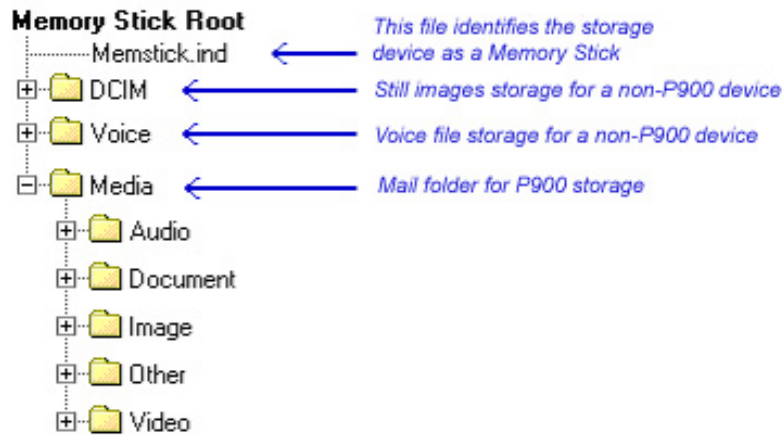
Memory Stick file structure showing a combination of
P900 folders and folders created by other devices

The 'DCIM' and 'Voice' folders, which have been created when the Memory Stick was used in other devices, will be visible when viewed in a P900. If supported files in these folders are to be made available for P900 applications, they must be moved to one of the folders within P900's 'Media' folder; this may be done using the P900's File Manager.

Storage Manager

Storage Manager provides management of application and files.

The Storage Manager provides a list of all the applications installed on the P900 – see image on the right.

Facilities are provided for:

- Running any of the applications;
- Reviewing the space taken by each category of files and space remaining on the internal memory;
- Uninstalling applications other than the standard P900 applications.

The Files button gives access to a file management screen, with the following facilities:

- Reviewing the space taken by individual files held in the internal or external memory, listed according to their type.
- Copying files to a different folder.
- Deleting files. This can be done either
  - directly from this file management screen, or
  - by switching to the associated application and deleting from there. This will allow files to be reviewed before deletion.
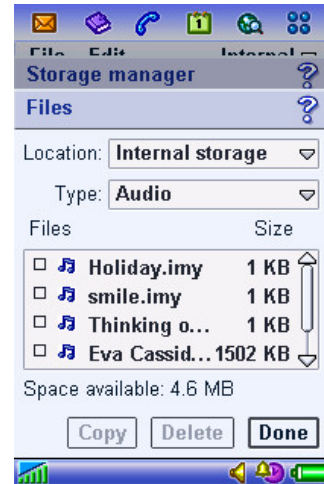
Phone and PIM Applications

Phone

The P900 is a full-featured mobile phone having full integration with the other functions of the device, including third party applications.

The phone includes useful and fun features such as:

- **Personalized ringtones** – conventional or polyphonic ringtones can be set in Contacts, giving audible indication of who is calling. Supported formats are AMR, AU, iMelody, MIDI, RMF (Beatnik), MP3 and WAV.
- **Picture Phone Book** – if there is a picture of the person in Contacts, it will be displayed when making outgoing calls, when receiving the CLI with an incoming call, and also when viewing the speed dial screen in picture view.
- **Quick access back to the Contact Card** - makes it easy to try an alternative number or send an E-Mail if the contact is unavailable or busy. Used during a call, this facility allows access to numbers stored in Contacts, e.g. account numbers needed for personal banking.
- **Voice dial** – make a call by speaking the contact's name. The contact's name may be recorded when entering/editing the entry in Contacts. The call is made by pressing the OK button on the flip or the button on the headset. If a 'magic word' is recorded, contacts may be dialled by saying the magic word followed by the contact name. It is then not necessary to press any buttons. Note that 'magic word' and recording of voice labels is not supported while using a Bluetooth cordless handsfree device.
- **Voice answer** – an incoming call may be answered, or sent a busy signal, using the words recorded for 'answer' and 'busy'. There is 40 seconds of storage space allocated for voice dial and voice answer. This is enough for approximately 35-40 words (contact names plus 'magic word', 'answer' and 'busy')
- **Access to most other applications** whilst talking on the phone.
- **Office handsfree** (speakerphone) which is enabled when the flip is opened, making it easy to access applications such as Calendar and Jotter whilst talking.
- **Flight mode** - enables the P900 to be used as a PDA in situations where radio transmitters may not be used. The GSM and Bluetooth transmitters (and receivers) are switched off.

Brief overview of the phone user interface

In FC mode, the phone is driven by the keypad, like a conventional mobile phone.

If the flip is opened, the phone application re-scales itself to the full screen size. Other P900 flip closed applications are also able to do this.

A traditional keypad view is available.
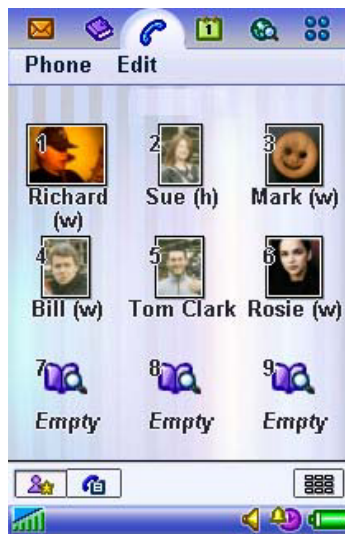
The shortcut view provides one-touch dialling to 9 contacts.
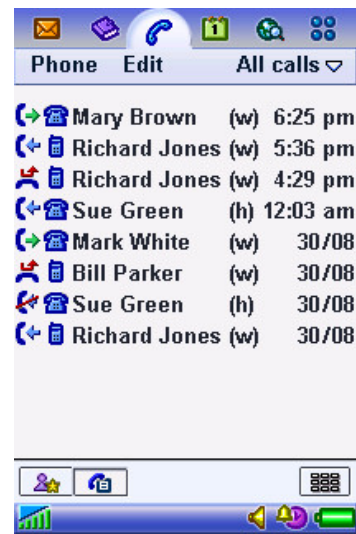
A call log view provides summary details of calls made, received and missed. Full details can be viewed from here.

The shortcut view automatically takes pictures from Contacts and places them under the shortcut button. The Jog Dial also works in this view; scroll to highlight the desired contact and press Select to call.

Corporate Telephony

P900 as a Corporate Telephone

Corporations have traditionally used wire phones and DECT phones in the office. There is now a strong shift towards GSM. Of prime importance to corporations is the ability to use the features of the corporate switch. The P900 is by virtue of its pen and large screen particularly well suited for this. P900 has special functionality for working together with corporate switches, equipped with mobile extension facilities, like Ericsson's MD110 ® and Business Phone®. It can also work with callback servers and other phone servers accepting tone input.

The P900 offers GSM mobility and user friendly access to corporate switch features. The user can change work mode via an icon in the status bar.

The functionality is realised using the calling card feature of the P900. This means that the call is not routed to the B-party directly but to the corporate switch, and the B-number is then sent as a DTMF tone string to the switch.

A user may dial either an internal number, e.g. 71234 or a public number, e.g. +468 123 4567. The internal number will be signalled as it is to the corporate switch mobile extension port. A public number will be equipped with the external line prefix, used by the corporate switch before being sent. A plus sign '+' will be replaced by the international prefix used by the switch. Public numbers that lie within the number series of the switch will be truncated, and only the internal number will be sent. This is in order to speed up call establishment.

The user activates features at the corporate switch by pressing feature buttons. Each feature button sends a string of tones, and can even include data that the user is prompted to provide.

The three most used features can be displayed during ongoing calls. Additional call features are displayed on a list under the **More** button.
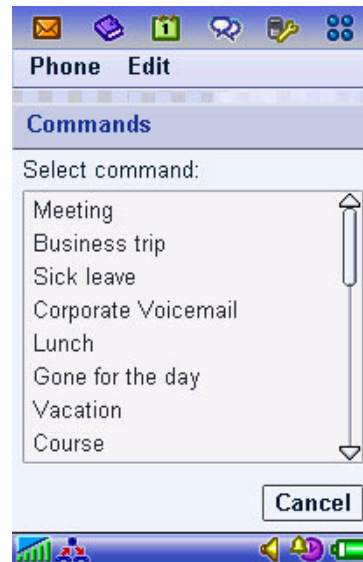
Offline commands are displayed under the 'corporate' status bar button. The offline commands will, if used in standby mode, result in a call being made to the PBX. The call may be cleared immediately after tone sending, if this is specified.

The company's IT manager defines the feature buttons and how the P900 should handle calls from and to the corporate switch. This is done in an XML-structured configuration file, with the extension '.pbx'. These files can be published on the corporate web site or e-mailed to users.

Contacts

The P900's Contacts application holds the details of all the user's contacts. It is available in FC and FO modes and is fully integrated with the phone and other PIM applications. Each contact can contain multiple phone numbers and E-Mail addresses, name and address details, personal notes and a photograph of the contact or other image. This information will typically be synchronised in to the P900 to begin with; contact data can also be added and edited on the P900 itself. Local and remote synchronisation is possible to the SyncML standard, see *Synchronisation & Data Transfer* on page 91 for more information.

Contact data can be beamed in or out using Infrared and Bluetooth. It can also be sent and received using Messages. See the Object Exchange section for full details.
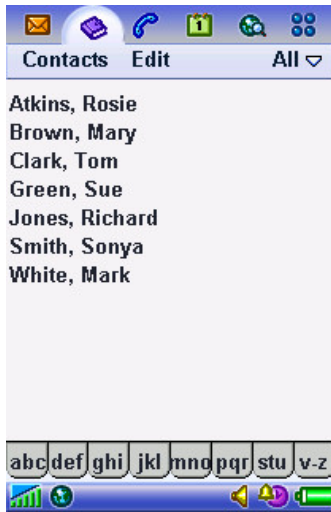
Contacts are displayed in a list, which may be filtered by folder such as business or personal.
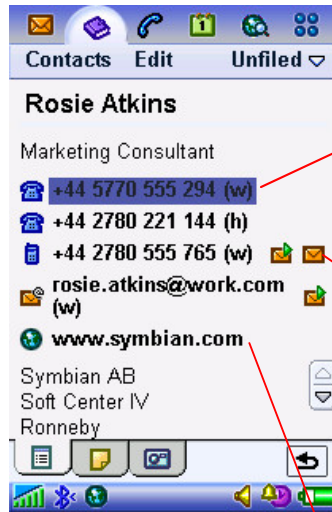
Selecting a person in the list shows their details. One tap will initiate a phone call, a new message or URL in the browser.
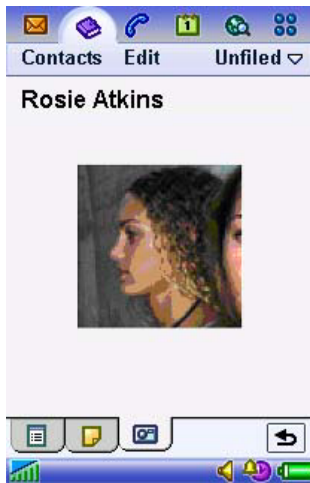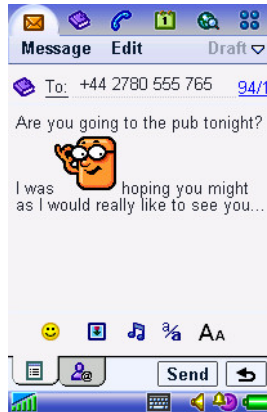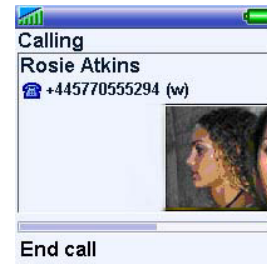
Photograph of Rosie stored in Contacts. Picture formats supported: BMP, GIF, JPG, MBM, PNG, WBMP.

A voice dial tag can be recorded, enabling Rosie to be called by saying her name.

A personal ringtone sound can also be set. It will be played whenever Rosie calls and her CLI is passed to the P900. Audio formats for ringtones: MP3, AMR, AU, iMelody, MIDI, RMF, WAV.

Calendar

The Calendar application keeps track of appointments and events and enables reminder alarms to be set. The alarm sound can be personalized, using any of the supported sound formats. Appointments can be shared using Infrared, Bluetooth beaming, and also by Messages. Local & remote synchronisations are both supported using SyncML; see *Synchronisation & Data Transfer* on page 91 for more information. The Chinese versions support the lunar calendar.
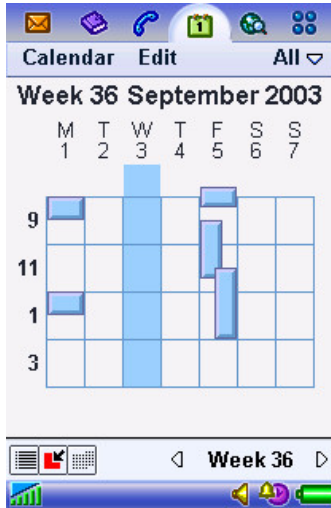
Week and month views provide a high level view of free and occupied time.

Convenient daily summary view.
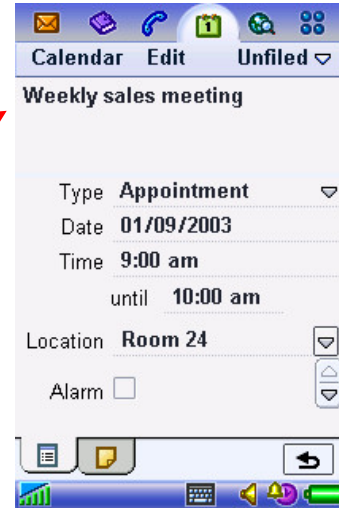
One tap shows the details of an appointment.

Tasks

Tasks is a simple yet powerful application, which manages a list of tasks to be done. Task items may be beamed, exchanged using Messages, synchronised locally, and remotely using SyncML, see *Synchronisation & Data Transfer* on page 91 for more information.
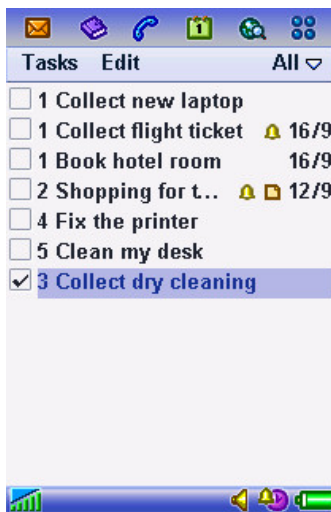
List of current tasks
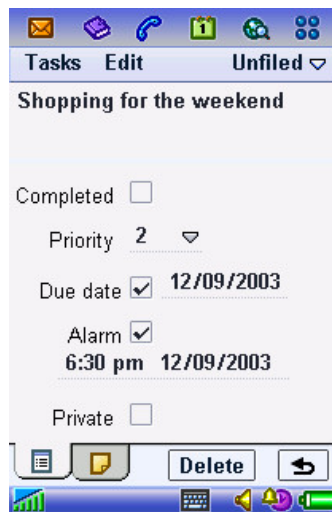
Detail view of a task

Notes attached to a task.

Jotter

The Jotter application provides a quick means of making notes in either text or sketch format.

Notes are displayed in a list format for fast reference. The pencil indicates a sketch.
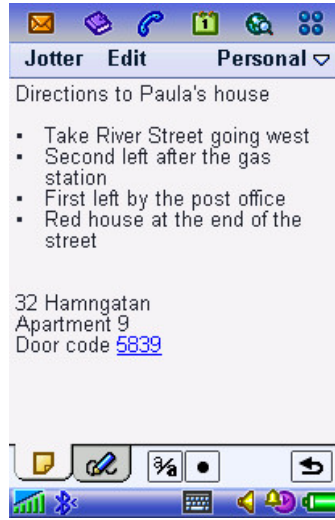
Text notes can be input using handwriting recognition or the virtual keyboard.

Diagrams and sketches can be made in colour, using the stylus like a pen.

Time, Sound recorder and Calculator
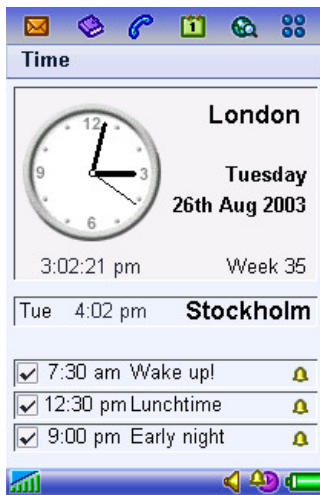
Time is a sophisticated alarm clock, which can show the time both locally and in another time zone. Alarms can be set. The alarm signal can be personalized using sound clips.

Sound recorder is a simple screen-driven dictation machine with the added advantage that recordings can be beamed and exchanged via Messages. It can also be used to record a personal ringtone.
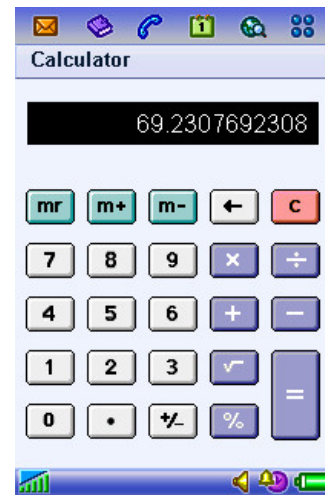
Calculator performs like a standard desk calculator, and is always available from the application launcher.

Multimedia

The P900 has extensive multimedia capability in many applications. This section explains the different standards supported and provides a summary of capability by application.

Audio Formats

The table below explains the various audio formats supported by the P900, together with indicative file sizes for 60 seconds of playback.

Format	Example File Size	Description
AAC	**800 KB (128 Kbps)**	Advanced Audio Coding. This is one of the audio compression formats defined within the MPEG-2 and MPEG-4 standards. Compared to MP3 it has more advanced features and is more efficient. AAC is commonly used as an audio component of an MPEG-4 video file or stream. The P900 Video Player can play AAC format audio, which is encoded into an MPEG-4 file or stream.
AMR	**94 KB (12.2 Kbps)**	Adaptive Multi Rate. AMR is a speech compression format that is highly optimized for the mobile environment, requiring as little as 4.75 Kbps bandwidth. AMR is used to convey voice recordings in MMS, 3GPP video clips or streams. P900 records AMR using 12.2 Kbps with a sample rate of 8kHz.
AU	**5.2 MB (22 kHz)**	Similar to WAV, this is an audio format commonly used in the Macintosh, Unix and Java worlds. It is not commonly used for content on mobile devices.
iMelody	**6 KB**	A format commonly used for monophonic ringtones.
MIDI	**20 KB**	MIDI means Musical Instrument Digital Interface. MIDI specifies a format, which describes music in a binary format, which may then be stored as a file. Unlike the other formats, MIDI is not a recording of music but a description, which enables a local synthesizer to play the music from the instructions included in the MIDI file. MIDI is ideal for polyphonic ringtones. The P900 includes the Beatnik mini-BAE^{TM} (Beatnik Audio Engine) providing support for General MIDI Level 1.
MP3	**960 KB (128 Kbps)**	MPEG1 Layer 3 audio compression. MP3 is a very popular format for portable players and downloading songs from the internet due to its smaller file size. The compression achieved with MP3 files is a question of size/quality compromises; a factor of 12 compression is typical.
RMF	**72 KB**	Rich Music Format^{TM}. A file format developed by Beatnik combining the compact size of MIDI files with the high quality of sampled sound.
WAV	**5.2 MB (22.05 kHz)**	This is typically used for short 'alert' sounds. The size of files is determined by sample rate, bits-per-sample and mono/stereo.

Loudspeaker Characteristics

General

The P900's built-in loudspeaker is most sensitive to middle and high frequencies; tones below 400 Hz generate distortion instead of bass. Therefore, sampling frequency for WAV should not be reduced below 16 kHz; otherwise the characteristic low frequency sampling 'ringing' will be very distinct compared to that of a more linear system.

Recommended WAV file format for the loudspeaker is 22.050 kHz sampling rate, 8-bit samples and 1-channel (mono).

P900 Loudspeaker

Ringtones

The frequency should be kept around 4 kHz with a narrow bandwidth in order to generate high SPL (~90dBSPL@40cm) ring tones.

Stereo Headphone Characteristics

The P900 is supplied with a pair of high quality stereo headphones.

Recommended WAV file format for playback over the headphones is 44.1 kHz sampling rate, 16-bit samples and 2 channel (stereo). Files to this standard are very large – use WAV only for short bursts of sound.

Recommended MP3 settings are 64 Kbps stereo.

Image formats

The table below explains the various image formats supported by the P900, together with indicative file sizes for a QVGA (320 x 240 pixel) image.

Format	Example File Size	Description
BMP	**226 KB**	Microsoft Windows Bitmap. A graphics format defined by Microsoft supporting 1, 4, 8 or 24 bit colour depth. No compression, so files can be very large. Used for icons and very small images.
GIF	**42 KB**	Graphics Interchange Format. Highly compressed by limiting the colour palette to 16 or 256 colours. GIF is therefore good for icons and diagrams. When a Jotter sketch is sent as an e-mail attachment, the GIF format is used.
GIF (animated)	**210 KB** (5 frames)	A GIF animation containing a number of images in a timed and repeating sequence. Some P900 applications display only the first image in the sequence.
JPEG (.JPG)	**13 KB**	An image compression format managed by the Joint Photographic Experts Group. The format supports various degrees of compression, enabling different quality/file-size balances to be provided in one standard. JPG files support millions of colours and are therefore good for 'real life' photographs.
MBM		Multi Bitmap. This is a Symbian OS format for colour and greyscale bitmap images.
PNG	**166 KB**	Portable Network Graphics. PNG compresses images with millions of colours no loss of detail, but has comparatively large file size. It is not commonly used.
WBMP	**23 KB**	Wireless BitMap. Part of the WAP specifications, an image format optimized for small mobile devices. The P900 supports Black and White, 2-bit greyscale and 6-bit colour modes, according to ETSI 3GPP TS 23.040

Colour Screen

Images having more than 65K colours will be adjusted to display optimally within the capabilities of the P900 screen.

Images larger than the display area will generally be scaled to fit the application window.

The Image and Video Viewers make use of the whole screen (320 x 208 pixels) in Wide Screen mode.

```
Screen Specification

Type:                 TFT
Size, flip closed:    208 x 208 pixels, 40 x 40 mm
Size, flip open:      208 x 320 pixels, 40 x 61 mm
Pixel Size:           0.192 mm
Pixel Density:        132 DPI (Dots Per Inch)
Colour depth:         16-bit (65K colours)
Surface:              Touch-sensitive
Illumination:         Back-light
```

Media Format and Application Summary

This table summarises the P900 applications and shows which audio, image and video formats are supported by each. It also shows the storage locations that can be accessed in each case. A description of the MPEG-4 and 3GPP video formats is provided in the Video Player section of this document.

Application	Usage Case	Audio Formats								Notes
		AAC	AMR	AU	iMelody	MIDI	MP3	RMF	WAV	
Phone	Ringtones		✓	✓	✓	✓	✓	✓	✓	7
Phone	Picture Phonebook									1
Phone	Speed Dial image									2
Phone	Background image									
Music player	Play		✓	✓	✓	✓	✓	✓	✓	16
Video Player	Play	✓	✓							3
Contacts	Personal Ringtones		✓	✓	✓	✓	✓	✓	✓	7
Contacts	Picture of contact									4, 5
CommuniCorder	Save photos/videos									6
Pictures	View photos									
Time	Alarm		✓	✓	✓	✓	✓	✓	✓	7
Calendar	Alarm		✓	✓	✓	✓	✓	✓	✓	7
Tasks	Alarm		✓	✓	✓	✓	✓	✓	✓	7
Sound recorder	Record/play								✓	8,9
EMS	Media objects				✓					
MMS	Playback		✓	✓	✓	✓	✓	✓	✓	
MMS	Compose		✓	✓12	✓12	✓12		✓	✓12	11
E-Mail	Display attachment	✓18	✓13	✓13	✓13	✓13	✓13	✓13	✓13	
E-Mail	Attach and send	✓18	✓	✓	✓	✓	✓	✓	✓	
Browser	Play/Display		✓	✓	✓	✓	✓20	✓	✓	
System	Screensaver									

Summary table continued…

Application	Usage Case	Image Formats							Video Formats		Storage Access		Notes
		BMP	GIF	GIF/animated	JPG	MBM	PNG	WBMP	+3GPP/File/MP4	+3GPP/Stream	Internal	Memory Stick	
Phone	Ringtones										✓	✓	7
Phone	Picture Phonebook	✓	✓	✓17	✓	✓	✓	✓					1
Phone	Speed Dial image	✓	✓	✓17	✓	✓	✓	✓					2
Phone	Background image	✓	✓	✓	✓	✓	✓	✓			✓	✓	
Music player	Play										✓	✓	16
Video Player	Play								✓	✓	✓	✓	3
Contacts	Personal Ringtones										✓	✓	7
Contacts	Picture of contact	✓	✓	✓17	✓	✓	✓	✓			✓	✓	4, 5
CommuniCorder	Save photos/videos				✓				✓		✓	✓	6
Pictures	View photos	✓	✓	✓	✓	✓	✓	✓			✓	✓	
Time	Alarm										✓	✓	7
Calendar	Alarm										✓	✓	7
Tasks	Alarm										✓	✓	7
Sound recorder	Record/play										✓	✓	8,9
EMS	Media objects	✓									✓		10
MMS	Playback	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓21	✓21	
MMS	Compose	✓12	✓	✓	✓		✓12	✓	✓12	✓12	✓	✓	11
E-Mail	Display attachment	✓14	✓14	✓14	✓14	✓14	✓14	✓14	✓15				
E-Mail	Attach and send	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
Browser	Play/Display	✓20	✓	✓	✓	✓	✓	✓	✓	✓	✓19	✓19	
System	Screensaver	✓	✓	✓	✓	✓	✓	✓			✓	✓	

Notes for Media Format and Application Summary Table

1   The number dialled, or an incoming CLI, is matched to a contact. The picture stored against that contact is then displayed.

2   The speed dial button is linked to a contact. The current picture of that contact is displayed in thumbnail format.

3   The Audio must be encoded in file or stream. An Audio-only file or stream is also supported.

4   The source may be in the formats and locations indicated.

5   A copy of the image is stored in the Contacts database.

6   The Pictures Remaining figure is calculated for the currently selected storage location.

7   Some system default sounds and options are also available. These may not be modified or deleted by the user.

8   Stored in internal storage. May be played in Sound recorder, selected as ringtones or included in MMS messages.

9   Playback of Sound recorder recordings only; all other audio playback is in the Music player.

10 Limited to Black and White, 8x8, 16x16 and 32x32 pixel.

11 All formats can be attached to an MMS.

12 These formats may not be supported on the receiving mobile phone.

13 Played via Music Player.

14 Displayed in Pictures.

15 Played via Video Player. Handled as attachment only.

16 In its standard Playlist view, the Music player lists only MP3 files. Other types of audio tracks are displayed in the Manage tracks view, and which types to display can be changed via the Edit | Preferences menu.

17 The first frame of the animated GIF is displayed as a static image.

18 When encoded in a 3GP file. Played by the Video Player. See also note 3.

19 Locally stored content can be accessed via the file:/// URL, for example, File:d:///Media%20files/document/menu/menu.htm.

20 Will automatically launch the appropriate application.

21 Subject to OMA DRM Forward Lock restrictions.

Data Flow Summary

The diagram below shows a generalised view of the ways in which data can be imported, stored and exported. Data is stored in a generic multimedia structure for images, audio, documents, and other types (including video). Therefore, an image received as an e-mail attachment can be saved and used by any application capable of reading it.
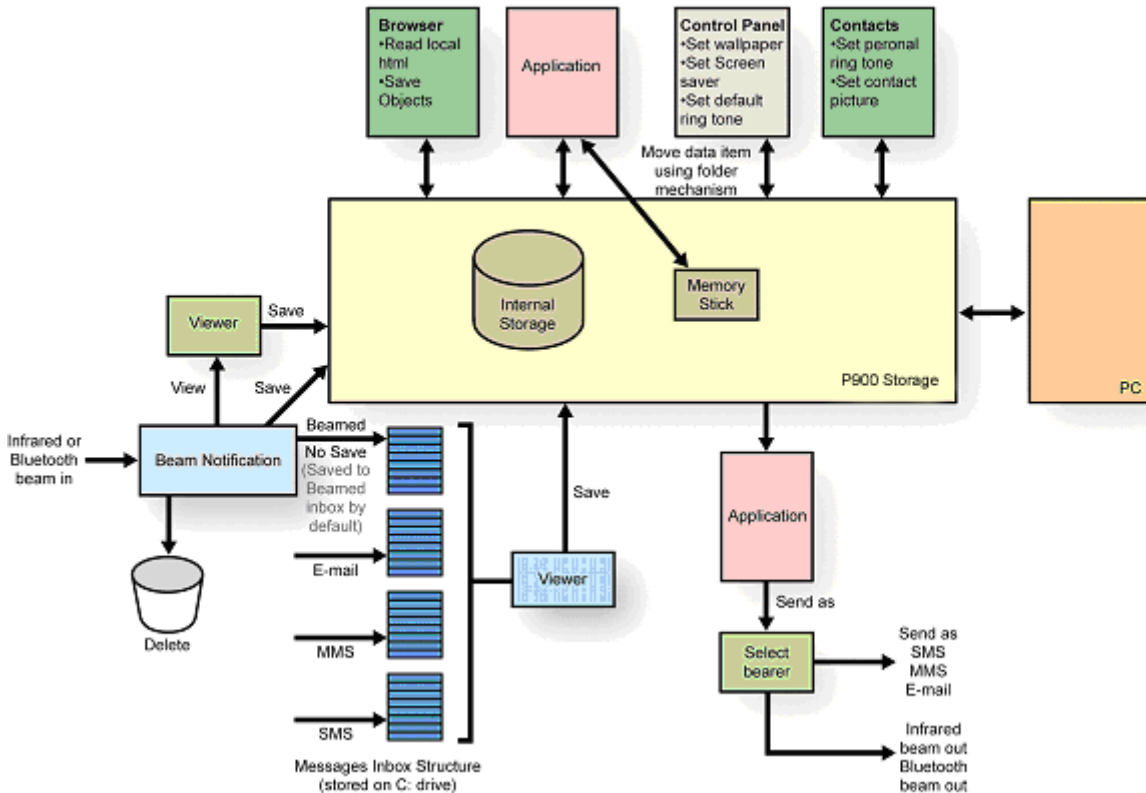
Beaming

When an infrared or Bluetooth beamed object is received, the user is immediately notified via an on-screen alert. The object can be viewed, saved or deleted. If no action is taken, the object is saved in the Beamed Inbox in Messages.

The Send as command in many applications allows an item of data to be beamed from the P900. For more information see Object Exchange – 'Send as' on page 97.

Viewer

The 'Viewer' boxes, in the diagram above, are instances of P900 applications that show selected details of the object and provide an option to save the object.

Messages

Objects embedded in, or attached to, messages can be viewed and saved via the Viewer mechanism described above. Background and ringtones can be selected directly from MMS messages.

The Send as command in many applications allows objects to be sent with a message. It is also possible to add multimedia attachments whilst composing MMS and e-mail messages.

Application Behaviour

This section highlights certain application capabilities that are useful to understand.

Browser

The Browser is able to read HTML based content from local storage. More importantly, a long tap on an object such as a picture will display a menu, from which it is possible to save the object to storage. This enables images to be collected and saved in internal or Memory Stick storage.

Folders

Almost all applications use folders to allow the user to sort information into useful groups. This mechanism can also be used to move an object between the Internal Storage and the Memory Stick. The Application summary table on page 36 shows which built-in applications have this ability. A separate application menu function, where provided, enables an object to be copied between Internal Storage and Memory Stick.

Control Panel

Background, Screen Saver, and default ringtone are set here. Refer to Personalization and Customization on page 81 for more information.

Contacts

In Contacts, the user can select a picture from the P900 storage and save a copy against a contact. A compatible audio file can be linked to a contact and played as a ringtone when that contact is identified as the calling party.

PC Suite for P900

The PC Suite for P900 enables multimedia content to be freely copied and moved between the P900 storage and a connected PC. The Internal Storage and Memory Stick appear as separate drives when viewed from the PC. See Synchronisation & Data Transfer on page 91.

Music player

The P900 Music player is a multi-format digital audio player, which enables the user to play a selection of favourite songs.

Music player Specification

- Formats: MP3, WAV, AU, AMR, MIDI, RMF, and iMelody.
- Features: Playlists, Random order, Loop, Automatic pause on incoming call.

Songs may be stored in the internal P900 user storage and on Memory Stick. Songs may be collected in numerous ways, including Internet download, file transfer from the PC using SyncStation and, of course, Memory Stick.

The Music Player is intelligently aware of other applications on the P900:

- Playback is paused when a telephone call is made or an incoming call is accepted.
- Playback is paused if the user starts another application, which requires the audio channels to be dedicated to it.
- Playback of MP3 files continues if the user switches to another application, thus providing music while using other applications such as PIM or Messages. Playback is also unaffected when opening or closing the flip.

The Music player is started from the Application Launcher and is accessed in Flip Open or Flip Closed mode.

The playlist is shown in the lower half of the screen and the currently selected track is shown at the top. The playlist is made up from all the tracks found in the selected folder – the image on the left shows all the folders (internal memory and Memory Stick Duo) have been selected.

The duration of the track is displayed in the top half of the screen together with information extracted from the file. For MP3 tracks, information is read from the ID3 tags in the file, and this includes artist, album and filename. ID3 1.x and 2.0 is supported.

Songs can be played in consecutive order or in a random sequence. A Loop function enables the playlist to be repeated automatically, providing continuous music.

Preference settings allow different file types to be included or excluded from the playlist. By default, only MP3 audio files are listed.

The Manage Tracks menu option allows tracks to be moved to different folders to make-up playlists. Tracks can also be deleted.

Imaging

CommuniCorder

The P900 has a built-in camera for taking still pictures and video recordings.

The still picture resolution can be set to:

- 640 x 480 pixel (VGA) (307,200 pixels), or
- 320 x 240 (QVGA), or
- 160 x 120 (QQVGA).

All these resolutions provide a 24 bit colour depth (16 million colours).

The video recorder has a 176 x 144 pixel (QCIF) resolution and uses real time video encoding with 3GPP H.263 or MPEG4 compression, together with Adaptive Multi-Rate (AMR) compressed sound. For details refer to the table on page 128. For a suitable PC Player please refer to http://www.sonyericsson.com/p900/videoplayer.

The CommuniCorder may be used in Flip Closed mode for fast point-and-shoot pictures using the screen as the viewfinder. The lens is recessed into the back of the P900. With the flip open, the viewfinder is supplemented with graphical controls and access to camera settings. For still images, the viewfinder is always 160 x 120 pixels, irrespective of the resolution at which the picture is taken. In video modes the viewfinder is 176 x 144 pixels. A dedicated hardware button on the side of the P900 provides fast access to the CommuniCorder application.

Images are stored in the P900's filing system and are therefore available for other applications to use. The number of images that can be stored depends on the available file space, which is shared with other applications. In FO mode, the viewfinder will give an estimation of the number of images remaining using the current settings for size and quality. Approximate JPEG file sizes are 50 Kbytes for VGA, 18 Kbytes for QVGA and 3 Kbytes for QQVGA (for medium quality images).

Images are placed into a user-definable folder on either internal or Memory Stick storage. They may be viewed and organized in the Pictures application, and are available for use by other P900 and third party applications.

Ready/Busy Indicator

Recording time remaining

Mode selection – operated by rotating the Jog Dial

View finder

In Flip Closed mode, the CommuniCorder is optimized for rapid 'point-and-shoot' operation.

The first press on the CommuniCorder button will switch on the viewfinder. Each further press on the button will then act as the shutter control – depending on the mode, either taking still pictures, or alternately starting and stopping the video recorder

Picture size and quality indicators

Number of pictures that may be taken with current camera settings and the available memory

Shutter control

MMS button

Shortcut to the Pictures application
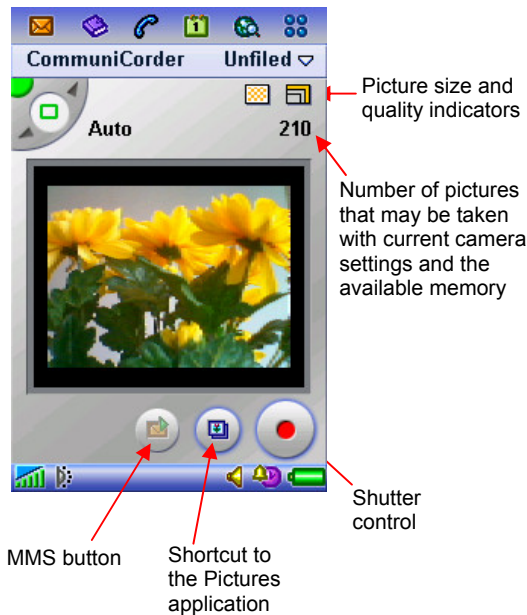
With the flip open the additional on-screen controls are:

- Shutter
- View all pictures (shortcut to Pictures)
- MMS (link to the Messages application). The last picture or video clip is automatically added to a new MMS message.

The mode control at the top left of the screen allows rapid selection of video or camera mode.
A number of preset options are available for video and camera mode:

- **Video** – sets video mode.
- **Auto** – automatic settings to suit the current lighting conditions.
- **Night** – preset for low light also the viewfinder refresh rate is reduced from 15 to 7 fps.
- **Indoor** – preset for typical indoor lighting.
- **Outdoor** – daylight settings.
- **Message picture** – creates QQVGA image that conforms with MMS specifications.
- **Message video –** sets video format that conforms with MMS specifications.

Manual control is available for a range of CommuniCorder settings:

- **Image size**
- **High/Medium/Low quality** (low uses least storage space)
- **Video clip size** (limit can be set in seconds or kilobytes)
- **Brightness** and **Contrast**
- **Backlight mode** (when there is light behind the subject in the viewfinder)
- **Flicker-free mode** (for fluorescent lighting)
- **Lighting** (automatic or one of 4 pre-set values)
- **Delay timer** (1 to 25 seconds between shutter operation and the picture being taken)
- **Picture freeze timer** (1 to 10 seconds following a picture being taken)

Pictures

Pictures is the P900's image viewer. It enables you to view and organize your photographs, including pictures taken by the built-in CommuniCorder plus images loaded from elsewhere, such as received via E-Mail or stored on a Memory Stick. Pictures supports image types JPEG, BMP, GIF (including animated), MBM, PNG and WBMP.
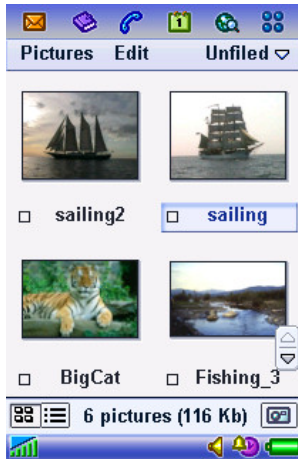
Images may be viewed in a list or as thumbnails and sorted by name, date, size or type. One or more pictures can be selected and then moved, copied or deleted.

Tapping an image or image name in the List view launches the Detail view. Buttons are provided for zooming the image and browsing through pictures in the active directory. From the menu, the Image editor application can be launched.

Images may be expanded to fit the width of the screen (portrait) or expanded and rotated to fit the full screen (landscape).

Image Editor

Using the Image editor, it is possible to crop, rotate and resize JPEG images. The editor also includes tools for drawing on the image using the stylus. Different pen sizes and colours are available, as well as a text tool for formatting and inserting text into the image.

When creating MMS messages, the Image editor is used for editing inserted JPEG and BMP images as well as for creating simple JPEG images from scratch.

A simpler version of the Image editor is available for creating images for EMS messages.

Using Images

Pictures may be up loaded to the internet. Sony Style Imaging is an on-line album enabling you to share your pictures and video clips.

www.sonystyle-imaging.com

Pictures can be easily sent as a Multimedia Message. Simply select a picture, add a message and send just like an SMS or build a slide show with several images and your favourite sound clips.

Pictures of your friends can be saved in Contacts. When a contact calls (or you call that contact), the picture is displayed with the details of the call. This is known as 'Picture Phone Book'

Images may also be shared using Bluetooth or Infrared links.

Video Player

The P900 Video Player is used in Flip Open mode only.

Locally Stored Clips

Video clips may be downloaded from the Internet or copied over from a connected PC. Video files are large compared to still images. Video clips recorded on the P900 require approximately 1 MB storage per minute. Video files may be stored on Memory Stick as well as internal storage.

Files viewed on the P900 video player must be .3GP or .MP4, with video coded in MPEG-4 Simple Visual Profile and audio in AAC or AMR format.
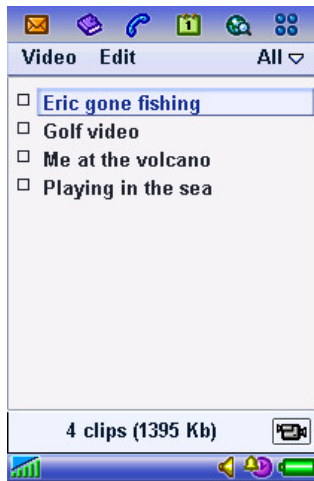
List view – videos may be sorted by name, date or size. One or more videos can be selected and then moved, copied or deleted.

Tapping a title launches the Detail view.

A shortcut to the CommuniCorder application is provided.
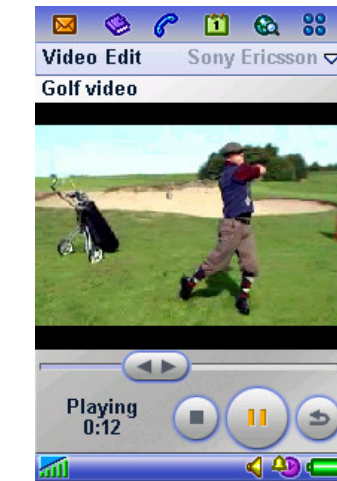
The Detail view is where the video is played. From the menu, the clip can be renamed, copied or deleted, or sent via Bluetooth, infrared or MMS.

The video may also be viewed in full screen. The video is played in landscape mode while maintaining the original aspect ratio.

Streaming Support in the P900

The Video Player can be launched from hyperlinks in the Browser or in messages. Content is streamed using RTSP (Real Time Streaming Protocol) session control according to 3GPP specification.

Audio support is AAC and AMR according to 3GPP

3GPP specifies the following codecs:

- H.263 Profile 0 Level 10 (mandatory)
- MPEG-4 Visual Simple Profile Level 0 (optional)
- H263 Profile 3 Level 10 (optional)

The first two codecs are supported by the P900.

Recommended Settings

The table shows the recommended video coder settings to optimize video for the P900.

	Video Bandwidth	Video Size	Audio Sample/Bit Rate	Audio Channels
Video + AAC	64 Kbps	192 x 144	22.05 kHz / 32 Kbps	Stereo
Video + AMR	64 Kbps	192 x 144	8.00 kHz / 12.2 Kbps	Mono

Note: The P900 Video player application supports a maximum video size of 192x144, which is slightly larger than QCIF (176x144). The 3GPP standard is QCIF.

More information on video formats are available at http://www.sonyericsson.com/developer.

Memory Stick® Duo™

Memory Stick® provides a convenient way of adding storage and other functions to a wide range of devices. The P900 supports Memory Stick® Duo™, a miniature version of the Memory Stick series which is just one third the physical size of standard Memory Sticks. Memory Stick Duo starts at 8 MB and has a roadmap, which foresees sizes up to 1Gbyte in the future. A 32 MB Memory Stick Duo is supplied with the P900 and sizes up to 128 MB are supported.

A Memory Stick Duo can be plugged into any standard size Memory Stick slot using a Memory Stick Duo Adaptor. The two types have full electrical and file system compatibility.

Physical and Electrical Properties

Memory Stick Duo is very space-efficient. It is 20mm wide, 1.6mm high and 31mm deep, giving a volume of 992 mm^3. Memory Stick Duo weighs 2 grams.

The electrical contact consists of 10 pins in a structure, which prevents direct touch, providing high contact reliability. Current maximum transfer speed is 2.45 MB/second to read data and 1.8 MB/second when writing data. An erasure prevention switch protects important content and data.

Memory Stick Versions and Compatibility

There are currently several versions of the Memory Stick Duo:

Memory Stick Duo

Available Sizes: 8, 16, 32 MB (standard), 64 and 128 MB (Magic Gate). Maximum size 128 MB

Hardware interface: Serial

Write protect switch: No

Colour: Violet (standard), white (Magic Gate)

File system: FAT16

Memory Stick Duo New

Available Sizes: 32, 64, 128 MB (Magic Gate). Maximum size 128 MB

Hardware interface: Serial, parallel

Write protect switch: No

Colour: Dark blue

File system: FAT 16

Memory Stick Duo Pro

Available Sizes: 256, 512 MB (Magic Gate). Up to 4GB will be supported.

Hardware interface: Serial, parallel

Write protect switch: No

Colour: Yellow

File system: Fat 32

The file system FAT16 supports sizes up to 128 MB; FAT32 will support sizes up to 4 GB. The P900/908 can currently only use FAT16.

The parallel hardware interface gives more than double the read/write speed compared to the serial interface. The P900/908 uses only the serial interface.

Memory Stick Support

PC and Apple Mac Support

PCs and Apple Macs may be enabled for Memory Stick via built-in Memory Stick slots, Floppy Disk adaptors, PC Card adaptors, USB adaptors and even a Memory Stick enabled mouse. (Memory Stick Duo Adaptor required)

Industry Support

Memory Stick is supported by a wide range of companies including major names in consumer electronics, computing, automotive, mobile phone, photographic and semiconductor sectors of industry. As at 14th November 2002, 376 companies have declared support at www.memorystick.org

Memory Stick compliant products include PCs, PDAs, digital cameras, portable music players, printers, projectors and entertainment robots. Future applications include home and car audio, game machines and multimedia kiosks.

Memory Sticks are currently marketed by Sony, SanDisk, Lexar Media, I-O Data Device Inc. and Apacer Technology. As of October 2002, there were already over 30 million Memory Sticks in use worldwide; this is expected to reach 200 million in 2005. (Source: http://www.memorystick.com/en)

Memory Stick Applications in the P900

Any number of Memory Stick Duo units can be used with a P900, providing virtually unlimited storage opportunities. Here are the main applications:

- Additional storage for pictures taken with the CommuniCorder
- Images from the CommuniCorder can be transferred to other image-aware devices such as PCs and printers.
- Transfer of data and media (sound, pictures, video clips, documents etc) between the P900 and a PC or Mac
- Save data and media from the P900 on to a Memory Stick, for example to make backup copies of important files.
- Transfer of data and media between P900s.
- New applications may be installed from a Memory Stick.
- Third party applications can make use of Memory Stick storage.
- Data can be transferred over SyncStation between a Memory Stick in the P900 and a connected PC.
- Personalize the P900 using media on a Memory Stick, for example ring signals, alarm sounds and pictures of contacts.
- Use media on a Memory Stick when composing MMS messages.

Specifically, the following built-in applications are enabled to work with the Memory Stick: CommuniCorder, Pictures, Video Player, Music player, E-Mail (attachments), Viewers (e.g. Word), MMS (media), Browser, Phone (ringtones, screensaver), Contacts (pictures of contacts; ringtones).

Compatibility with other Memory Stick devices

The P900 defines its own folder structure on a Memory Stick, within a vendor-specific area and this is the only area that is accessed by all of the P900 applications, except for the File Manager. The File Manager may be used to move files between the P900's MMFH (Multimedia File Handling) system and folders placed on the Memory Stick by other devices, thus allowing files to be shared between the P900 and other devices.

Memory Stick connected to a PC

Using the supplied Memory Stick Duo Adaptor, the P900's Memory Stick Duo may be inserted into a memory-stick enabled PC or camera.

In the example below, the Sony Vaio PC locates the Memory Stick on the S: drive. The memory stick is new and has been initialised by the P900. Note that some capacity is taken up by the filing system.
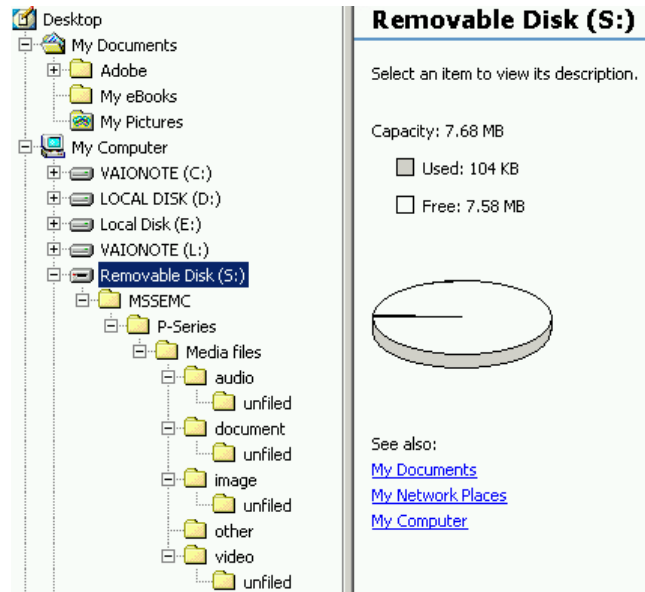
Folders **MMSEMC** and **P-Series** identify the data structure as that of the P900, according to defined Memory Stick conventions. Media data is stored in the standard P900 structure.

Messages

The P900 Messages application has integrated support for SMS, EMS, MMS, and E-Mail from a unified UI. Messages may be addressed using the contacts data and hyperlinks are supported in all message types to create E-Mails, call telephone numbers and navigate directly to web and WAP pages that are referenced in the text.
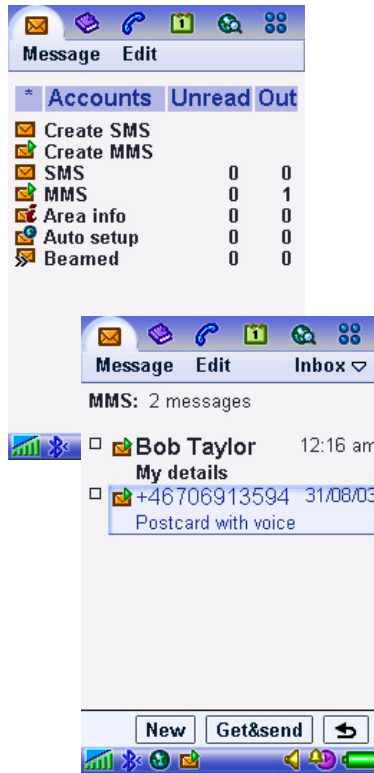
- **SMS** (Short Message Service): With SMS a user can send text messages containing up to 160 characters to and from GSM mobile stations (up to 70 characters using Chinese text). P900 also provides concatenated SMS, i.e. the user can write a longer message and the P900 will automatically send it using more than one SMS.
  Over The Air setup messages are held in a special 'Auto Setup' mailbox
  Area information (SMS Cell Broadcast) is a type of text message sent to subscribers within a network area.
  EMS (Enhanced Messaging Service) enables the user to include graphics, sounds and font attributes as part of a text message, which can then be sent over the normal GSM/SMS service. Such messages may also be received and the extra media objects saved.
- **MMS** provides true multimedia capability with real pictures, sound and time-based sequencing.
- The **E-Mail** client supports POP3 and IMAP4 E-Mail and multiple accounts may be set up, for example business and personal. Attachment viewers are included for Microsoft® Word, Excel, PowerPoint® and Adobe® Acrobat® (PDF), with approx. 20 more available from the CD-ROM
- Incoming beamed items will be found in the 'Beamed' mailbox

EMS (Enhanced Messaging Service)

Enhanced Messaging Service (EMS) adds powerful functionality to the well-known SMS standard. With it, mobile phone users can add life to SMS text messages in the form of pictures, animations, sound and formatted text. This gives the users new ways to express feelings, moods and personality in SMS messages. As well as messaging, users will enjoy collecting and swapping pictures, ring signals, and other melodies.

EMS uses existing SMS infrastructure and industry standards, keeping investments to a minimum for operators and providing a familiar user interface and compatibility with existing phones and with other manufacturers. EMS is part of the 3GPP standards.

An EMS message can be sent to a mobile phone that does not support EMS, or only supports part of EMS. All the EMS elements i.e. text formatting, pictures, animations and sounds are located in the message header. The EMS contents will be ignored by a receiving phone that does not support the standard. Only the text message will be displayed to the receiver. This is true consumer-friendly standardisation. EMS is compatible to SMS across most of the range of mobile phones from the oldest to the newest.

Some companies in the mobile phone industry have developed their own messaging technologies, which only work with their own phone models. Network operators are in favour of EMS because it is universal – many of the major mobile phone manufacturers are constructively improving and developing the EMS standards even further for implementation in their products.

Examples of EMS contents and applications

A wide range of contents, applications and services may be developed. Below is a list of examples and areas where messaging can be enhanced with EMS:

- User-to-user message
- Message notifications for voicemail, e-mail, unified messaging
- Illustrated news & commercials

EMS Media Objects in the P900

Sounds and melodies
EMS sound is in the form of simple melodies according to the iMelody standard. Multiple sounds may be included in a message.

A library of sounds is included with the P900. Additional sounds may be copied from incoming EMS messages and pasted in to a new message. Sounds from received messages can also be stored and accessed via the Select sound dialog.

EMS also has pre-defined sounds such as 'Chime high' and 'Notify.' Rather than sending the complete sound to the receiving phone, EMS sends a 'token' instructing the receiving phone to play that sound according to its own library. When the P900 receives a message that includes an EMS pre-defined sound, it will be played in polyphonic form.

The P900 does not include a melody composer for EMS, but it is possible to set ringtones from melodies received in EMS messages.

Pictures and Animations
EMS pictures and animations are in the form of small bitmaps. These are transmitted in binary black and white (meaning that there are no scales of grey in between). Multiple pictures can be added to a message.

Example 32 x 32 pixel pictures

A library of pictures is included with the P900. Images are stored in the 'Predefined' folder (32 x 32 pixel images) and animations are stored in 'Predefined animations' (48 x 48 pixels). Images from received messages may also be saved. They are stored in a subfolder (called EMS) to the internal 'Images' folder, and available under 'Message images' within the EMS 'Select image' dialog. These images can then be edited and re-used, new images can be created using the Enhanced image editor.

Example stored colour animation for EMS

Pictures may be added to a message by copying and pasting them from received messages.

New images can be created using a simple grid and pen editor. Animations may not be created or edited.

EMS also has pre-defined images such as smilies. Rather than sending the smiley bitmap, a combination of characters is sent to instruct the receiving phone to display the pre-defined image. The P900 will display these images in colour, since a pre-defined image is always displayed from local P900 storage.

The P900 does not support the use of EMS to set background images because other methods are more appropriate for the large size and colour capability of the P900's screen.

Text

There are 3 text font sizes. **Bold**, *italic,* underline and ~~strike through~~ styles are available, and text may be aligned left, centre or right.

Concatenated messages

A part of the EMS standard is the support for concatenated messages, which means that the phone is able to automatically combine several messages both when creating and receiving EMS. This is useful to be able to build and display messages with rich content, since the amount of information in each SMS is limited by the SMS standards.

EMS Display in the P900
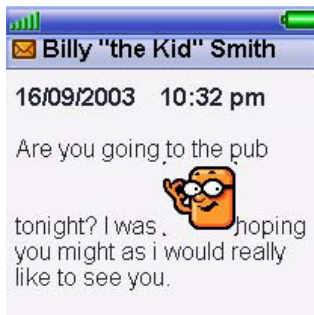
Receiving an EMS message in FC mode

In the P900, the extra facilities of EMS are integrated with the SMS UI, making it easy for the user to enrich an ordinary text message. A selection of icons and sound objects is included and more can be added via M-Services download.

Objects in received messages may be saved for re-use when composing outgoing messages, so as well as messaging users will enjoy collecting and swapping pictures, ring signals and other melodies.

Composing an EMS message in FO mode.

Simply tap on the required object and select copy or save from the Edit menu.

One message may contain several EMS objects, such as pictures, animations and sounds.

Messages may be created using the keypad to enter text in FC mode, or using handwriting recognition or virtual keyboard in FO mode.

MMS (Multimedia Messaging Service)

One of the key features in the P900 is the Multimedia Messaging Service (MMS), rapidly becoming the preferred messaging method of mobile terminal users, since the ability to send real pictures, video and sound greatly enhances the messaging experience. An MMS message from the P900 can contain text, graphics, animations, photographic images, audio clips, ring melodies and even a video clip.
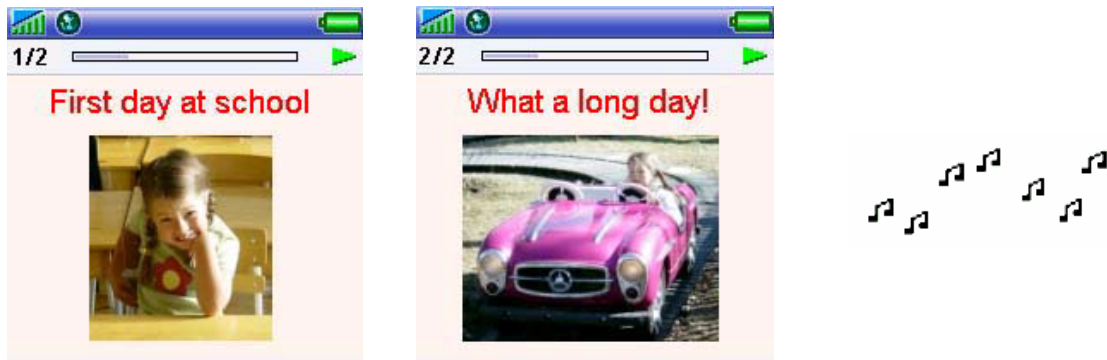
Defined and specified by 3GPP as a standard for third generation implementation, MMS completes the potential of messaging. Sending digital postcards and multiple-slide style presentations is expected to be among the most popular user applications of MMS. Eagerly awaited by young users in particular, MMS is projected to fuel the growth of related market segments. Using the Wireless Application Protocol (WAP) as bearer technology and powered by the high speed transmission technologies GPRS, EDGE and UMTS (W-CDMA), Multimedia Messaging allows users to send and receive messages that combine text and media in slides, having a built-in timing sequence decided by the sender. The messages may include combinations of text, graphics, photographic images, speech and music clips. MMS will serve as the default mode of messaging on all terminals, making total content exchange second nature. From utility to sheer fun, it offers benefits at every level and to every kind of user.

Benefits

Essentially enabling the mobile terminal to serve as image processor and conveyor, Multimedia Messaging accommodates the exchange of important visual information as readily as it facilitates fun. Business and leisure usage of MMS will be dynamically merged, resulting in enhanced personal efficiency for users and increased network activity for operators. In short, MMS affords total usage for total communication. Because MMS uses WAP as its bearer technology and is being standardised by 3GPP, it has wide industry support and offers full interoperability, which is a major benefit to service providers and end users. Ease-of-use resulting from both the gradual steps of the messaging evolution and the continuity of user experience gained from interoperability is assured.

The MMS server, through which MMS messages are sent, supports flexible addressing (to both normal phone numbers (MSISDN) and e-mail accounts), which makes user interface more friendly and allows greater control for operators. The MMS server, moreover, is responsible for the instant delivery feature of MMS.

MMS objects

Although MMS is a direct descendant of SMS, the difference in content is dramatic. The size of an average SMS message is about 140 bytes, while the maximum size of an MMS message is limited only by the memory. Multimedia Messages will initially be in the range 30k-100 Kbytes. The P900 is optimized for messages up to 200 Kbytes. In the P900, the MMS inbox is only constrained by the amount of storage available internally.

An MMS message can contain one or more of the following:

Text
Much larger amounts of text can be used in MMS messages when compared with SMS; thousands of characters can be included in a message. Text colour and size may be changed, and smilies may be inserted as with EMS messages.

Audio
MMS provides the ability to send and receive recorded audio and polyphonic sounds in messages. Not only can users share a favourite song or ring signal with a friend, they can also use the mobile phone to record sound and send it along with a message. Because sound includes speech as well as music, this extra dimension of an MMS message makes for enhanced immediacy of expression and communication. Rather than sending a downloaded birthday jingle in EMS, for example, a user can send a clip of his or her own personal rendition of 'Happy Birthday'.

Picture
With the built-in CommuniCorder, users can take a snapshot, or video clip, and immediately send it from the CommuniCorder application using the 'Send as MMS' menu option. Still pictures can also be taken directly from within the Messages application when creating new MMS messages. The ability to send pictures and video clips is one of the most exciting attributes of MMS, as it allows users to share meaningful moments with friends, family and colleagues.

Mobile picture transmission also offers inestimable utility in business applications, from sending on-site pictures of a construction project to capturing and storing an interesting design concept for later review. The ability to put text and pictures in a message allows users to create their own electronic postcards, an application that is expected to substantially cut into the traditional postcard-sending market.

The P900 supports the following image formats for MMS: GIF (including animated), JPEG, PNG, WBMP and BMP. Images may also be edited during message creation.

Scribble
A scribble is a simple image, such as a diagram, a cartoon or a roadmap, created from scratch by drawing with the stylus on the P900 screen. The built-in image editor lets the user select pen thickness and colour as well as insert text and crop, resize or rotate the picture.

Video
In addition to still pictures, it is possible to insert video in to an MMS. This may be a video clip recorded with the built-in CommuniCorder, or a downloaded video file. The MMS application is able to play video or streamed video. If a video clip is sent as an attachment, the video player is automatically launched when tapping the attached clip.

PIM Objects
With MMS in the P900, it is easy to send and receive business cards (vCard), Calendar and Tasks entries (vCal) and Jotter notes (text content is added to a slide). Received PIM objects are listed under the 'Attachments' tab.

SMIL presentations
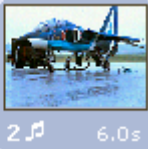
SMIL stands for Synchronised Multimedia Integration Language and is pronounced 'smile'. SMIL in the P900 allows the user to create and transmit multiple-slide style presentations on the mobile device. SMIL is an advanced XML-based protocol, and Sony Ericsson MMS supports a subset of this protocol. Using a simple media editor, users can incorporate audio and animated GIFs along with still images, animations and text to assemble full multimedia presentations. The idea of SMIL is to allow the user to customize the page timing in slide presentations. The user can decide in which order the image and text will be displayed, as well as for

how long the images and text lines are to be shown in the display. The user never sees the underlying SMIL code and does not need to understand it.

The P900 has an implementation of SMIL 2.0 Basic Profile. Messages created by the P900 use a subset of SMIL as defined in the Conformance Specification (see below).

SMIL Example
As an example, consider a two-slide message. In this case, it was created using the Sony Ericsson MMS Home Studio described in the Personalization and Customization section of this document.

	Slide 1	**Slide 2**
	Picture (Slide_1.jpg)	Picture (Slide_2.jpg)
	Text 'this is my new car'	No text
	Audio: Slide_1.midi	Audio: Slide_2.amr

The following files are used:

Name	Size	Type
mms	1 KB	SMIL Multimedia Presentation
Slide	1 KB	Text Document
Slide_1	13 KB	JPEG Image
Slide_1	11 KB	MIDI Sequence
Slide_2	8 KB	AMR File
Slide_2	10 KB	JPEG Image

Slide.txt contains the text for slide 1. The SMIL conveyed in the mms.smil file looks like this example:

```
<smil>
<head>
<meta name="generator" content="SEMC P9x0" />
<layout>
<root-layout width="160" height="160" />
<region id="Image" width="160" height="120" left="0" top="0" />
<region id="Text" width="160" height="20" left="0" top="120" />
</layout>
</head>
<body>
<par dur="35723ms">
<img src="Slide_1.jpg" region="Image" />
<audio src="slide_1.mid" end="35.723s" />
<text src="slide.txt" region="Text" />
</par>
<par dur="6.026s">
<img src="slide_2.jpg" region="Image" />
<audio src="slide_2.amr" end="6.026s" />
</par>
</body>
</smil>
```

The components of the message will be encapsulated, as in the example below:
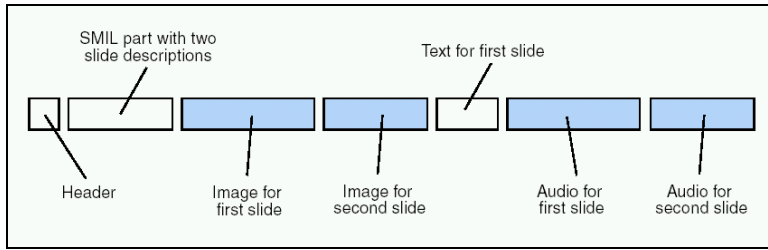
Media Object Timing

Timing of individual media objects must be within the overall slide time. This provides plenty of flexibility and greatly reduces the complexity of building a presentation.

The user may add text, an image and a sound clip to each slide. The timing of each object within the slide can be adjusted. The default timings are as follows:

Object type	Start Point (Seconds from start of slide)	Default Duration (Seconds)
Text	0	5 seconds
Image	0	5 seconds
Video	0	Duration of video [1]
Animation (GIF)	0	5 seconds
Audio	0	Duration of audio clip [1]
No Content	0	5 seconds

1. Assuming the length of the clip is more than 5 seconds. If the clip is shorter, default duration is 5 seconds.

The user is allowed to shorten the duration of a slide such that any media item would be truncated, but the media object timing must have been reduced first. The following example helps explain P900 timing behaviour:
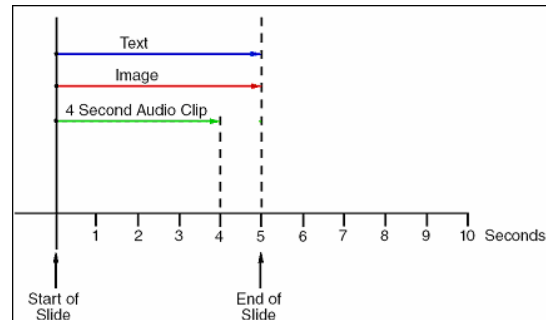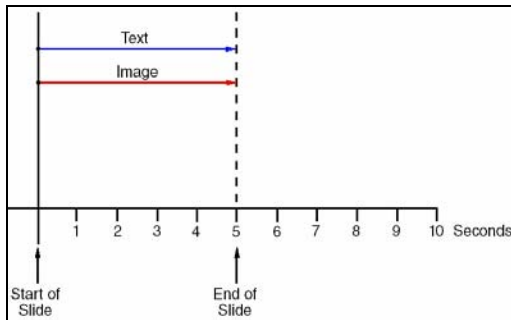
The user creates a new message using the Blank template. An image (still picture or video) and some text are then added. Both of these are set to last 5 seconds, which is the default duration of a slide.

A 4 second audio clip is now added. The duration of the slide will remain at 5 seconds.
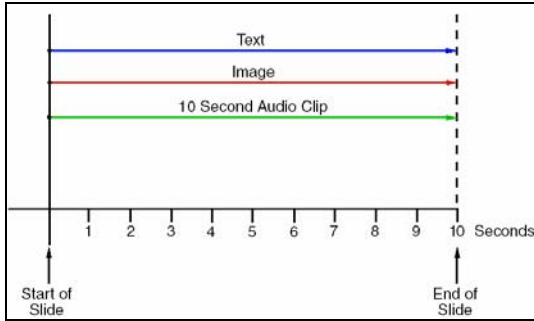
If a 10 second audio clip is added, the slide duration automatically increases to match. The user may reduce the duration of the audio, and the page time will reduce accordingly. The audio will be truncated after the newly set duration.

Templates

A template is a predefined message containing one or more slides. It may be modified by the user to quickly produce an attractive message. The Blank template is the default – in this case, nothing is pre-selected and the user may create slides as required.

The P900 comes with a number of pre-defined templates, all of which have sound and an animated image (GIF format, 160 x 120 pixels). These and other useful content pre-loaded by Sony Ericsson are described in Personalization and Customization on page 81.

Smart templates are also provided that will automatically launch the appropriate applications needed for each part of the MMS.

Users may store a favourite message as a template. User installed and ordinary pre-defined templates can be deleted. Smart templates may however not be deleted as they are used to provide QuickShare functionality.

Notification and download

When the user has an incoming multimedia messages she will receive a notification, in the same way as for text messages. The user can specify if and when she wishes to download the actual message. The following alternatives are available:

- On – always download the message automatically.
- Home only – messages are downloaded automatically only when connected to the home network.
- Off – messages have to be downloaded manually.

Also, additional restrictions can be placed on downloads:

- Message size – either no restriction, or smaller than a specified file size.
- Exclude Message classes – option to block Advertisements, and/or Information messages.
- Exclude Anonymous sender – option to exclude messages from senders not listed in Contacts, or where sender information has been hidden.

Interoperability and Conformance

The P900 is fully conformant with OMA Multimedia Messaging Service version 1.1. However, it has much greater capabilities than those specified in the conformance document. The user may therefore choose for an alert to be shown if a message exceeds the specifications. The setting is called 'Content alert' and may be found in Control Panel, Messaging accounts, MMS, Advanced. Content alert is useful when sending messages to smaller less capable MMS phones.

When Content Alert is active, images that are bigger than the standard, and messages that exceed the message size limit, will cause warnings to occur. When non-conformant messages are received, they will be displayed within the capability of the SMIL player.

Media Object Summary

The table below shows the media standards supported by MMS on the P900.

Standard	Media Type	Conformance Mode	
		Standard	None
US-ASCII (IANA MIBEnum 3)	Text	Y	Y
UTF-8 (IANA MIBEnum 100)	Text	Y	Y
UTF-16 (IANA MIBEnum 1000) with explicit BOM (Byte Order Mark)	Text	Y	Y
UCS-2 ISO/IEC 10646	Text		Y
AMR	Audio	Y	Y
AU	Audio		Y
IMelody	Audio		Y
MIDI	Audio		Y
RMF	Audio		Y
WAV	Audio		Y
JPEG/JFIF	Image	Y	Y
GIF-87a	Image	Y	Y
GIF-89a (spec includes animation)	Image	GIF89	Y
WBMP	Image	Y	Y
BMP	Image		Y
PNG	Image		Y
3GP	Image		Y
MPEG4	Image		Y

The MMS player will render all of the above formats. The display window for images is 200 x 120 pixels in FC mode and 200 x 200 pixels in FO mode. These are the optimal sizes for images where MMS messages are composed specifically for the P900. Incoming images larger than this will be re-scaled to fit within the window, preserving aspect ratio.

Composing a multimedia message on the P900

Multimedia messages may be created in FC or, as shown below, in FO mode.
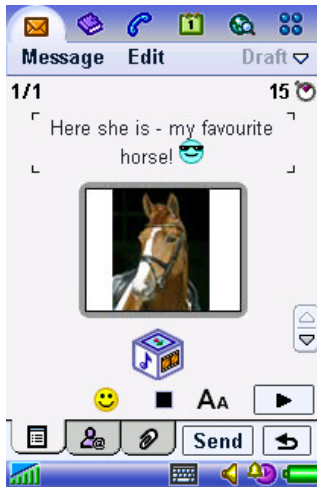
Composing a multimedia message is like building a small slide presentation. A typical slide will consist of a picture and text. Sound can be added to complete a slide. The user can select background colour, and the size and colour of text.

The user can set the duration of the slide. The default time is 5 seconds. If a sound or video is added, the slide duration is automatically set to the duration of the clip if it is longer than the default time of 5 seconds.

Slides can be chained together to make a sequence. Timing elements can be added to control the display of images and text within a slide. The user can preview the message before sending and make any timing adjustments via the UI. Slide order may also be changed.

Multimedia messages can be created using any suitable media in the user storage space – including media downloaded from the internet, synchronised from a PC or created on the P900 itself. Simply tap the placeholder in the slide template and select the required item.

An Image editor is provided so that images may be modified before sending. It can also be used to create drawings from scratch. The available functions are:

- Crop (Select a part of the picture, for example just the cat)
- Rotate
- Pen (Draw on the picture in a choice of colour and thickness)
- Insertion and formatting of text
- Scale (Resize image)
- Undo operations

The pen function enables notes and drawings to be made on images. These become part of the image and cannot be erased separately from the image itself. The annotated image (with pen) is saved separately and sent with the message, leaving the original image unmarked.

The MMS message is compiled using MIME standards and consists of the following parts:

- One part containing the description of the slides, using MMS SMIL.
- One part containing the actual contents of the slides – text, images and sound.

Receiving a multimedia message

The user can choose to retrieve messages automatically, or just receive notifications of available messages. In the latter case, the user then manually selects which messages to download. Received messages are located in the MMS inbox.

MMS playback in Flip closed mode
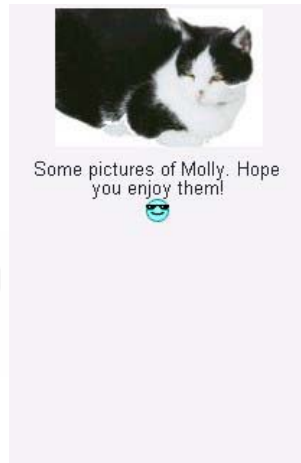
MMS Playback in Flip open, fullscreen mode.
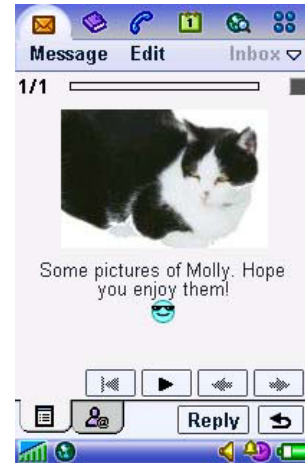
MMS Playback in Flip open, edit mode.

Receiving a multimedia message on other terminals

Interoperability is dependent upon the capability of the receiving terminal and the MMS server in the mobile network.

For example, the Sony Ericsson T610 is enhanced with MMS, enabling multimedia messages to be exchanged with excellent compatibility.

For a mobile without MMS, the text may be sent by SMS together with a URL, which enables the picture and message to be seen via the WAP browser.

E-Mail

P900 E-Mail Features

The P900 E-Mail client supports the following standards:

POP3	Post Office Protocol 3	POP is used to copy, move and delete messages from an incoming mail server in the network
IMAP4	Internet Message Access Protocol	IMAP is also used to copy, move and delete messages from an incoming mail server. IMAP has more features than POP, but the P900 behaves in the same manner whichever is used.
MIME	Multipurpose Internet Mail Extension	MIME is a protocol describing data, for example to define the attachments included in an e-mail.

These standards are supported by most Internet Service Providers and many corporate environments. Any number of E-Mail accounts may be set up – a typical configuration will be one business and one personal account. OTA configuration of E-Mail and ISP accounts is supported. E-Mail accounts and associated ISP accounts may be remotely configured over the air.

Built-in password generators from RSA Security and Secure Computing and make it possible for the P900 to connect corporate networks which use these popular access controls, so allowing corporate e-mail to be used.

When connected via GPRS, automatic polling can be used so that E-Mail is automatically collected and presented in the Inbox. Controls are provided to filter messages based on size, enabling cost and download time to be managed. Another option enables only e-mail headers to be presented in the inbox. Headers are quick to download. The user may read and select headers and request the message to be downloaded.

Attachments may be viewed using the built-in viewers for Microsoft® Word, Excel, PowerPoint® and Adobe® Acrobat® (PDF). More viewers may be loaded from the supplied CD-ROM. See Viewer section for more information.

A signature may be set up so that essential details are automatically copied to the end of each outgoing e-mail.

The supplied PC Suite for P900 enables E-Mail to be synchronised with Microsoft® Outlook® and Lotus® Notes®. During synchronisation, new e-mail from the PC is transferred in to the corresponding 'Synchronised e-mail account' inbox on the P900. Messages and replies written using this account on the P900 are transferred and sent via the PC.

Web and WAP based e-mail can, of course, be accessed using the P900's browser.

E-Mail Fetch and Delete Operation

The P900 is designed to work either as the only means of accessing e-mail, or to work together with a PC which accesses the same e-mail account. It is useful to explain how each case works.

E-Mail account accessed by the P900 alone

The P900 Messages application fetches e-mail from the POP server using the COPY method. This means that e-mails are copied from the server and therefore two copies exist, one at the server and one in the P900 e-mail inbox.

When the P900 connects to the POP server, an e-mail synchronisation process takes place that follows these three simple rules:

- New incoming e-mails are always copied to the P900.
- Incoming e-mails deleted on the P900 will be deleted from the POP server during the next 'Get&Send'.
- Incoming e-mails deleted on the POP server by another e-mail client, e.g. on the user's PC, will be deleted from the P900 during the next 'Get&Send'.

Outgoing e-mails are stored in the P900 and will need to be deleted, as required, to free up storage space.

E-Mail account accessed by the P900 and another device

A common configuration is to use the P900 to access e-mail whilst on the move, but to maintain a master copy of e-mail on a PC. In this case, the e-mail client on the PC must be set to copy from the server. For example, in Microsoft Outlook Express this is done by selecting Tools, Accounts, Properties, Advanced tab and tick 'Leave a copy of messages on server'

All messages will now be received at both the P900 and the PC.

From time to time it will be necessary to delete messages on the P900 in order to create free storage. Before doing this, ensure that the PC has already collected the messages that will be deleted on the P900.

E-Mail account accessed by the P900 and another device – Alternative Setup

If the P900 is only used for reading mail when away from the PC and it is not required to retain any mail on the P900 after it has been copied to the PC then the following alternative may be preferred.

Leave the PC e-mail client on the default setting of MOVE messages from the server (i.e. do not leave a copy of the message on the server). In this case, the behaviour will be as follows:

- PC Sends and receives e-mail before leaving the office.
- P900 inbox will be emptied if 'Get&Send' is performed immediately after the PC has checked for e-mails.
- New messages through the day will be received on the P900.
- Upon return to the office, a Send and Receive on the PC will collect the day's messages, minus any that were deleted on the P900. A 'Get&Send' is then performed on the P900 to empty its inbox.

Area Information

Area Information, commonly known as SMS Cell Broadcast, is a method of sending text messages to mobile phones within a certain part of the network. For example, traffic news can be sent to users in a single cell or a group of cells. It is not widely deployed by network operators.

Information is organized into numbered channels. The user selects the required channels in the P900 Control Panel, Messaging Accounts, CBS tab. The requested text messages are received and placed in the 'Area info' mailbox.

Cell Information may be switched on and off in the Control Panel. When enabled and supported by the network, the ID of the current cell (or group of cells) will be displayed underneath the network operator name in the FC phone display. This is often the telephone area code or postal code of the current location.

Document Viewer

The P900 Viewer application enables the user to manage and view a wide range of document formats. A set of plug-ins is included for common document types and more can be loaded from the Multimedia for P900 CD-ROM. Viewer will list the documents that it finds on Internal and Memory Stick storage. Documents can be opened from the list.
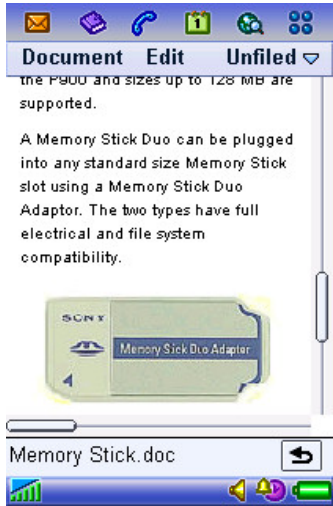
Viewer is also automatically started when opening an e-mail attachment, in which case the user can also choose to save the document.

Exact options whilst viewing a document depend on the document type. For example, when viewing a Microsoft® Word document, draft (text only), Normal (text, tables, graphics) and Page (whole page on the screen) views are available. Text can be copied from the document and pasted into, for example, a Jotter note or an e-mail.

Viewer supports a subset of functionality in each case, for example, Word headers and footers will not be displayed.

Documents can be exchanged using Memory Stick, infrared, Bluetooth wireless technology, MMS and e-mail.
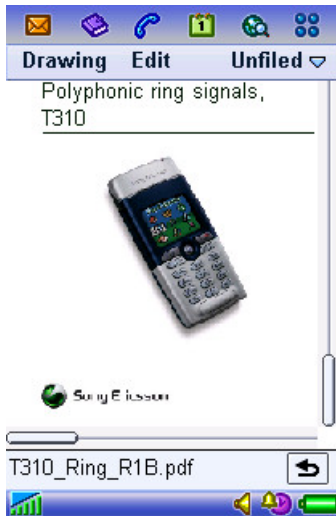
When viewing a PDF document, it can be fitted to the width of the screen or to the window.

It is also possible to zoom in and out.

Document Types Supported

Document type	Group	Location	Notes
Adobe® Acrobat® (PDF)	Built-in	Built-in	
Microsoft® Excel	Built-in	Built-in	
Microsoft® PowerPoint®	Built-in	Built-in	
Microsoft® Word	Built-in	Built-in	
Rich Text File (RTF)	Extended Office	CD	
Microsoft® Project	Extended Office	CD	
Microsoft® Visio®	Extended Office	CD	
Microsoft® Excel	Extended Office	CD	Older formats
Microsoft® PowerPoint®	Extended Office	CD	Older formats
Microsoft® Word	Extended Office	CD	Older formats
Corel® WordPerfect®	WordPerfect	CD	4.0 to 8.0
Corel® WordPerfect® Graphics	WordPerfect	CD	
Corel® Presentations	WordPerfect	CD	
Corel® Quattro® Pro	WordPerfect	CD	
Lotus® 1-2-3®	Lotus	CD	
Lotus® Ami Professional Draw	Lotus	CD	
PKZip®	Archive	CD	
Gnu Zip	Archive	CD	
CGM	Graphics	CD	
Fax	Graphics	CD	
PCX	Graphics	CD	
Ichitaro	Other	CD	
Microsoft® Outlook® message file	Other	CD	
PFS: First Choice	Other	CD	
PFS: Write	Other	CD	

Document Editors

Trial versions of editors for MS Word and MS Excel documents are included on the Multimedia CD. Full versions can be purchased according to instructions on the CD.

Browser, M-Services and MeT

The P900 features an integrated browser capable of browsing WAP, Web (HTML) and cHTML content from a common User Interface (UI).

P900 Browser

Content Types Supported

The P900 browser, called 'Internet,' supports all of the following content types within a single browser, directly or via a gateway/proxy.

World Wide Web (WWW) - HTML

The WWW is the most popular method of publishing information on the internet and on company intranets. Content is organized using the Hypertext Markup Language (HTML).

The P900 browser can read HTML pages and therefore gives access to a vast amount of existing material. Of course, much of the content on the WWW is aimed at large screens and will therefore require scrolling on the P900. However, some websites, and more frequently those of interest to the mobile user, have 'low graphics' or 'mobile friendly' options, which are better suited to small screens.

HTML 3.2 is supported, minus some features that are applicable to large screen devices such as PCs. The main points to note are that the P900 browser has limited support for Frames or JavaScript

Wireless Application Protocol (WAP) - WML
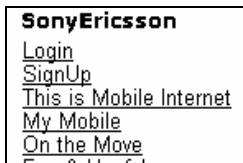
WAP uses Wireless Markup Language (WML), which is like HTML but specially optimized for mobile devices. The P900 browser is compliant with WML 1.3 and therefore gives access to a world of existing WAP content. The large touchscreen and multiple WAP accounts make it easy to access and surf WAP pages

Wireless Application Protocol (WAP) 2.0 – xHTML

Extensible Hypertext Markup Language, xHTML, is a combination of HTML 4.0 and XML, managed by the World Wide Web Consortium. xHTML Basic provides a common subset of features to enable the design of pages that will work on small handheld devices, yet rich enough for content authoring. In WAP 2.0, xHTML Basic is extended with additional markups to create xHTML Mobile Profile. This is the core markup language for WAP 2.0.

WAP 2.0 introduces many new facilities including colour graphics, animation, large file downloading and improved menu handling.

The P900 browser supports xHTML Mobile Profile.

cHTML

Compact HTML is a version of HTML optimized for small handheld devices. It is widely used in Japan. The P900 browser will display cHTML content where it is available on the internet or from mobile operators over GSM/GPRS.

Browser User Interface

The browser is always close at hand because of the dedicated hardware button. It may also be reached from the application picker and the application launcher.

The browser is used in FO mode. To switch to full screen, press the Internet button or select Edit>Full screen. To switch back again press the Internet button or press the Jog Dial backwards. Pressing the Jog Dial forwards when in full screen mode brings up a menu with the most common commands.

The touchscreen makes navigation very quick and simple – just tap a bookmark or a link to navigate. The Jog Dial can also be used to scroll the page. To work with an object on a page, such as an image, tap and hold it. A menu will be displayed listing available options such as Save, Copy, View and Send as.

To open a new URL, click Internet and select Open Page. Local HTML content can be browsed, for example from the Memory Stick: file:///d:/Media%20files/document/menu/menu.htm
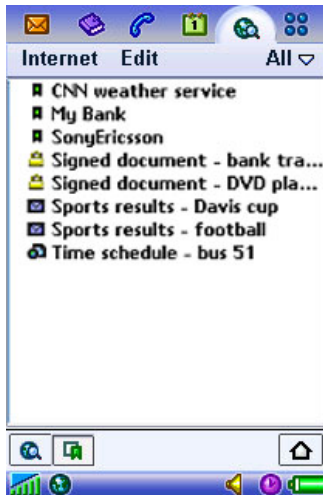
Bookmarks and other information are presented in a simple list view. Just tap the text of a bookmark to view the page. Tap the icon to view the bookmark details. As in the P800, WAP Accounts may be stored in a bookmark, ensuring that the correct WAP/internet service provider is used to access the required page.

Pages may be saved to local storage. They are kept in the bookmarks list and may be opened offline.

WAP Push messages are received within the browser and presented in the list view.
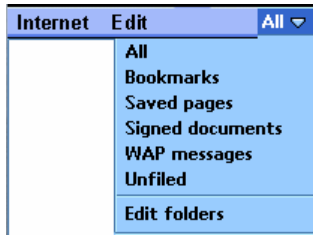
The user may organize bookmarks into user-defined folders, for example creating a folder of sports bookmarks and a folder of transport bookmarks.

It is also possible to view a list of all signed documents (see MeT example above) and access incoming WAP Push messages.

Browser Security

World Wide Web

The P900 supports the TLS/SSL to provide a secure encrypted link between the browser and the website. This method is commonly used for secure transactions on the WWW. An icon in the display indicates when a secure connection is in use.

WAP Security

When using certain WAP services the user may want a secure connection between the phone and the WAP gateway, for example when using banking services. An icon in the display indicates when a secure connection is used. The P900 is based on the WAP 2.0 specifications where security functionality is specified with a technology called Wireless Transport Layer Security (WTLS) and WAP TLS Profile.

The WAP protocols that handle the connection, its transport and its security are structured in protocol layers. The security is handled by the WTLS layer operating above the transport protocol layer. There are three WTLS classes that define the levels of security for a WTLS connection:

- WTLS class 1 involves encryption with no authentication.
- WTLS class 2 involves encryption with server authentication.
- WTLS class 3 involves encryption with both server and client authentication

Server authentication	Requires a server certificate stored at the server side and a trusted certificate stored at the client side.
Client authentication	Requires a client certificate stored at the client side and a trusted certificate stored at the server side.

A Wireless Identity Module (WIM) can contain both trusted and client certificates, private keys and algorithms needed for WTLS handshaking, encryption/decryption and digital signature generation. The WIM module can be placed on a SIM card and will then be referred to as a SWIM card.

Certificates

To use secure connections, the user needs to have certificates saved in the phone. User certificates can be downloaded. There are two types of certificates:

Certificate authority	A certificate used to verify that a WAP site is genuine. If the phone has a stored certificate of a certain type, it means the user can trust all WAP gateways which present a certificate that can be verified by the trusted certificate. Certificates can be preinstalled in the phone, pre-installed in the

SWIM, or downloaded from the trusted supplier's WAP page.

User certificate   A personal certificate that verifies the user's identity. A bank that the user has a contract with may issue this kind of certificate. User certificates can be pre-installed in the SWIM card.

The P900 is loaded with WTLS/X509 certificates from Baltimore, CTE Cybertrust, Entrust, GlobalSign and VeriSign.

WIM Locks (PIN Codes)

There are two types of WAP security locks (PIN codes) for the WIM on SIM. The locks protect the subscription from unauthorised use when browsing. The locks should typically be supplied from the supplier of the SWIM.

Access lock   An access lock protects the data in the WIM. The user is asked to enter the PIN code the first time the SWIM card is accessed when establishing a connection.

Signature lock   A signature lock is used for confirming transactions - like a digital signature.

Push Services

These are useful for sending updated WAP site contents or WAP links to mobile users. Examples of services that can be implemented using push services are:

- Notifications about new E-Mails, voice mails etc
- News, sport results, weather forecasts, financial information (stock quotes etc.)
- Personal Information Manager (PIM) - delivery of contacts, meeting requests etc.
- Interactive games, e.g. play poker with a friend

There are two different forms of Push services: Service Indication and Service Loading. Reception of push messages and automatic load of URL (see below) may be turned on and off in the P900 user preference settings.

Service Indication (SI)

A Service Indication message contains a short text message and a URL. In the P900, these types of messages are typically stored in the WAP messages inbox, which is integrated with the bookmark list in the browser application. When the user opens a message, both the text message and the URL will be displayed. The user has the options to postpone the message, load the URL or to delete the message.

Service Loading (SL)

A Service Loading message contains a URL. When such a message is sent to the P900, the URL will automatically be loaded into the browser application if the user is currently browsing the same site; otherwise, it will be treated as a Service Indication message.

M-Services

M-Services is a set of feature guidelines published by the GSM Association with the support of leading mobile network operators and handset manufacturers. These include easy start-up for the user, better user experiences, easy download of contents, and simple charging models. Technically, the guidelines cover existing standards including WAP, MMS, EMS, SIM-AT and SyncML. Requirements are also made in the areas of UI, MIME descriptors, media formats and codecs.

For developers and operators, this means that a standardised yet rich set of services can be deployed simply. Users will be able to enjoy a new world of consistently available and advanced mobile Internet services such as:

- Pictures
- Backgrounds
- Screensavers
- Audio / Ring signals
- Games

The P900's large colour touchscreen, dedicated browser access button and large amount of memory exceed the requirements of M-Services. The UI meets many of the recommendations. Since the P900 has a proper filing system for storage of media, download content is typically stored to file such that it is available to many applications including the P900's personalization settings. The P900 supports both WAP Provisioning and the established Ericsson/Nokia OTA provisioning standards – see Personalization and Customization section for more details.

Opera Browser

The Opera browser is available on the CD for P900. The Opera browser is also available for downloading on the web sites http://www.sonyericsson.com and http://www.opera.com . The Opera browser has been designed to display practically all Web pages on the Internet. The browser supports the de facto HTML standard "street HTML" (used by most Web developers), JavaScript, Frames, and the ability to add plug-in applications This means the users can access their favourite Web pages. The Opera browser is firstly an HTML browser. It also has support of full screen mode in the same way as the built-in browser.

Some key features:

- Small Screen Rendering: the page is reformatted to fit inside the screen width and eliminate the need for horizontal scrolling.
- Tap and hold on a bookmark displays the page in a new window.
- Tap and hold within a Frame gives the alternatives: "Maximize frame" or "Open frame in new window".
- Tap and hold on a link gives the alternatives: "Open link" or "Open link in new window".

Support for TTY

A TTY (Teletype) device is used primarily by people who have a disability that makes the normal use of a mobile phone difficult. It is connected via the accessories connector at the base of the P900, and the phone preferences must then be set for 'TTY Accessory'.

Normal calls may still be made while the P900 is in TTY mode only when a TTY is not attached. Other accessories such as handsfree will not work correctly. Also the flip should not be opened during a TTY call, as this will impair the quality of the connection.

Alternate Line Service (ALS)

General

ALS allows the user to have more than one line (more than one telephone number) allocated to a single SIM subscription. The user can select which line will be used for an outgoing call, while incoming calls can be received on either line at any time. However, the second line may only be used for speech calls.

If the user is not subscribed to the ALS service, then all of the ALS settings dialogs are hidden and are never shown.

Line Naming

The default line names (line1/line2) may be changed by the user, e.g. Business and Personal.

Line Selection and Indications

The currently selected line for outgoing calls is indicated by an icon. Tapping the icon allows the user to select the alternate line for making a call. When a call is received, the incoming call dialog will show which line the call is being received on.

Call Log

The call log entries will contain information which line was used for the incoming and outgoing call.

Line Facilities

Facilities such as Call Waiting, Call Barring, Call Divert, and Ring Tones may be setup and customized for each line individually. The P900 dialogs will automatically adjust to allow for the two lines when ALS is used. CSP settings are also individual to each line, but if there is only one CSP it will be applied to both lines.

Customer Service Profile (CSP)

General

A CSP held on a SIM card is able to automatically adjust the features provided by the phone so that particular features are not shown, typically by removing items from menus. However, some actions which are hidden may still be carried out using Service strings – the CSP does not prevent the user from doing this.

Alternate Line Service with CSP

ALS SIM subscriptions can have a CSP for each line. In that case, depending on the feature, it can be either the CSP of the selected line or the active line which is applicable. The selected line being the line on which outgoing calls will be made, and the active line the one on which a call is currently active.

If an ALS SIM has a CSP for Line1 only, then this CSP is used for both lines.

P900 Features subject to CSP

Call Divert (Call Forwarding)

There is a separate CSP bit for each of the Call Divert settings:

- Call Forwarding Unconditional (CFU)
- Call Forwarding when Busy (CFB)
- Call Forwarding No Reply (CFNRy)
- Call Forwarding Not Reachable (CFNRc)

Call forwarding indicator

If the Divert all calls (CFU) setting is active on the network, the CFU indicator is shown on the status bar even if CFU is disabled by the CSP.

Call Transfer (CT)

It is the CSP of the active line that is applicable in this case.

Call Barring

The CSP of the selected line is applicable for Call barring.

There is a separate CSP bit for each of the individual Call barring settings:

- All Outgoing calls (BOAC)
- Outgoing International calls (BOIC)
- Outgoing International calls except Home (BOIC exHC)
- All Incoming calls (BAIC)
- All Incoming calls when Roaming (BIC Roam)

Multiparty calls (MPTY)

For the P900 MPTY means 'Conference calls'. It is the CSP of the active line which is applicable in this case.

Advice of Charge (AoC)

Irrespective of the CSP, AoC information is only shown if the SIM subscription supports it.

If this feature is prohibited then the Advice of charge dialog is not shown in the Phone preferences list (selected line CSP). Also:

- Cost information is not shown in the 'Total call information' dialog in the Call log. (selected line CSP)
- Cost information is not shown in the active call display (Active line CSP)

Call Hold (HOLD)

It is the CSP of the line on which the call is active that is applicable in this case.

Call Waiting (CW)

The CSP of the selected line is applicable for Call waiting.

Messages

The Messages application will not comply with the CSP.

ALS

Irrespective of the CSP, ALS information is only shown if the SIM subscription supports it.

CLIP

Not affected by CSP

CLI Send / CLI block

The CSP of the selected line is applicable for these settings. These are two individual features – 'Show my number' and 'Hide my number'.

Information numbers

The CSP of the selected line is applicable for Information numbers. Irrespective of the CSP, Information numbers are only shown if the SIM subscription supports it.

Flight Mode

What is Flight Mode?

GSM or Bluetooth radio signals from a mobile phone may be harmful to the safe operation of an aircraft.

Flight mode is a special mode of the P900 in which the phone does not transmit such signals, but allows the user to read and write information resident in the PDA part of the device.

How it works

1) Ordering the phone into or out of Flight Mode can be done in two different ways:

- From the Power Button
- From the Status bar signal strength icon

2) When going into Flight Mode

- The radio signal strength indicator, RSSI changes into a red circular Stop Symbol
- The radio transmitters for both GSM and Bluetooth are switched off
- The operator name is changed into "Flight Mode"

3) While in Flight Mode:

- The phone does not emit any intended radio signals
- Unintentional signals caused by the electronics in the phone are at a similar level to other consumer electronic devices and do not exceed levels stated in FCC part 15, or EN550022.
- The phone can not by itself leave the Flight Mode.

4) When leaving the Flight Mode:

- The red circular Stop Symbol once again changes into the normal radio signal strength indicator, RSSI
- The radio transmitters for both GSM and Bluetooth are switched on
- The text "Flight Mode" is changed into an operator name

Certification

The above facts are hereby stated and certified by us, the manufacturer, Sony Ericsson Mobile Communications AB, located in Stockholm, Sweden. There is no certificate from any independent certification authority.

Flight attendants

It is important that flight attendants learn how to recognize:

- What phones is Flight Mode capable
- That the phone is in the Flight Mode stage

We recommend that no devices be switched on during take-off and landing.

Regulatory

Currently, the FAA has issued a document, USE OF PORTABLE ELECTRONIC DEVICES ABOARD AIRCRAFT, stipulating how airlines should handle these devices.

The document is due for a make-over, probably by the end of 2003.

The EUROCAE (European Organization for Civil Aviation Equipment) released a document WG-58 (Working Group-58) that outlines tests and PED evaluation aboard European aircraft.

Standardization

It is the opinion of Sony Ericsson, that:

- Flight Mode ought to be standardized. Suitable bodies for this may be the FAA, IATA etc. Both the user interface and the procedures should be standardized.
- No new radio emission standards need to be set up for Flight Mode. Instead, existing standards should be applied; e. g. FCC part 15, or ETSI EN550022.

Symbian OS Operating System

Symbian is the company that developed the Symbian OS technology. Symbian OS is the operating system for Wireless Information Devices, and can be found in a wide range of PDA, 'communicator' and 'smartphone' designs. The Symbian OS technology delivers application and communication capabilities in a small package - it has a robust system kernel, powerful object-oriented middleware, industry-standard communication protocol suites, and an optimized implementation of Sun's Java^{TM} language. Symbian OS is the largest-selling operating system for smartphones and communicators.

The P900 is based on Symbian OS v7.0 and the established UIQ UI. Sony Ericsson and Symbian have been actively working with software developers for some time, and a range of UIQ-based applications are now available on the market. Sony Ericsson is also an active participant in developer events such as the Symbian Developer Conference and Java One.

Third party applications may make use of the communications, display and storage facilities of the P900. Such applications may therefore be much more powerful than browser-based applications, enabling games to be faster and more exciting, for example.

The P900 supports Java-based applications. Java technology is platform-independent, portable, modular and secure. Java applications are easy to develop, deploy and maintain. Because it supports both PersonalJava^{TM} and J2ME CLDC/MIDP (see next page), the P900 is ready to run many applications written for handheld computers and mobile phones.

The P900 has up to 16 MB user data space (up to 13 MB on the Chinese versions) in which settings, user data and third party applications are stored. Applications are easily downloaded directly to the P900 using the browser, or may be installed from a connected PC.

Key applications for the consumer include games, information and entertainment. Corporate applications may be deployed, extending information access to the P900.

Open Environment

Applications may be written in C++, Java and Visual Basic. Supported Java environments are PersonalJava^{TM} and J2ME CLDC/MIDP, both of which are optimized for quick start-up time.

C++

Developers using C++ will have access to the widest set of Sony Ericsson and Symbian Application Programming Interfaces which enables application programs to access more features in the device.

C++ is the native Symbian OS application programming language and is also more efficient than applications written in Java.

Java

Java is a widely used and extensible programming platform, which makes the development of personalized applications and content much easier. Originally developed by Sun in 1991, Java is a programming language used to develop applications – utility programs, games, plug-ins etc. – for different hardware and software platforms. Users of Java-enabled devices can install new applications and games to make their devices more personal and adapt them to specific needs.

PersonalJava™

PersonalJava, also known as pJava, is an edition of Java appropriate for mobile devices such as PDAs. It is suited to more powerful mobile phones and PDAs, such as the P900, and has a richer development environment and can interact more extensively with the P900 functionality compared to J2ME MIDP/CLDC.

PersonalJava was transferred into the J2ME platform in 1999, becoming the J2ME CDC/Personal Profile. However, CDC/Personal Profile has not really taken off yet and, pending its breakthrough, PersonalJava will still be a powerful option for years to come.

The P900 includes Symbian's implementation of PersonalJava according to the Sun Microsystems 'PersonalJava Application Environment Specification (PJAE)' version 1.1.1, January 7, 1999. That version corresponds to a Sun JDK 1.1.7 implementation.

J2ME CLDC/MIDP

J2ME CLDC (Java2 Micro Edition, Connected Limited Device Configuration, version 1.0) is an edition of Java aimed at small resource-constrained mobile devices where the runtime environment must fit into a few hundred kilobytes of memory (as compared to the 2.5Mb required for a typical PersonalJava environment).

MIDP (Mobile Information Device Profile) defines a programming API that has gained wide industry acceptance and many MIDP compliant mobile phones are anticipated to come to market. A large number of applications for this environment are therefore to be expected.

The P900 supports this J2ME CLDC/MIDP 2.0 environment. Applications may make use of the following services:

- Persistent storage (RecordStore class only – no access to the rest of the filing system)
- J2ME canvas size is 208 x 172
- Touchscreen
- Virtual Keyboard and Jog Dial (up, down, select) input

J2ME uses a security model, often referred to as a sandbox. The sandbox includes a number of system components working together to ensure that untrusted applications cannot gain access to system resources.

Visual Basic and .NET

Visual Basic is commonly used for MIS applications and is a supported environment via the AppForge platform. .NET interfaces are supported. More information in documentation on www.sonyericsson.com/developer.

Developer Tools

Symbian OS v7.0 UIQ SDK for Sony Ericsson P900/908

The UIQ SDK is used to build applications for the Sony Ericsson P900/P908 phones. The SDK contains library files, documentation, sample code, tools and utilities for building P900 applications in C++ and for creating installation files of C++ and Personal Java applications. It also includes a UIQ emulator, which requires CodeWarrior Development Studio for Symbian OS to run C++ applications.

The SDK is a free download from http://www.SonyEricsson.com/developer

Recommendations (Java development)

The UIQ SDK includes support for both Personal Java and J2ME CLDC/MIDP and can be used with other Integrated Development Environments (IDE) such as Sun ONE Studio 4 (Mobile Edition required for J2ME

CLDC/MIDP and Community Edition required for Personal Java), Metrowerks CodeWarrior™ Wireless Studio and Borland Jbuilder®. Use these productivity tools/IDE to build the executable Java file (.JAR file) and then test it in the UIQ emulator or in the IDE's Java emulator.

Recommendations (C++ development)
To speed up development, Sony Ericsson encourages testing your C++ application in the UIQ emulator, which is part of the UIQ SDK. Symbian provides two versions of the SDK, one to be used together with Metrowerks CodeWarrior™ for Symbian OS and the other to be used together with Borland C++ BuilderX™ Mobile Edition.

To be able to emulate your application in the UIQ emulator, make sure you compile your application using one of the recommended IDE compilers.

Other Tools Support

There are a number of other tools and SDKs, available from Sony Ericsson and its partners, for development on a number of technologies on P900, for example: MMS, Themes and DRM. For further information, visit the Sony Ericsson Developer World at http://www.SonyEricsson.com/developer.

Developer support

Online Developer Resources

On www.SonyEricsson.com/developer, developers will find all documentation and tools such as phone White Papers, Developers Guidelines, SDKs and APIs. The developer web site also contains discussion forums monitored by our Sony Ericsson Developer Support team, a searchable Knowledge Base of support queries and solutions, Tips & Tricks, example code etc. To stay up to date on development issues, register and subscribe to the monthly Sony Ericsson Developer Newsletter.

Sony Ericsson Developer Support

Sony Ericsson offers developers professional technical support services. The service can be purchased from the developer web portal, as part of the Sony Ericsson Core and Core+ membership package or as individual support incidents. There are two levels of support, described below.

Basic E-mail Developer Support

The Basic E-mail Developer Support is an annual support service included in the Core membership that provides developers with all the basics to successfully develop world-class applications for Sony Ericsson products. With this support contract, developers get access to Sony Ericsson developer support engineers via e-mail with same-day response, five technical support incidents as well as the ability to purchase more.

Priority E-mail Developer Support

The Priority E-mail Developer Support is an annual support service included in the Core+ membership that equips professional developers with everything they need to successfully develop world-class applications for Sony Ericsson products. With this support contract, developers get priority access to Sony Ericsson developer support engineers via e-mail with fast response times and up to 50 technical support incidents.

Personalization and Customization

The P900 may be personalized by the user and customized at the factory:

- By the User (via the UI, including interactive M-Services).
- By the User via PC-based utility applications.
- Via Over The Air (OTA) configuration, initiated by operator, user or IT helpdesk.
- In the factory or at a Sony Ericsson Service Point, on behalf of a mobile operator.

User Personalization

Alterations to the appearance of many of the screens may be conveniently carried out through changing the phone's Theme. New Themes may be loaded on to the P900 from the internet and other sources. A guide to creating P900 Themes is given on page 86.

Individual aspects of the phone's appearance may be altered as explained below.

Background and Application Shortcuts

The user may set a static image, or animated GIF, to be the background 'wallpaper' for the FC standby screen. Image size is 208 x 189 pixels and formats JPEG, GIF, BMP, WBMP, MBM and PNG are supported. Larger images, for example a 640x480 picture from the CommuniCorder, will be resized to fit.

Correspondingly, a separate background can be set for the Application launcher view in FO. The size for FO background is 208 x 254 pixels. The same formats as for FC is supported, with the limitation that for an animated GIF file, only the first frame is displayed (as a static image).

Background images may be selected from internal or Memory Stick storage. They can also be downloaded via M-Services, beamed in to the P900 using Bluetooth or Infrared, or transferred in over the PC link.

The application shortcut buttons may be personalized by the user. In FC they will disappear after a short period to reveal more of the background image. Rotating the Jog Dial will redisplay them. They user may switch them on all the time. Backgrounds are set in Control Panel -> Device -> Display. A useful shortcut is to tap the battery icon ▭ in the FO Status Bar and select Settings. FC background can also be set directly from a received MMS message, and FO background can be set directly from the Pictures application.

Screen Saver

A 'screen saver' image is displayed after a period of inactivity. The user can switch this facility on and off and select the delay period before the screen saver is displayed. Image size is 208 by 320 and the format is the same as the FC background image above. Note that use of animated GIF increases power consumption. The top part of the image is displayed in FC mode and the entire image is displayed in FO mode.

Device lock may be used in combination with the screen saver. Upon pressing a button or touching the screen, the user will be prompted to activate keys and/or enter the device lock code.

When the screen saver or screen blanker is deactivated, the P900 will revert to the state it was in before the screen saver was activated.

Picture Phone Book
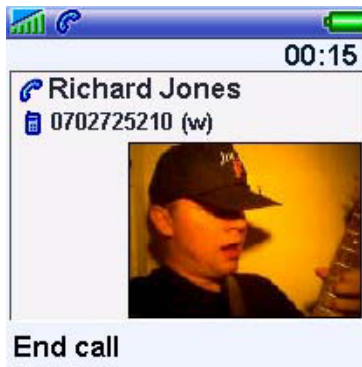
The user may store a picture of each person in Contacts. When an incoming call is received with CLI matching that contact, the contact's picture will be displayed together with the other information. The contact's picture is also displayed when making a call, or using the speed dial screen in picture view mode.

Pictures are easily taken using the built-in CommuniCorder, though of course other images can be loaded in to Contacts. A copy of the picture is held in the Contacts database; therefore, the original picture may be deleted or renamed without losing the copy stored in Contacts.

Ringtones

The user can add as many ringtones as desired, subject only to available file space. Ringtones may be collected from many sources including Memory Stick, M-Services, MMS, EMS and transfer from a PC.

Any compatible audio file in the multimedia storage (Internal or Memory Stick) including MP3 can be selected as a ringtone. The P900 can play both iMelody format ringtones and the following polyphonic formats: AMR, AU, MIDI, RMF (Beatnik), MP3 and WAV.

A system default ringtone is provided. This is the ringtone when the P900 is first initialised. It cannot be deleted and is retained after a Master Reset.

The user may select a user default ringtone in the Phone application. In FO mode select Edit, Preferences, Sounds and alerts. This will now be played where no Personal ringtone is identified for the incoming call.

A Personal ringtone may be selected for a contact – simply select the required ringtone whilst entering or editing the contact's details. When the Calling Line Identification (CLI) of the incoming call is matched to a contact, the Personal ringtone for that contact will be played. If the ringtone has been deleted, moved, renamed or exists on a Memory Stick that is unplugged, then the system default ringtone will be played.

The flow diagram on the next page illustrates the logic for ringtone selection when an incoming call arrives.

If no CLI information is available, then only a default ringtone can be played. If the user has selected a personalized default ringtone and it is available (can be read from the internal storage or Memory Stick) then it will be played, otherwise the system default will be played.
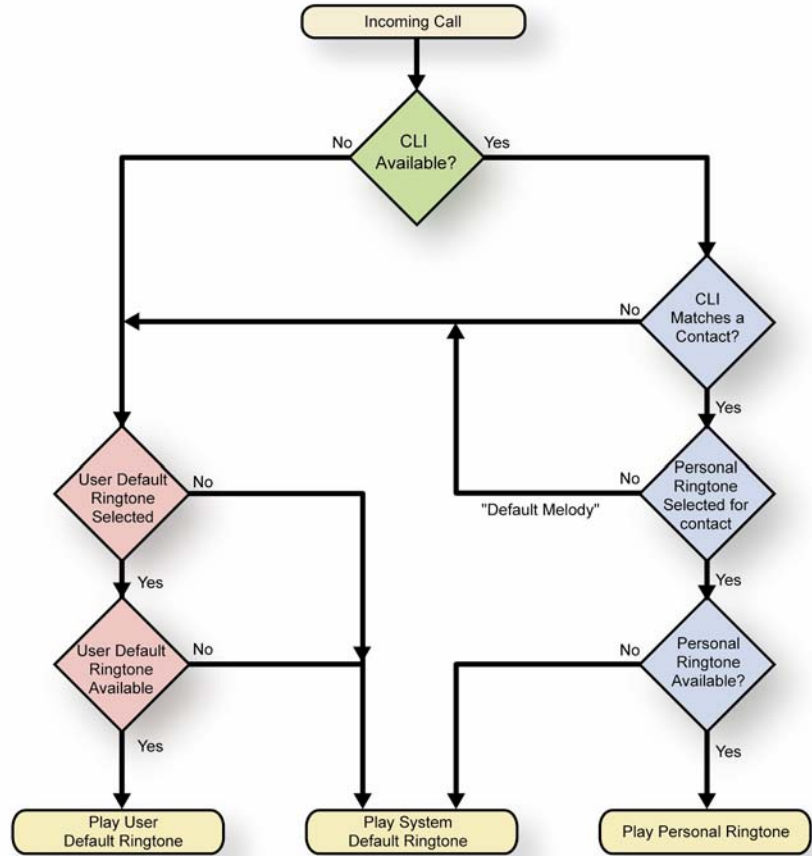
Other Audio Personalization

The following sounds may also be personalized in the P900:

- Time (alarm)
- Calendar (reminder alerts)
- Tasks (reminder alerts)
- Messages (notification of new message)

Sony Ericsson Content

The P900 is supplied with a variety of multimedia material in order to demonstrate the applications and provide the user with a 'starter pack' of useful and fun content. The material supplied on the P900 itself is selected to be acceptable in all cultures and to be independent of time. More contemporary and localised content can be made available via download.

The content loaded in the internal storage (apart from EMS) can be deleted by the user and will be lost on Master Reset. It may be restored from the Multimedia CD.

The content provided includes Background images, GIF animations, Screen savers, MMS pictures, Ringtones, Sound effects, Music, Video, and MMS templates.

Over-The-Air (OTA) Configuration

OTA remote configuration provides simple set-up of services. The user is spared the task of finding complex technical information and then manually entering it via the UI. Instead, a web request or a call to be the mobile operator's helpdesk is all that is necessary – the appropriate settings can then be sent via SMS directly to the P900.

OTA configuration using the Ericsson/Nokia Over The Air Settings Specification enables the following parameters to be provisioned:

- WAP Account (Account name & WAP Gateway settings)
- ISP Settings (Bearer information, username, password)
- Bookmark (name and URL)
- SyncML DS settings
- MMS Settings

The following parameters may be remotely configured according to WAP Forum specifications:

- WAP Account
- ISP Settings

Further OTA configuration is provided using Nokia Smart Messaging. It is used to set up E-Mail accounts, specifically:

- ISP (Bearer information, username, password, IP and DNS addresses, login script)
- E-Mail account (Username, password, address, server details)

Sony Ericsson WAP Configurator

Sony Ericsson's WAP Configurator provides WAP settings for many networks as a free service to owners of Sony Ericsson mobile phones. It may be found at http://www.sonyericsson.com/.

Factory Customization

Factory Customization will be available to mobile operators and volume customers. This enables the hardware, applications, settings and media to be tailored to customer needs, including:

- Customized One-button Internet Access
- Pre-configured settings. ISP, homepage, GPRS etc
- Pre-loaded content, including screensavers, backgrounds, ringtones, local WAP/WEB pages, pictures, and demonstration MMS messages.
- Bookmarks
- Pre-loaded applications. Games, extended security, 3rd party applications
- Calendar, contacts, Jotter notes, etc.
- Certificates
- Customized Flip
- SIM lock

Customization is carried out by loading the P900 with a uniquely identifiable Customization package, made up from the following elements:

- Default values for user configurable settings

- Default values for hidden settings (i.e. settings unavailable to the user via the UI. Hidden settings are used to switch between Customization alternatives anticipated in the generic system software).
- Preloaded user data (i.e. content such as welcome documents and messages, notes, contacts, etc.)
- Preinstalled executables (i.e. executable wizards, 3rd party applications, etc.)

Themes

A Theme is a way to provide a complete customized visual experience for the user.

Themes can define:

- Text, outline and background colours
- Background images
- Graphical appearance of interface elements
- Sounds for events

A theme can include all these items, or just a select few.

Customizable items – Flip open mode

Customizable items – Flip closed mode
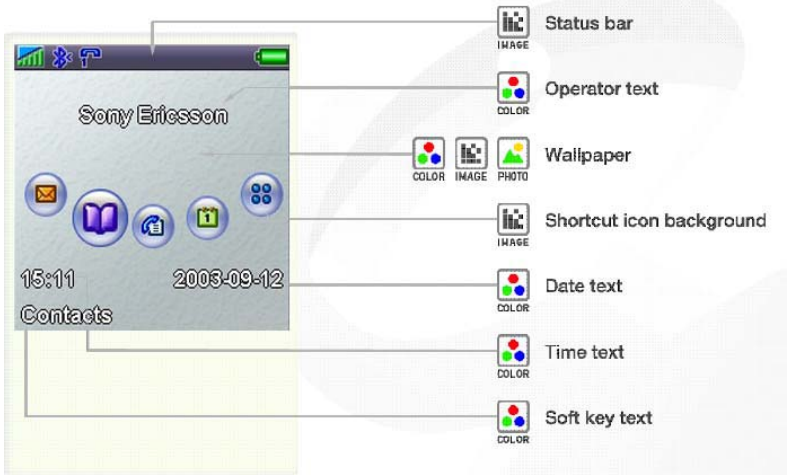
All Themes are based on 6 main colours:

- A light colour
- A mid colour
- A dark colour

Each colour also has a complimentary text colour

A theme may also contain audio for the following events:
- Ring signal (line 1, line 2 and data)
- New message signal (sms, mms, e-mail, beamed item, area info and auto setup
- Calendar (alarm and reminder)

A Theme package is a standard zip file with the file extension .utz, containing several files.
Some of the files must match the definition given in a XML file in the theme package, while others must match the rules specific to P900 Theme extensions.

Games

The P900 is supplied with two games. Many more can be loaded thanks to the P900's support for third party applications written in C++, PersonalJava and J2ME CLDC/MIDP.

Solitaire

A solitaire game is included. Options to tap or drag-and-drop for moves and high-score facility.

Chess

The P900 includes a sophisticated Chess application, which includes the ability to play remotely with another player over SMS.

Players are created by selecting them from Contacts or giving them local names within the Chess application. Players may be:

- Local (Computer) – Play against the P900, selecting a suitable skill level.
- Local (Human) – two players can use the P900 as a chessboard.
- Remote (Human) – Play against another person, exchanging moves using SMS.

Each move is timed and a list of moves may be viewed. It is possible to step backwards and forwards through a game.

Each game is given a name and it may be suspended and saved at any time. The user may therefore have a number of games stored at any time, moving between them as required.

V-Rally® (demo)

Take to the high road! A playable demo version of V-Rally®, one of the most respected driving brands in the games industry today, is delivered with the P900. Push yourself to the limit and test your precision driving skills in the king of rally racing games.

The demo game is provided on the Multimedia for P900 CD-ROM and must be installed before use. The game is suspended by events such as incoming phone calls.

Bluetooth^{TM} Wireless Technology

The P900 features built-in Bluetooth wireless technology. Its short-range radio link operates in the globally available 2.4 GHz frequency band, ensuring fast and secure communications up to a range of 10 metres.

Bluetooth wireless technology is designed to operate also in noisy radio frequency environments, providing reliable and high data throughput. To achieve this, techniques such as frequency hopping and error correction are used. To enforce data security, data can optionally be encrypted.

Bluetooth wireless technology facilitates instant connections, which are maintained even when the devices are not within line of sight. High-quality voice transmission is provided under adverse conditions, making it possible to use a headset connection to the P900 at all times.

Sony Ericsson is a founding partner of the Bluetooth Special Interest Group (SIG). Examples of Bluetooth wireless technology devices that are available now or are expected to be available in the near future include:

- Headsets for wireless voice transmission and remote call control
- PCs, laptops, PDAs, palmpads for data transfer, synchronization etc.
- MP3 music players
- Other phones for exchanging business cards, ring signals, playing games etc.
- Household appliances with built-in logic, as well as games and entertainment devices
- Digital still and motion video cameras
- Handheld scanners for text, barcodes and images
- Access points in hotel lobbies and airports for connecting to computer networks and the Internet

Please note that restrictions upon the use of Bluetooth may exist in a few countries. Contact a Sony Ericsson representative to check if the use of Bluetooth is restricted in your country or region. If you are unsure, the Bluetooth function should be switched off until you know the possible scope of any restrictions.

Benefits of Bluetooth wireless technology in the P900

No cables	Bluetooth wireless technology gives a true wireless connection to headset, computers, networks, printers and other devices.
Radio Link	Bluetooth does not require line-of-sight alignment. For example, when using the P900 to connect a laptop to the internet, a Bluetooth link between the laptop and the P900 can be established even when the P900 is placed in a jacket pocket, or placed near a window for better GSM/GPRS reception.
Several devices	The P900 can maintain several devices, which you trust, in a pairing list, enabling rapid and safe connection when those devices are in range.
High transmission speed	Comparable to IR or cable.
Secure and fast	Data connection with a Bluetooth PC/laptop turns the phone into a modem for connecting to the Internet and for data transfer (no need to find and plug in cables or to align infrared sensors).
Synchronisation	Fast synchronisation of calendar and phone book with PC/laptop and PDA.
Beaming	Quick exchange of business cards, calendar events and melodies with other phones and devices. Via the File Transfer Profile it is possible to exchange any type of file with e.g. a PC that supports the File Transfer Profile.
Low power	Low power consumption.

P900 Bluetooth transfer methods

P900 supports both the OPP and FTP transfer methods between devices. While the P900 can exchange any type of item using the OPP method, other devices may often be restricted to exchanging only vCards by OPP. Personal Computers and PDA devices often support the Bluetooth FTP transfer method, thus the FTP method of transfer opens up wider possibilities.

When selecting the 'Send as' transfer method, OPP transfer is seen as simply 'Bluetooth', while the 'Bluetooth shared' item is used for the FTP method. When the 'Bluetooth shared' method is chosen the item is moved to the Shared folder within the messages beamed folder. Once a Bluetooth FTP transfer link has been established from another device, its user may browse the Shared folder – but only after access permission has been granted by the user of the P900.

Bluetooth applications with the P900

Bluetooth Headset

- Make and receive calls using the buttons on the handset and voice command.
- Multiple headsets can be defined, for example a Bluetooth personal headset and a Bluetooth car kit.

Laptop PC / PDA

- Connect to P900 over Bluetooth and use it as a modem to connect to the Internet.
- Synchronise data.

Mobile Devices

- Share business cards and appointments using vCard and Vcal
- Share photographs and sound clips

Synchronisation & Data Transfer

In everyday life, access to an updated calendar and details of friends and business colleagues is greatly appreciated. To be truly mobile, users must be able to carry their important information with them. Equipping mobile phones with Personal Information Manager (PIM) programs like calendars, task lists and address books gives users access to their most important data anywhere and anytime. The information is kept updated by synchronising with the information at the office or at home. The growing use of groupware such as Microsoft® Outlook® and Lotus® Notes® means that more and more meetings are booked electronically in daily business life.

The P900 uses the SyncML protocol for synchronisation. This means that it has compatibility to synchronise with a wide variety of devices over a number of different communications media.

SyncML – An Open Standard for Synchronisation

SyncML Background

Leading the way in providing remote synchronisation capability, Sony Ericsson realises that interoperability of remote synchronisation is of utmost importance if mobile data usage is to become as widespread as generally predicted. That is why Ericsson, along with IBM, Lotus, Motorola, Matsushita, Nokia, Palm Inc., Psion and Starfish Software, founded the SyncML initiative in February 2000. Supported by more than 600 software and hardware developers, the SyncML initiative seeks to develop and promote a globally open standard for remote synchronisation, called SyncML. Unlike many other synchronisation platforms, SyncML is an open industry specification that offers universal interoperability. Because it uses a common language, called XML, for specifying the messages that synchronise devices and applications, SyncML has been called the only truly future-proof platform for enabling reliable and immediate update of data. The benefit for the end user is that SyncML can be used almost anywhere and in a wide variety of devices, regardless of application or operating system. In October 2002, the SyncML Initiative Ltd merged with OMA, and the ongoing work regarding the SyncML standard is now carried out in OMA.

What is SyncML?

SyncML is the common language for synchronising all devices and applications over any network. SyncML leverages Extensible Markup Language (XML), making SyncML a truly future-proof platform. With SyncML any personal information, such as E-Mail, calendars, task lists, contact information and other relevant data, will be consistent, accessible and up to date, no matter where the information is stored. For example, a calendar entry made to a mobile device on a business trip is equally available to a secretary in a network calendar. SyncML is the ultimate choice for remote synchronisation.

The P900 uses SyncML for both local synchronisation (for example, with a PC using Bluetooth or a cable connection) and remote synchronisation over HTTP.

SyncML Protocol Architecture
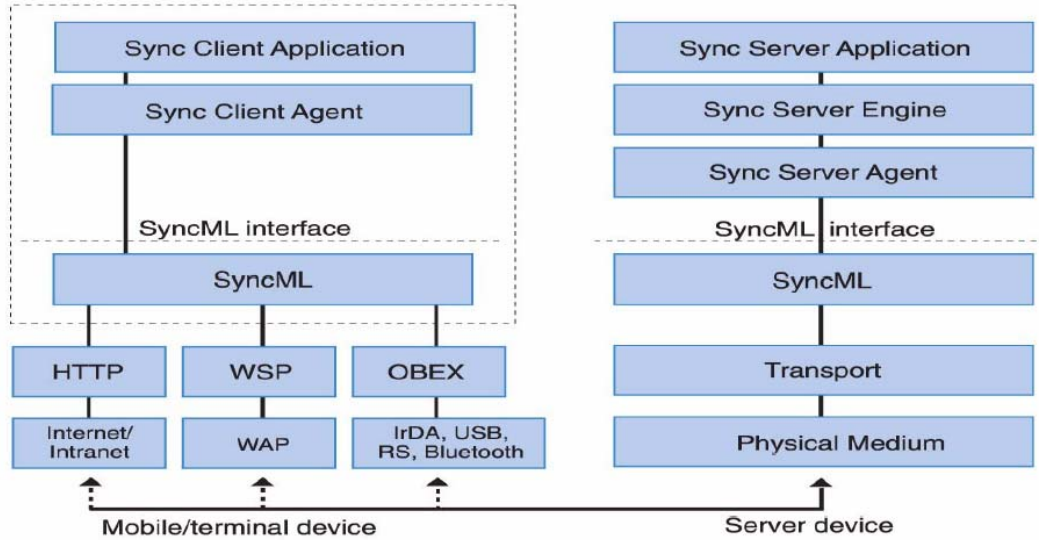
Benefits of a common synchronization protocol

End users
Today's user of mobile devices probably uses a different synchronization product with every device. Each technology can synchronize only a few applications, or is limited to a particular type of network connection. This arrangement is expensive to install, confusing to configure and operate, and costly to administer. With SyncML, users will be able to buy devices that synchronize with a broader range of data.

Device manufacturers
Device manufacturers will benefit from a common protocol that will make the device interoperable with a broader range of applications, services, and network and transmission technologies.

Service providers
Service providers moving into the growth area of application hosting are particularly concerned that a proliferation of synchronization technologies will make it impossible to deploy and support their customers in a cost-effective manner. To support the range of data types and devices in use today, service providers must install and configure multiple server infrastructures, maintain and support that infrastructure, and maintain compatibility and performance. The alternative now available, to use a single solution for data connectivity, involves the risk of a tight coupling to a propriety solution. With SyncML, they will be able to provide connectivity to a wider selection of applications.

Application developers
Choosing to support multiple synchronization technologies enables an application to support more types of devices and networked data, but that choice comes at a cost. With SyncML, application developers will be able to develop an application that can connect to a more diverse set of devices and network data.

Network operators
As multiple applications that need remote synchronization over WAP are developed, there will be an automatic growth of revenue for network operators.

Which information can be synchronised?

The P900 supports synchronisation of the following data types:

Application	Remote Sync	Local Sync
Contacts	✓	✓
Calendar	✓	✓
Tasks	✓	✓
Jotter (text part only)	**	✓
E-Mail	**	✓

** The E-mail and Jotter implementations are proprietary and therefore not SyncML compliant. Note that Email can of course be fetched remotely using the Messages application.

Apple® iSync

The latest version of Apple's iSync supports the P900. Using Bluetooth, iSync can synchronize Contacts, Calendar and To Do items between a P900 and a Mac computer.

Remote Synchronisation

Remote synchronisation takes place over the air using HTTP and is the ideal way to keep the P900 up to date. Using GPRS, the P900 can be continuously connected to the remote synchronisation server.
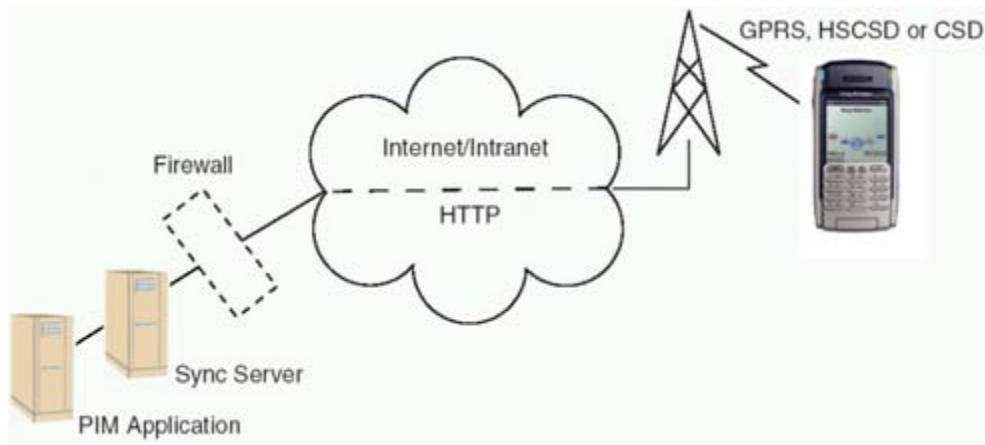
Synchronisation services will be offered by mobile operators, third-party service providers and as added capability to corporate PIM applications. Corporate PIM applications such as Microsoft® Exchange and Lotus® Notes® can be supplemented with SyncML capability.

PC Suite for P900

Local Synchronisation

The P900 is supplied with PC software for local synchronisation. It may be loaded from the PC Suite for P900 CD-ROM.
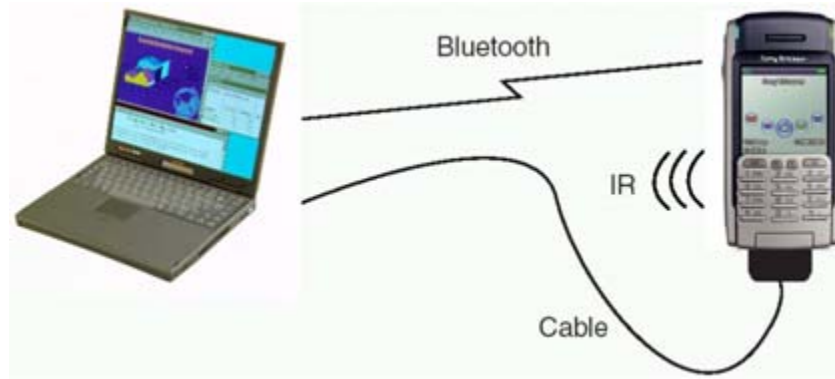
Bluetooth, Infrared or Cable

The P900 always synchronises using SyncML, regardless of connection type. It connects via Bluetooth wireless technology, infrared or cable. The cable is connected either directly to the phone or to the desktop charger.

Automatic synchronisation

Synchronisation can be configured to start automatically, given that a suitable synchronisation program must be running on the other device:

- When the USB cable is plugged in to the P900.
- When the P900 is placed in to the desk stand and the desk stand is connected to the other device.
- When Bluetooth is activated on both devices and they come into operating range
- When infrared is activated on both devices and the infrared sensors are aligned.

Intelligent process

A synchronisation engine performs the task of synchronising. For local synchronisation, the synchronisation engine is an application that runs on the desktop computer. The synchronisation engine compares, updates, and resolves conflicts to ensure that the information in the phone is the same as that in the computer.

Compatibility

The supplied PC software enables synchronisation with the following applications:

- Lotus® Organizer® 5 & 6
- Lotus® Notes® 4.6, 5.0 & 6.0
- Microsoft® Outlook® 98, 2000, 2002

The PC requirements are as follows:

- Microsoft® Windows® 2000, Me, XP, 98 and 98SE.
- Minimum recommended hardware configuration for the version of Windows in use.
- 30Mb free space on hard disk

File Transfer Utility

A utility is provided which enables files to be transferred to and from a P900 connected to a PC. It makes the P900 appear as a device in Windows Explorer. The Internal Storage and Memory Stick appear as two drives connected to the device:

Folders		Name	Size	Type
Desktop		Cyclist	12,4 KB	JPEG Image
My Documents		Daylight moon	6,32 KB	JPEG Image
SEKIW773		Fastfood	15,2 KB	GIF Image
My Network Places		Football	5,17 KB	JPEG Image
Recycle Bin		Gears	28,1 KB	GIF Image
My P900		Golf	10,4 KB	JPEG Image
My P900		Jump	6,76 KB	JPEG Image
Memory Stick		Ladder	8,74 KB	JPEG Image
audio		Lightning	8,33 KB	JPEG Image
unfiled		Party	15,9 KB	GIF Image
document		Silverformation	13,3 KB	JPEG Image
unfiled		ssaver cosmos	68,0 KB	GIF Image
image		ssaver tracks	67,0 KB	GIF Image
unfiled		Winter	18,5 KB	JPEG Image
other				
video				
unfiled				
Phone Memory				
audio				
EMS				
Sony Ericsson				
unfiled				
document				
Unfiled				
image				
Sony Ericsson				
unfiled				
other				
video				
Sony Ericsson				
unfiled				

View of the P900 internal and Memory Stick storage in Windows Explorer.

Typical uses for this include:

- Archiving pictures taken on the P900 to PC storage
- Moving images to the P900 to use in personalization, MMS messages etc.
- Moving sound clips to the P900 for personalization.
- Store work documents (Word, Excel etc) on the P900 to read whilst on the move.

Backup and Restore

Backup is initiated from the connected PC. Note that the Syncstation desk stand must be used for backup and not infrared or Bluetooth wireless technology. Files in the user data area (which includes loaded third party applications) are backed up to PC storage.

The restore utility takes stored data from the PC and places it back on to the P900.

Language Change Utility (Standard P900 only)

The P900 has a larger, richer UI compared to an ordinary mobile phone. Applications often have help information also. Consequently, it is impractical to store many languages on a standard P900 at the same time. To facilitate language change, a PC utility is provided which enables the required language to be loaded on to the P900. The Language Change Utility is not available for Chinese versions.

Software Installation Utility

This utility enables P900 applications to be installed from the PC.

Dial-Up Networking Wizard

This utility assists the user to create GPRS, HSCSD and CSD connection definitions in the Windows Dial-Up Networking folder. All the necessary information can be entered in a logical way. Set Infrared status to Modem in the Control Panel to use this facility over infrared.
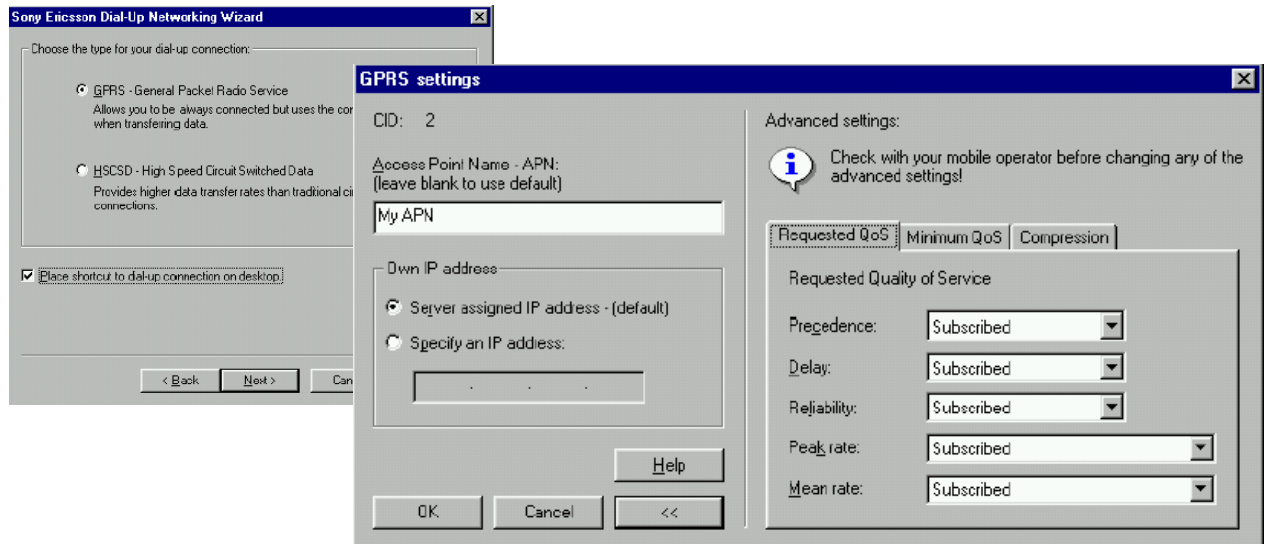
Other PC Suite for P900 Content

- User Guide and Quick Guide documentation in local languages
- Drivers for USB and using the P900 as a modem

Object Exchange – 'Send as'

The P900 makes it possible to transfer objects over Bluetooth, infrared and Messages. This is presented to the user via 'Send as' commands in applications. Simply select an item such as a contact, select 'Send as' and select the method to be used for sending. Typical applications are to beam an appointment to other people, or to receive a new background image.

Bearer > Application (Data Type)	IR	Bluetooth	SMS	MMS	Email
Contact (vCard)	✓	✓	✓	✓	✓
Appointment (vCal)	✓	✓	✓	✓	✓
Tasks (vCal)	✓	✓	✓	✓	✓
Jotter **	✓	✓	✓	✓	✓
Image	✓	✓		✓	✓
Sound Clip (Ringtone)	✓	✓		✓	✓
Bookmark	✓	✓	✓	✓	✓
Sound recorder (Voice Notes)	✓	✓		✓	✓
Third Party Applications ('Send as' API)	✓	✓		✓	✓

** SMS is text only; option to send the picture as GIF using the other bearers.

Note that the P900 Messages application enables the user to add objects into EMS and MMS messages. See the Messages section on page 51 for more information.

To perform a 'Send as' beam operation using infrared, the two devices are lined up and the sender initiates the transfer.

To beam over Bluetooth, a scan finds the other devices within range. The user can then select the required device and send the information across.

When sending over SMS, MMS or Email, the required message type is created with the selected object attached. It is then sent over the air.

GPRS, HSCSD and CSD Connections

The introduction of GPRS (General Packet Radio Services) is one of the key steps in the evolution of today's GSM networks for enhancing the capabilities of data communication. Data traffic is increasing enormously (over both wired and wireless networks), with the growth in demand for Internet access and services paralleling that for mobile communications. Users want access to the Internet while they are away from their offices and homes, and surveys have found that the vast majority of business professionals want the ability to send and receive E-Mail, browse the Web and transmit text and graphics on a portable device. That is why the main applications driving Mobile Internet development are Email clients and Web browsers.

The demand for high-speed Internet access will be the key driver for coming generations of wireless services, and GPRS can deliver the necessary speed. GPRS allows innovative services to be created, enabling new and previously inaccessible market segments to be addressed and increasing customer loyalty.

GPRS applications can be developed for both horizontal and vertical markets. Vertical applications are specific, including those for operations such as reaching police and emergency, taxi, delivery or automated services (vending machines, supervision, vehicle tracking). Horizontal applications are more generic and include those for Internet access, Email, messaging, e-commerce and entertainment.

GPRS is able to take advantage of the global coverage of existing GSM networks. Applications developed for GPRS can be deployed on a large scale and can reap the associated benefits. GPRS also provides a medium for secure connections to private networks, banking and financial services.

The P900 supports connection to the Internet, company intranets and mobile operator WAP services over GPRS, HSCSD and CSD. A typical configuration will be to use GPRS for a continuous connection to the net. With GPRS, the P900 sends data in 'packets' at a very high speed. The P900 remains connected to the network at all times, using transmission capacity only when data are sent or received. This means that the Email client and the browser is always available for immediate use. Third Party applications such as instant messaging clients will also benefit from a GPRS 'always on' connection.

Using the P900 as a Modem

The P900 contains a complete GSM/GPRS modem enabling it to be used to connect external devices such as laptop PCs to the Internet or corporate intranet. The P900 is connected to the laptop using infrared, Bluetooth or cable, and will connect over the air using GPRS, HSCSD or CSD. To use this facility for Infrared or Cable, set 'Status' for the chosen connection to 'Modem' in the Control Panel.

The P900 appears to the laptop like a normal modem, having an AT command set compatible with industry de facto extensions and ETSI 07.07. Note that SMS and SMSCB are not supported over this channel. A Windows modem driver file is supplied on the PC Suite CD-ROM.
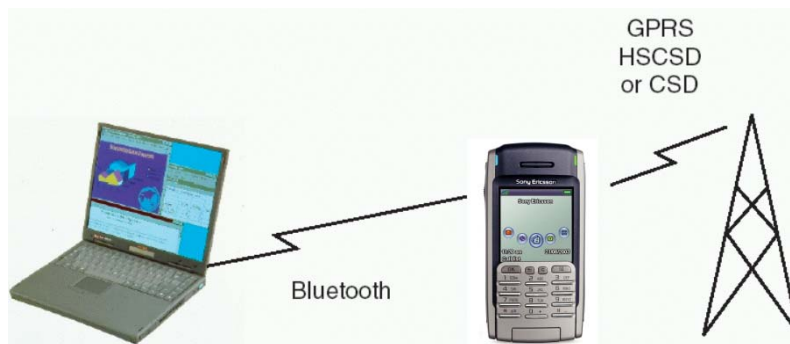
Once paired with a Bluetooth-enabled laptop, the P900 is ready to make an immediate connection to the Internet or corporate network. Because Bluetooth is wire-free and requires no line-of-sight alignment, laptop can be positioned for maximum comfort whilst the P900 can remain in a jacket pocket, briefcase or even be placed up to 10 metres away to get optimal reception.

Infrared may also be used to link the P900 with other devices. Range is typically up to one metre. The two infrared 'eyes' must be kept in line of sight, at an angle of no more than approximately 30 degrees.

Or a USB cable may be used.

Chinese Models in Detail

This section provides more information about the extra features of the P900/P908 for Chinese language markets and the differences when compared to the standard, non-Chinese, P900 models.

Product Name and Languages

Market	Product Name	Default Language for UI and Dictionary	Alternative UI Language
China	P908	Simplified Chinese (ZS)	English (EN)
Hong Kong	P900	Traditional Chinese Hong Kong (ZH)	English (EN)
Singapore	P900	English (EN)	Simplified Chinese (ZS)
Taiwan	P900	Traditional Chinese Taiwan (ZT)	English (EN)

All Chinese models have both the default and alternative language stored on ROM and neither can be deleted.

There are basically two written languages of Chinese – Traditional and Simplified. Traditional Chinese is used in Taiwan and Hong Kong. Simplified Chinese is primarily used in the People's Republic of China (PRC).

Input Methods

Market	Product Name	Flip Keys	Default Input Method	Alternative Input Method
China	P908	Strokes, Latin	Pinyin	Strokes
Hong Kong	P900	Strokes, Latin	Strokes	Pinyin
Singapore	P900	Strokes, Latin	Pinyin	Strokes
Taiwan	P900	BoPoMoFo, Strokes, Latin	BoPoMoFo	Strokes

Strokes is an input method based on the basic building blocks of Chinese characters. A Stroke is a component of a Chinese character written with one motion of the brush to paper.

Pinyin is a method of writing down the pronunciation of Chinese characters using the letters of the Latin alphabet, according to rules that have been standardised in the PRC.

BoPoMoFo is a method of writing Chinese characters using letters of the Chinese phonetic alphabet. This method is also known as Zhuyin and is mainly used in Taiwan.

FC Character Input

There are two different flip designs, one with Strokes and one with BoPoMoFo characters. Latin characters (a, b, c…) are included on both. Pressing the * key enables the user to switch between available input methods.

Elements are entered with keys 1-9 using multitap or T9™ predictive text; matching Chinese characters are displayed in the candidate area. The Jog Dial may be used to assist in character selection.

This is the Strokes keypad. Note the additional symbols on keys 1-6.

FO Character Input

Virtual Keyboard

Virtual keyboards are provided to enable the user to input elements. The top area is where selected characters are displayed to make up the sentence. An element display area shows the selected element(s). Candidates are displayed within a candidates area, and may be selected.

Pinyin Virtual Keyboard. Includes an elements and a candidate display area.

Strokes Virtual Keyboard. Includes a components area.

BoPoMoFo Virtual Keyboard. Includes an elements and a candidate display area.

Handwriting Recognition

The user writes text directly on to the screen. The shapes drawn persist until the character is interpreted. Simplified Chinese is supported on the P908 and Traditional Chinese on the other Chinese P900 versions.

Numeric input area

Chinese input area

Candidates area

Switch between Chinese and English input
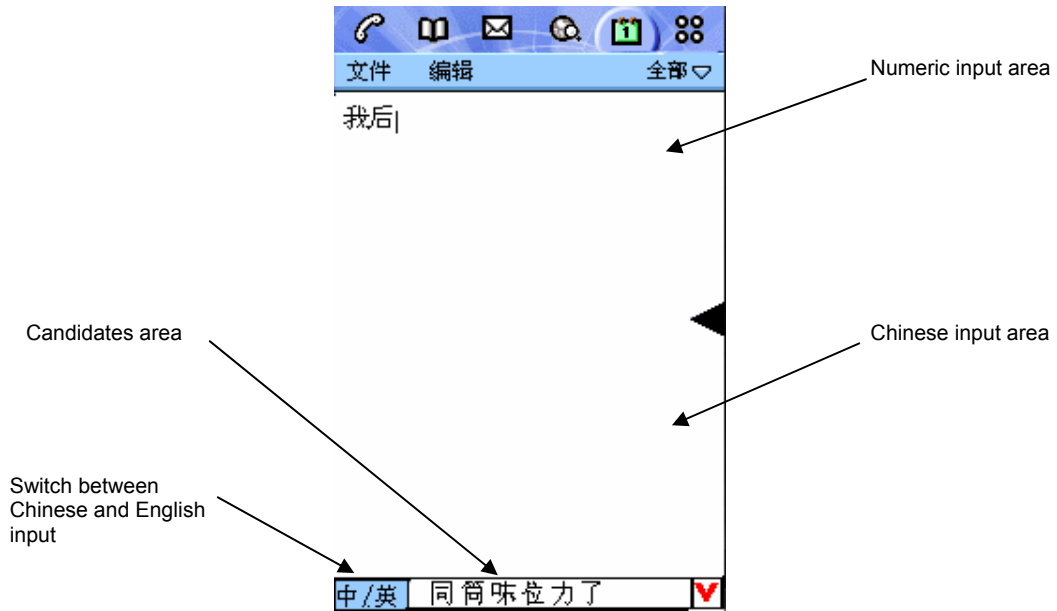
Chinese Dictionary
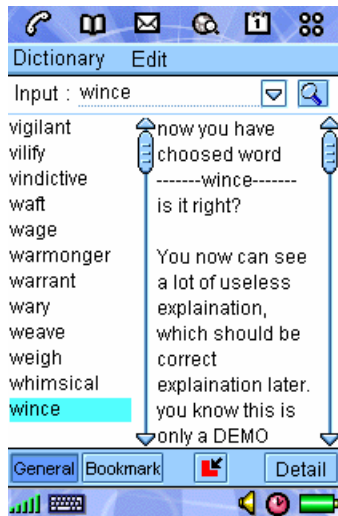
The Chinese models has a standalone Chinese-English / English-Chinese dictionary. Both Traditional and Simplified Chinese versions are supplied on the CD-ROM. The user may load the version required.

Lunar Calendar

The Chinese models have two calendars: one based on the Western solar calendar system and one based on the Chinese lunar system. Before the solar calendar was adopted, China exclusively followed a lunar to decide the times of planning, harvesting and festival occasions. Today the solar calendar is used for most practical matters of daily life but the lunar calendar is still important because it determines numerous seasonal holidays such as the Traditional New Year. When Chinese is the selected language, the lunar calendar is available by clicking the selected year.

Lunar year name image

Lunar year animal image

Solar date

Lunar date
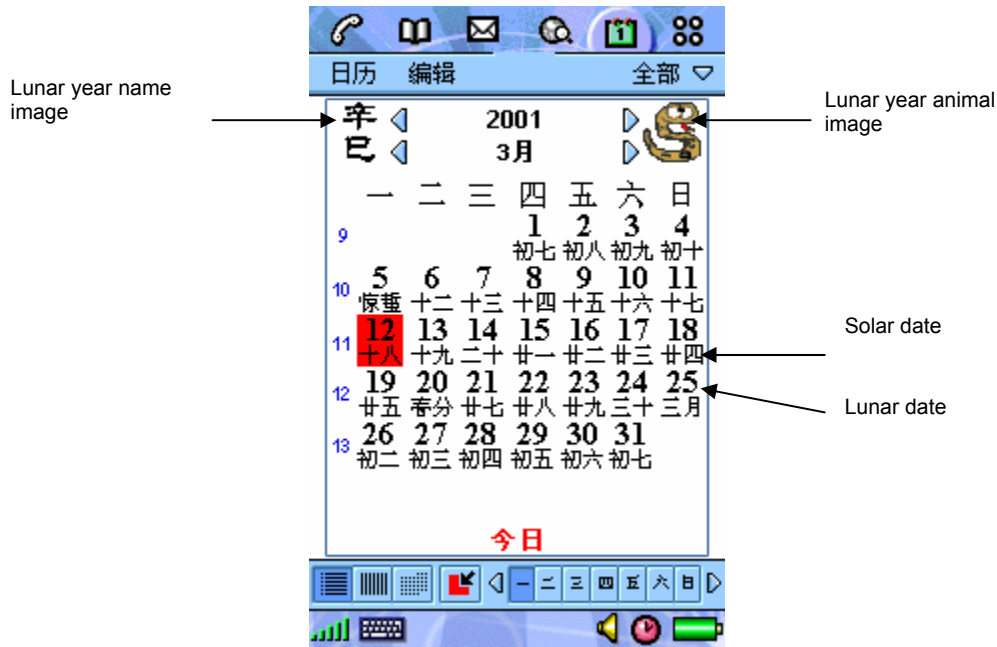
Contacts

Names written Latin characters are sorted in a group separate from those written in Chinese.

User Storage

The Chinese UI and input methods need more storage space compared to the Latin character version. Internal user storage space for messages, dictionary, applications, contacts, images etc is therefore reduced to 13 MB in all Chinese models (compared to up to 16 MB in the Standard (non-Chinese) P900).
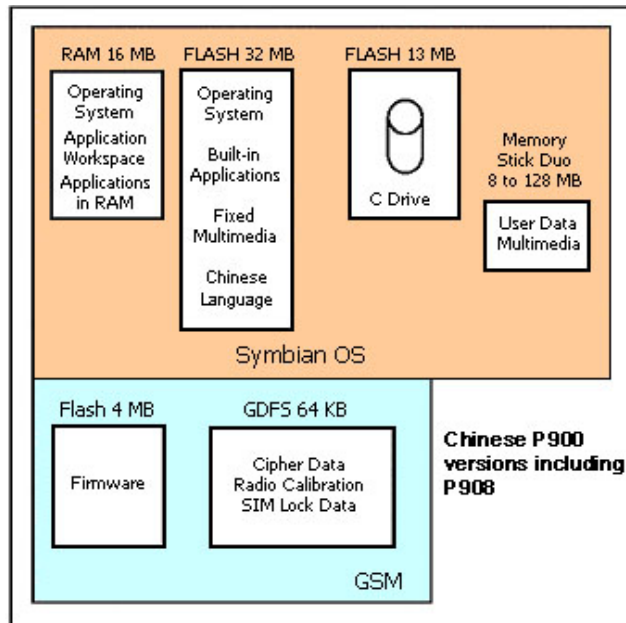
SIM Application Toolkit

SIM Application Toolkit (SIM-AT) is a method of developing small applications for mobile phones. User interaction is via the screen and keyboard, whilst connectivity is provided by means of SMS and USSD transports. SIM-AT can also be used to initiate phone calls. A typical application is to provide a simple menu-based interface to value-added services provided by the mobile operator. The application is stored and distributed on the SIM card. SIM-AT offers a powerful way to deploy programs and services to users, without the need for new or upgraded equipment. All necessary set-up and programming is distributed to users over the air, directly to their phones.

The P900 supports SIM-AT according to GSM 11.14 in order to protect investment in SIM-AT based applications and to enable users to continue using the services and applications on their SIM cards. The applications are accessed from within the UI of the P900's Phone application.

The P900 also has much richer application environments including WAP, Web, C++ and Java. These enable applications to be created with a much better UI and superior connectivity such as TCP/IP over the Internet.

SIM-AT Services supported by the P900

Service	Description
CALL CONTROL	This will enable the SIM to allow, bar or modify a call (supplementary service operation or USSD operation).
DISPLAY TEXT	Text is displayed on the screen according to the request from the SIM application: Priority: Normal, High Clear Message: Automatic after delay, Wait for user. Alphabet: UCS2, packed and unpacked SMS default
EVENT DOWNLOAD	The Event Download enables the ME to report on events to the SIM: • Location Status • Idle Screen Available • Language Selection • Call Connected • Call Disconnected • Browser Termination
GET INKEY	Request the user to enter a single character. • 0-9 *# + only or alphabet set • Yes/No Response • SMS default or UCS2 character set
GET INPUT	Request the user to enter a number of characters. • 0-9 *# + only or alphabet set • SMS default or UCS2 character set • Input echoed or secret • Packed or unpacked.
LAUNCH BROWSER	The P900 will launch the integrated browser.
MORE TIME	More Time allows the SIM Toolkit more time for processing its task, if the

	processing takes long enough to affect normal GSM operation, and clock stop prevents processing to take place in the background.
PLAY TONE	Play supervisory tones (e.g. Dial tone, Busy tone) as defined in GSM 02.40.
POLL INTERVAL	Periodically, the handset sends a status command to the card to check whether the card is present. The SIM can send a poll interval command to request a certain amount of time between status commands.
POLL OFF	Cancels any previous poll interval commands.
PROFILE DOWNLOAD	Profile downloading provides a mechanism for the ME to tell the SIM its capabilities.
PROVIDE LOCAL INFORMATION	Send current known locality information to the SIM: • MCC, MNC, LAC and Cell Identity • IMEI • Network Measurement Results • Date, time and time zone • Language Setting • Timing Advance
REFRESH	The Refresh command enables the SIM to inform the P900 that data on the SIM has changed and the P900 needs to be updated: • SIM Initialisation and Full File Change Notification • File Change Notification • SIM Initialisation and File Change Notification • SIM Initialisation • SIM reset
SELECT ITEM	Allows the user to select one alternative from a menu.
SEND DTMF	If there is an active call, play the requested DTMF tone(s) down the line.
SEND SHORT MESSAGE	Send an SMS containing data provided by the application. • Packing by the ME if required
SEND SS	Send an SS request to the network.
SEND USSD	Send a USSD request to the network.
SET UP CALL	Set up a voice call: • If not currently busy on another call • If not currently busy on another call, with redial • Putting all calls (if any) on hold • Putting all calls (if any) on hold, with redial • Disconnecting all other calls • Disconnecting all other calls, with redial
SET UP EVENT LIST	The SIM supplies a list of events to the P900. When one of these events occurs, the details will be provided to the SIM: • Location Status • Idle screen available • Language selection

- Browser Termination
- Call connected
- Call disconnected

SET UP IDLE MODE TEXT	The P900 displays text from the SIM on the phone's idle screen.
SET UP MENU	Define the SIM Application Menu.
SMS PP DOWNLOAD	This feature will allow data to be downloaded through the Short Message channel on a card by card basis (Point to Point - PP).
SMS CB DOWNLOAD	A cell broadcast envelope broadcasts a message to all of the mobiles in a particular region. The handset can forward the cell broadcast page to the SIM. Normally used to target services geographically.

CD-ROM Contents

The P900 is shipped with two CD-ROMS: PC Suite for P900 and Multimedia for P900.

PC Suite for P900

The PC Suite for P900 CD-ROM includes the following:

Local Synchronisation   PC software for synchronising PIM data between the P900 and PC applications such as Microsoft® Outlook® and Lotus® Notes® and Lotus Organizer. Described elsewhere in this paper.

Backup and Restore   Utility to back up the data from the P900 for storage on a PC. Restore enables data to be returned to the P900, for example, after a software upgrade. This operation must be performed using the P900 Deskstand.

File Manager   Enables Windows Explorer to see the P900 as a device and the internal and Memory Stick storage as two disk drives on the device. Multimedia files may be copied between the PC and the P900.

Software Installer   Utility to install new applications from the PC.

Language Change Utility   Enables the user to load a different language from the CD-ROM and switch the P900 UI to that language, assuming the specific P900 model supports this.

Dial-Up Networking Wizard   Wizard for GPRS and HSCSD settings.

Chinese Dictionaries   (Chinese versions only) Standalone dictionary for looking up Chinese words. Supplied in Simplified Chinese, Traditional Chinese Hong Kong and Traditional Chinese Taiwan.

Drivers   Drivers for using the P900 as a modem over Infrared, Bluetooth or Cable. USB driver for the DSS-25 deskstand.

Manuals   User Guide and Quick Start Guide in Acrobat® PDF format.

                                  Available in all supported languages.

Multimedia for P900

Note: Some of the applications listed below are trial versions that have time limits or restricted functionality.
More applications may be added, and others removed, on subsequent releases of the CD.

P900 Applications

AppForge Booster .NET (Full version) - An operating system extension that enhances the functionality of the P900. When installed on a device, the user is able to run thousands of applications developed by the leading mobile application developers.

Opera 6.0 (Full version) – The small and fast Opera browser provides a full internet experience for the P900.

Image editor (Full version)- Sony Ericsson Image Editor lets you zoom, rotate and adjust colour, contrast and brightness settings for images of the most commonly used PC image file formats before sending them to your phone.

MobiPocket Reader (Full version) - Let's you transform your P900 into a full-featured eBook reader.

V-Rally for Sony Ericsson (Trial version) – The smash hit PlayStation title comes to the Sony Ericsson P900. With all the tracks, all the cars and all the fun and excitement of a real rally, V-Rally will have you on the edge of your seat. Buckle up and remember - there is no second place.

Handy Base (Trial version) - A high performance and powerful database management system for the Sony Ericsson P900.

Handy Day (Trial version) - Gives an overview of the daily appointments and tasks in a single view. It shows all today's upcoming appointments, events, tasks, and new messages.

Handy Expense (Trial version) - An expense tracking application that allows you to record business expenses as they occur, thus reducing the amount of time spent on creating an expense report.

Handy Safe (Trial version) - A perfect assistant for secure and convenient managing all of your important information in one place.

DateMate 1.0 (Trial version) - Keep track of birthdays, anniversaries and other events! DateMate integrates a calendar and a messaging client to provide an easy-to-use and efficient way of remembering anniversaries as well as being able to send out a quick greeting.

gate5 Mobile Guide (Trial version) - A convenient and intuitive way of retrieving events and city maps, corresponding to the current city.

Photo Editor (Trial version) - Photo editing applications for mobile phones. With its user-friendly interface you can modify pictures taken from your camera in a few minutes and send them to a friend.

WorldMate Professional Edition (Trial version) - Will assist the frequent business traveller in planning, managing and tracking her business travels.

eZiTap™ (Trial version) – An application that increases your speed of text entry on the virtual keyboard. It learns all the words you enter. Then, every time you start typing, eZiTap™ predicts the most appropriate words for you to select.

MoreApps - MoreApps is a wireless application catalog that contains a selection of mobile applications that you can download, try and buy for your P900.

P900/PC Applications	*Remote Control (Trial version)* - With this powerful software tool you can connect your phone to your PC directly or via the Internet from any location, to collect important information, read e-mail, send faxes and control the status of your Web server from anywhere in the world. Remote Control gives you the potential to control your PC directly from your phone.
PC Applications	*PacketVideo Recorder (Full version)*- Make your own video and audio files for your phone using low cost USB web cameras, DV cameras and microphones.
	PC Video player – This is an internet link to a video player suitable for playing P900 video clips on a PC.
	MMS Home Studio (Full version)- For creating MMS templates on a PC.
	Adobe® Photoshop® Album (Trial version) – Finding and organizing digital images. Quickly fix common photo problems with the Single Click Fix button, eliminate red eye, or crop out unwanted areas of your photos.
MMS	MMS templates including copies of the templates loaded on the P900 in the factory.
Themes	A selection of Themes including those loaded on the P900 in the factory. See 'Personalization and Customization' for more information.
Pictures	A selection of images including those loaded on the P900 in the factory. See 'Personalization and Customization' for more information.
Ring Signals	A selection of ring signals including those loaded on the P900 in the factory. See 'Personalization and Customization' for more information.
Video	'Take a break' and a copy of the pre-installed 'Hole in one' video clips.

P900 Consumer Package

The exact contents of the P900 package depend on the localisation.

The basic contents are as follows:

- P900
- Standard Battery
- Travel charger
- 32 MB Memory Stick Duo
- Memory Stick Adapter
- Deskstand DSS-25
- Stereo Portable Handsfree
- Carry case
- Wrist strap
- 1 extra stylus
- Flip replacement kit
- PC Suite for P900 CD
- Multimedia for P900 CD
- User documentation set

Terminology and Abbreviations

3G
Generic term for the third generation mobile systems which will offer voice and faster data services compared to today's 2G (e.g. GSM) and '2.5G' (e.g. GPRS) solutions.

3GPP
3rd Generation Partnership Project. Collaboration between a number of telecommunications standards bodies to specify 3G. 3GPP also maintains and develops the specifications for GSM.

AAC
Advanced Audio Codec.

ALS
Alternate Line Service. A system that allows a user to have more than one line allocated to a single SIM subscription.

AMR
Adaptive Multi-Rate. A variable rate speech coding (compression) method selected by the 3GPP for the 3G evolution of the GSM phones.

AU, .au
Format for audio data files.

AWT
Abstract Windowing Toolkit. A Java Graphical User Interface library.

BAE
Beatnik Audio Engine™

Bearer
Path over which data flows. Specifically in CSD and HSCSD, the type of telephony link from the GSM network to the server – PSTN or ISDN.

Bluetooth
Bluetooth wireless technology is a secure, fast, point-to-multipoint radio connection technology. It is a specification for a small-form factor, low-cost radio solution providing links between mobile computers, mobile phones and other portable handheld devices, and connectivity to the Internet. Available from the Bluetooth Special Interest Group (SIG), http://www.bluetooth.com.

Bookmark
A URL and header/title stored in the phone, enabling the user to go directly to a Web or WAP page.

BMP
Microsoft Windows Bitmap. A graphics format defined by Microsoft supporting 1, 4, 8 or 24 bit colour depth. No compression, so files can be large.

bps
Bits per second – rate of data flow.

CB
Cell Broadcast. Type of SMS message.

cHTML
A version of HTML optimized for small devices.

CLDC
Connected Limited Device Configuration. The J2ME 'configuration' implemented in the P900. CLDC specifies a runtime environment with specifically limited resources, suitable for memory-constrained devices.

CLI
Calling Line Identity. Shows the number of the person calling you in your mobile phone display. The P900 will also display the name and photograph of the caller if they are in Contacts.

You can then make an informed choice as to whether or not to take the call. Bear in mind that not all numbers can be displayed. To use this service, it must be supported by your network.

COM Port
Defines a serial/RS-232 port within the Windows® environment. May be physical (COM1 port on the rear of the PC) or virtual (COM5 port communicating with a PC card modem).

CPHS Compliancy
The Common PCN Handset Specification (CPHS) is an industry standard that defines terminal and SIM functionality in addition to the standard GSM specifications.

CS
Circuit Switched. Connection from A to B which has a fixed bandwidth and is maintained over a period of time, for example a voice telephone call.

CS-1 to CS-4
Coding Scheme. Determines the data rate per timeslot in GPRS.

CSD
Circuit Switched Data. CSD is a GSM service providing a CS data connection at a rate of 9.6 or 14.4 Kbps.

CSP
Customer Service Profile. on a SIM card will determine which menus on the phone are available to the user.

CSS
Cascading Style Sheet. A feature of browsers.

DCIM
Digital Camera IMages. The name of the root directory when storing images according to the Design rule for Camera File system (DCF) standard.

DRM
Digital Rights Management. DRM allows content providers to control access to their resources through the secure delivery of media to mobile phones and other consumer appliances.

DTMF
Dual Tone Multi Frequency. A method of coding digits as a combination of two audible tones.

DUN
Dial-Up Networking.

ECML
Electronic Commerce Modelling Language.

EFR
Enhanced Full Rate, speech coding. Provides better speech quality than HR or FR.

e-GSM
Extended GSM. New frequencies specified by the European Radio Communications Committee (ERC) for GSM use when additional spectrum is needed (Network-dependent). It allows operators to transmit and receive just outside GSM's core

900MHz frequency band. This extension gives increased network capability.

EMS
Enhanced Messaging Service. An extension of SMS enabling pictures, animations, sound and text formatting to be added to text messages. 3GPP has included EMS in the standards for SMS.

ETSI
European Telecommunications Standards Institute. www.etsi.org

FC, FC mode
Flip Closed – used in this document to refer to the P900 with the flip closed.

FCC
Federal Communications Commission. US government agency which regulates radio communications.

FR
Full Rate, speech coding.

FO, FO mode
Flip Open. Used in this document to refer to the P900 when the flip is open.

GGSN
Gateway GPRS Support Node

GIF
Graphics Interchange Format. Format for storing images which also supports animated images. Highly compressed by limiting the colour palette to 16 or 256 colours.

G-MIDI
General MIDI. Specifies a minimum level of performance compatibility.

GPRS
General Packet Radio Services.

GSM
Global System for Mobile Communications. GSM is the world's most widely-used digital mobile phone system, now operating in over 160 countries around the world.

GSM 900
The GSM system family includes GSM 900, GSM 1810 and GSM 1900. There are different phases

of roll-out for the GSM system and GSM phones are either phase 1 or phase 2 compliant.

GSM 1810
Also known as DCS 1810 or PCN, this is a GSM digital network working on a frequency of 1810 MHz. It is used in Europe and Asia-Pacific.

GSM 1900

Also known as PCS. Refers to a GSM system running in the 1900MHz band. Used in the USA and Canada, for instance.

HR
Half Rate, speech coding.

HSCSD
High Speed Circuit Switched Data.

HTML
HyperText Markup Language.

HTTP
HyperText Transfer Protocol.

IMAP4
Internet Message Access Protocol version 4. Used to collect email from a mail server. Has more features than POP3.

iMelody
A format for monophonic ringtones.

IrDA
Infrared Data Association.

ISDN

Integrated Services Digital Network. Can provide circuit-switched data connections in multiples of 64 Kbps.

ISP
Internet Service Provider.

J2ME
Java2 Micro Edition – an edition of the Sun Microsystems Java programming/runtime environment specifying two runtime environment 'configurations' aimed at small devices.

Java Phone
An API in Java used for interacting with a phone.

JFIF
JPEG File Interchange Format

JNI
Java Native Interface

JPEG
Joint Photographic Experts Group, best known for the .JPG format for still image compression.

JVM
Java Virtual Machine

Kbps
Kilobits per second – rate of data flow.

KVM
'Kilo' Virtual Machine

LAN
Local Area Network.

MBM
Multi Bitmap. Image file format on Symbian OS.

ME
Mobile Equipment. (Phone excluding SIM card)

MeT
Mobile Electronic Transactions. An initiative founded by Ericsson, Nokia and Motorola to establish a secure and consistent framework for mobile transactions.

MIDI
Musical Instrument Digital Interface. MIDI defines a protocol and file format which enables music to be described and stored in binary form.

MIDP
Mobile Information Device Profile. An API (or 'profile' in J2ME nomenclature) defined to enable a standard programming API for mobile devices. MIDP compliant applications execute in the restricted environment defined by the CLDC.

MIME
Multipurpose Internet Mail Extensions. A protocol defining how messages are sent on the Internet. For example, MIME is used to describe how attachments are encoded and what type of data they contain.

MMS
Multimedia Messaging Service. Logical extension of SMS and EMS, MMS defines a service enabling sound, images and video to be combined into multimedia messages.

MMS-C
MMS Service Centre

MO
Mobile Origination. For example, an SMS message sent from a mobile terminal.

MP3
MPEG Audio Layer 3. An audio compression technology that is part of MPEG-1 and MPEG-2 specifications. Commonly used to distribute music on the Internet and on portable players.

MPEG
Moving Picture Experts Group. A working group of ISO/IEC in charge of the development of standards for coded representation of digital audio and video.

MS
Mobile Station. (Phone and SIM card)

MT
Mobile Termination.

OS
Operating System, such as Symbian OS, Linux, Microsoft® Windows®.

OTA
Over-the Air Configuration. To provide settings for the phone by way of sending a message, SMS, over the network to the phone. This reduces the need for the user to configure the phone manually.

PC
Personal Computer.

PCS
Personal Communications Services, often used to describe GSM1900 networks.

PDA
Personal Digital Assistant. A handheld computer having functions such as address book, calendar etc.

PDF
Portable Document Format. A format created by Adobe for storing and distributing documents.

PDP
Packet Data Protocol.

Personal Java
An edition of Java appropriate for mobile devices such as PDAs.

Phone book
A memory in the SIM card where phone numbers can be stored and accessed by name or position.

PIM
Personal Information Management. Generic term for applications such as Contacts, Calendar, Tasks etc.

PKI
Public Key Infrastructure.

PNG
Portable Network Graphics. Format for storing images on file with data compression but without lowering of quality (loss of information).

Polyphonic
'Many sounds'. The maximum number of notes an instrument can play at the same time, commonly 16 in MIDI devices.

POP3
Post Office Protocol. Used to collect email from a mail server.

PSTN
Public Switched Telephone Network, for example ordinary analogue phone line for speech and/or computer modem.

PTD
Personal Trusted Device. Concept in MeT

QCIF
Quarter Common Intermediate Format. A video format size of 176 x 144 lines.

QQVGA
Quarter Quarter VGA, 160 x 120 pixels.

QVGA
Quarter VGA size, typically refers to a portrait oriented screen 240 pixels wide x 320 pixels high.

RADIUS
Remote Access Dial-In Service. Facility at the ISP or corporation to manage remote data connections.

RAS
Remote Access Service.

RMF
Rich Music Format^{TM} A file format developed by Beatnik combining the compact size of MIDI files with the high quality of MP3 and WAV.

Rx
Receive

SC
Service Centre (for SMS).

SDK
Software Development Kit

Service Provider
A company that provides services and subscriptions to mobile phone users.

SIM card
Subscriber Identity Module card – a card that must be inserted in any GSM-based mobile terminal. It contains subscriber details, security information and memory for a personal directory of numbers. The card can be a small plug-in type or credit card-sized, but both types have the same functions. The P900 uses the small plug-in card.

SIM-AT
SIM Application Toolkit – a means of providing simple applications that are stored on the SIM card.

SMIL
Synchronised Multimedia Integration Language. Used by MMS to describe how media objects are to be played.

SMS
Short Message Service. Allows messages of up to 160 characters to be sent and received via the network operator's message centre to a mobile phone.

SMSCB
SMS Cell Broadcast.

SMTP
Simple Mail Transfer Protocol. Protocol used to send email from an E-Mail client via an SMTP server.

SS
Supplementary Service

SWIM
A SWIM card is a SIM card containing a WIM

T9
(Text on 9 Keys) A text input system from Tegic that adds intelligence to multi-tapping letters on a telephone keypad.

TCP/IP
Transmission Control Protocol/Internet Protocol.

TE
Terminal Equipment. Generic term for GSM terminals such as phones and PC cards.

Terminal Adaptor
Generic term for the equipment terminating a digital comms line such as an ISDN2 line. The P900 is a Terminal Adaptor since it interfaces to GSM digital data services.

TLS
Transport Layer Security. Used by Web browsers, for example.

Tx
Transmit

TTY (Teletypewriter)
A telecommunication device with a keyboard and a visual display that is used primarily by people who are deaf, hard of hearing, or have a speech disability.

UI
User Interface. Sometimes called 'Man-Machine Interface'.

UIQ
A customizable pen-based user interface for media-rich mobile phones that is based on the Symbian OS. It may be used as the basis for building an attractive and efficient UI.

URL
Uniform Resource Locator. Points to a service or information on the Internet, for example: http://www.ericsson.com/mms/demo

USSD
Unstructured Supplementary Services Data. Narrow-band GSM data service. For example entering ***79*1234#** might return the stock price for stock 1234.

V.110

ETSI standard for data over an ISDN circuit.

V.120

ETSI standard for data over an ISDN circuit.

vCal; vCalendar

vCalendar defines a transport and platform-independent format for exchanging calendar and scheduling information for use in PIMs/PDAs and group schedulers. vCalendar is specified by IETF.

vCard

vCard automates the exchange of personal information typically found on a traditional business card, for use in applications such as internet mail, voice mail, Web browsers, telephony applications, call centres, video conferencing, PIMs /PDAs, pagers, fax, office equipment, and smart cards. vCard is specified by IETF.

VGA

Video Graphics Array. Graphics standard introduced by IBM, having a resolution of 640 x 480 pixels.

VPN

Virtual Private Network.

WAP

Wireless Application Protocol. Handheld devices, low bandwidth, binary coded, a deck/card metaphor to specify a service. A card is typically a unit of interaction with the user, that is, either presentation of information or request for information from the user. A collection of cards is called a deck, which usually constitutes a service.

WAV

Waveform audio. Format for storing sound.

WBMP

Wireless BitMap. Part of the WAP specifications, an image format optimized for small mobile devices.

WBXML

Wireless Binary Extensible Markup Language.

WIM

Wireless Identity Module.

WML

Wireless Markup Language. A markup language used for authoring services, fulfilling the same purpose as HyperText Markup Language (HTML) does on the World Wide Web (WWW). In contrast to HTML, WML is designed to fit small handheld devices.

WTLS

Wireless Transport Layer Security. Part of WAP, WTLS provides privacy, data integrity and authentication on transport layer level between two applications.

xHTML

Extensible Hypertext Markup Language

XML

Extensible Markup Language

Related Information

Links

http://www.SonyEricsson.com/P900	P900 website
http://www.SonyEricsson.com/developer	Sony Ericsson Developer World
http://www.3gpp.org/	Home of the 3rd Generation Partnership Project
http://www.etsi.org/	Home of the European Telecommunications Standards Institute.
http://www.mobiletransaction.org/	MeT – Mobile electronic Transaction homepage
http://www.symbian.com/	Information on Symbian and Symbian OS
http://www.syncml.org/	SyncML homepage
http://www.bluetooth.com/	Home of the Bluetooth Special Interest Group
http://www.irda.org/	Home of the Infrared Data Association
http://www.wapforum.com/	Home of the WAP forum
http://www.imc.org/	Home of the Internet Mail Consortium
http://www.t9.com/	Home of the T9 predictive text input system
http://www.rsasecurity.com/	RSA Security provides the SecurID® two-factor authentication solution.
http://www.securecomputing.com/	Secure Computing provides the SafeWord™ authentication and access control solution.
http://java.sun.com/	The source for Java technology.
http://www.appforge.com	Visual Basic and .NET tools
http://www.borland.com/mobile/	Borland tools for mobile development (Symbian C++ and Java)
http://www.metrowerks.com/	Code Warrior tools for Symbian OS
http://www.beatnik.com/	Beatnik provides enhanced audio solutions including the RMF format.
http://www.memorystick.org/	Technical specifications and Supporting Companies' site for Memory Stick.
http://www.memorystick.com/	Information site by 'memorystick.com' Business Centre within Sony Corp.
http://www.opera.com	Home of the Opera browser with information and download of the latest version for P900.

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Facts and Figures

Technical Specifications

General

Product name	P900 (Latin and Chinese versions) P908 (Chinese version for People's Republic of China)
Size	57 x 115 x 24 mm
Weight	150 grams with battery and flip
System and power class	E-GSM 900 Class 4 GSM 1800 Class 1 GSM 1900 Class 1
Antenna	Built in
Speech Coding	HR, FR, EFR supported where available, for high speech quality.
SIM Card	Small plug-in card, 3V or 5V type
Operating System	Symbian OS v7.0 Based on the 'UIQ' design.
Processor	ARM 9
Internal User storage	For settings, user data (e.g. images, contacts, messages) and third party applications: Standard P900: Up to 16 MB Chinese versions: Up to 13 MB (dictionary not activated)
Additional Storage	Memory Stick Duo, up to 128 MB size supported. 32 MB Memory Stick Duo supplied, plus Adapter

Battery Life

Standard battery	Talk Time: up to 13 hours Standby time: up to 400 hours

GPRS Maximum Data Rates (Kbps)

		CS-1 9.05 Kbps	CS-2 13.4 Kbps	CS-3 15.6 Kbps	CS-4 21.4 Kbps
4 + 1	Rx	36.2	53.6	62.4	85.6
	Tx	9.05	13.4	15.6	21.4

Speed achieved depends on the Coding Scheme supported by the GSM Network.

HSCSD Maximum Data Rates (Kbps)

		9.6 Kbps per timeslot	14.4 Kbps per timeslot
2 + 1	Rx	19.2	28.8
	Tx	9.6	14.4

Screen

Display type	TFT
Display size	Flip closed: 208 x 208 pixels, 40 x 40 mm Flip open: 208 x 320 pixels, 40 x 61 mm
Pixel size	0.192 mm
Colour resolution	16-bit (65,536 colours)
Screen surface	Touch-sensitive
Illumination	Variable intensity backlight

Keypad

16 keyswitches on hinged/removable flip
Jog Dial, 5-way: up, down, towards, away and inwards
Browser button to switch to integrated browser
CommuniCorder button – switches to camera viewfinder and acts as shutter
On/Off button

Input

	P900 Standard version	P908/P900 Chinese versions
Flip Closed	Numeric keypad on flip Latin characters on number keys T9 predictive text or multitap input (selectable)	Numeric keypad on flap Stroke Pinyin Bopomofo
Flip Open	Touchscreen Natural character recognition On-screen virtual keyboard	Touchscreen Chinese character recognition English character recognition Numeric character recognition Stroke Pinyin Bopomofo

Third Party Application Support

SDKs	C++ PersonalJava™ J2ME™ CLDC/MIDP 2.0 Visual Basic 6 and .NET
Load formats	C++, Java™ or VB applications in Symbian SIS format. MIDP installation (JAR/JAD) from Browser or connected PC
Security	Support for signed applications

Telephony

Handsfree options:	Built-in Office Speakerphone Portable Handsfree Bluetooth Headset (optional accessory) Stereo Headset (optional accessory)
Picture Phone Book	Picture of contact displayed when making outgoing call Picture of caller displayed when incoming call CLI matches entry in Contacts. (See Contacts and Personalization for details) Pictures of contacts shown on speed dial screen when in picture mode
Personal Ringtones	Sound clips as personal ringtones and default ringtone: MP3, AMR, AU, iMelody, MIDI, RMF (Beatnik) and WAV.
Voice control	Voice Dialling Voice Answering (answer or send 'busy') Magic Word activation 40 seconds storage for approx. 50 words and contact names
Other features:	Support for calling cards Access most applications whilst on a phone call Flight mode, enabling P900 to be used as a PDA in locations where radio transmitters must be switched off. GSM and Bluetooth are switched off when in flight mode.
SIM-AT	SIM Application Toolkit according to GSM 11.14
USSD	Incoming and outgoing

Personal Organizer

Applications	Contacts (Address Book) Calendar (Diary) Tasks ('To-Do' list) Jotter (Text and 'ink' notes) Sound recorder (Dictaphone) Time (World Clock) Calculator (Chinese versions only) English-Chinese-English Dictionary (Chinese versions only) Lunar Calendar

Integrated CommuniCorder

Image Size	Still Camera:	640 x 480 pixels (VGA)
		320 x 240 pixels (QVGA)
		160 x 120 pixels (QQVGA)
	Video Camera	176 x 144 pixels (QCIF)
Colour depth	24 bit (16.78 million colours)	
Storage format*	Still Camera:	JPEG/JFIF, 3 compression levels, user-selectable.
	Video Camera*	Picture: 3GPP/MPEG-4. Sound: AMR
Other features	Delay timer Brightness and Contrast settings Lighting (4 pre-set values plus automatic) Flicker-free setting (for fluorescent lighting) Backlight mode (when there is light behind the subject) Night mode Mute shutter CommuniCorder button first press switches to viewfinder – subsequent press acts as the shutter or video on/off. Jog Dial acts as mode select and alternative shutter button. On-screen icons show quality setting and remaining pictures or video clip time. Quick share feature provides rapid switch to MMS with picture or video ready to send.	

*) For details about different video storage formats of the CommuniCorder, see table on page 128.

Pictures (Image Viewer)

Formats	JPEG, BMP, GIF (including animated), MBM, PNG, WBMP
Sharing via	IR, Bluetooth, MMS, E-Mail, PC file transfer, Memory Stick

Image Editor

Usage	The Image Editor is available from the Pictures application and also when composing MMS messages.
Functions	Crop, Rotate, Rescale
Electronic ink (draw on picture)	Colour, pen size, eraser function

Video Player

File Format	.3GP (3GPP PSS), .MP4
Streaming transport	RTSP according to 3GPP
Video coding	MPEG-4 Simple Visual Profile Level 0 H263 Profile 0 Level 10
Audio coding	AMR, AAC

Music Player

File Format	AMR, AU, MP3, WAV, RMF, iMelody G-MIDI level 1 with 16 voices polyphony
Features	Playlists, Loop, Automatic pause on telephone call. MP3 ID3 tag details displayed.

Messages: SMS

Classes	0, 1 and 2
Bearer	GSM and GPRS
Broadcast	Basic & Extended channel
Concatenated	Up to 255 messages

Messages: EMS

Standards compliance	3GPP 23.040 Version 4
Supported objects	Sounds, Melodies, Pictures, Animations
Image editor	User may create and edit icons (16x16 and 32x32 pixels)

Messages: MMS

Image formats	GIF (Including animated), JPG, BMP, WBMP, PNG
Audio format	AMR, AU, iMelody, MIDI, WAV
Video format	.3GP (3GPP PSS), .MP4
Presentation	SMIL
Conformance	OMA Multimedia Messaging Service version 1.1

Messages: E-Mail

Incoming mail server support	POP3, IMAP4
Outgoing mail server support	SMTP
Content coding	MIME compliant
Attachment Viewers	VCard, vCal, Pictures, Video Player, Music player Document viewers as below
Other features	Automatic download of messages over GPRS 'always on' connection

Document Viewer

Document type	Group	Location	Notes
Adobe® Acrobat® (PDF)	Built-in	Built-in	
Microsoft® Excel	Built-in	Built-in	
Microsoft® PowerPoint®	Built-in	Built-in	
Microsoft® Word	Built-in	Built-in	
Rich Text File (RTF)	Extended Office	CD	
Microsoft® Project	Extended Office	CD	
Microsoft® Visio®	Extended Office	CD	
Microsoft® Excel	Extended Office	CD	Older formats
Microsoft® PowerPoint®	Extended Office	CD	Older formats
Microsoft® Word	Extended Office	CD	Older formats
Corel® WordPerfect®	WordPerfect	CD	4.0 to 8.0
Corel® WordPerfect® Graphics	WordPerfect	CD	
Corel® Presentations	WordPerfect	CD	
Corel® Quattro® Pro	WordPerfect	CD	
Lotus® 1-2-3®	Lotus	CD	
Lotus® Ami Professional Draw	Lotus	CD	
PKZip®	Archive	CD	
Gnu Zip	Archive	CD	
CGM	Graphics	CD	
Fax	Graphics	CD	
PCX	Graphics	CD	
Ichitaro	Other	CD	
Microsoft® Outlook® message file	Other	CD	
PFS: First Choice	Other	CD	
PFS: Write	Other	CD	

Integrated Browser Technical Data

Markup Languages	HTML 3.2 (excluding features such as Frames and JavaScript that are not relevant to a small screen device) WML 1.3 WBXML xHTML Basic xHTML Mobile Profile cHTML
WAP version	2.0
Scripting	Compiled WML scripts
Style sheets	WCSS
Images	BMP, WBMP, GIF (including animated), JPEG, PNG
Bearer	GPRS, HSCSD, CSD
Security	WTLS Class 1, 2, 3; WTLS Cipher RC5 with key length 128 TLS/SSL; TLS Cipher RC4 with key length 128 SignText
Certificates	Pre-installed: Baltimore, Entrust, GlobalSign, RSA and VeriSign. Download WTLS, X509
WIM	WIM interface including SIM-WIM (SWIM)
Bookmarks	Yes, number only limited by available user storage
Bookmark import/export	IrDA, Bluetooth, SMS, MMS, E-Mail
Home Page	Yes
Cache	15 KB – 1 MB user-configurable; 600 KB default.
Clear cache function	Yes
Cookies	Yes
Hyperlinks	Underlined in text Image according to Style Sheet.
WAP Accounts (WAP Profiles)	Yes. Integrated with bookmarks. Quantity only limited by available user storage.
OTA Support	Ericsson/Nokia OTA WAP Forum Provisioning
User Agent Profiles	Yes, list of client capabilities

M-Services

Compliant with M-Services specification, Phase 1

User Personalization

Background	BMP, GIF, Animated GIF, JPEG, MBM, PNG, WBMP 208 x 189 pixels in FC mode and 208 x 254 pixels in FO mode. In FO mode, only the first frame of an animated GIF is displayed.
Screen saver FC and FO	BMP, GIF, JPEG, MBM, PNG, WBMP Animated GIF supported; note that animation uses more power. 208 x 320 pixels FO image size 208 x 208 pixels visible area with flip closed (same image as FO)
Ringtones and Alarm tones	MP3, AMR, AU, iMelody, MIDI, RMF, WAV Recommended format for WAV files is PCM, 22,050Hz, 8 bit, Mono, often called 'radio quality'
Picture Phonebook	BMP, GIF, JPEG, MBM, PNG, WBMP (Picture formats that may be loaded into Contacts)
Application selection	Applications available via FC on-screen icons. Applications available from Application Picker in FO mode.

Bluetooth Wireless Technology Technical Data

Bluetooth compatibility statement	This product is manufactured to comply with the Bluetooth specification 1.1.
Coverage area	Up to 10 metres (33 feet)
Bluetooth functions	Generic Access Profile Serial Port Profile Generic Object Exchange Profile Dialup Networking Profile Object Push Profile Headset Profile File Transfer Profile
Qualified profiles	DUN-GW FT-Server GAP Generic Object Exchange Headset-AG OBEX OPP-Client OPP-Server Serial-DevA Serial-DevB

Infrared Transceiver Technical Data

Data transmission rate	Max speed between phone and IrDA device (e.g. PC, another phone) SIR: up to 115,200 bps

Remote Synchronisation

Data	Contacts Calendar Tasks
Bearer	HTTP
Protocol	SyncML

Local Synchronisation

Data	Contacts Calendar Tasks Jotter Text Notes E-Mail
Bearer	Bluetooth, IrDA, USB
Protocol	SyncML
PC Applications supported	Lotus Organizer 5 & 6 Lotus Notes 5.0 & 6 Microsoft® Outlook® 98, 2000, 2002

PC Suite for P900

Local Synchronisation (as above)
Drag-and-drop file transfer between the P900 and the PC. (e.g. Word documents, JPEG images)
Backup and Restore of user data and settings
Software Installation Utility
Language Change Utility (not available for Chinese versions)
Dial-Up Networking Wizard
Drivers for P900 to be used as a wireless modem
Interactive Learning Video
Soft copies of user documentation

Security

Data protection	SIM PIN (at power on) Device Lock (at power on and/or activated by screensaver)
Browser	TLS, SSL, WTLS, Certificate handling
Third party applications	Support for signed applications
Intranet Access	SecureID® from RSA Security SafeWord from Secure Computing

Remote Configuration

Ericsson/Nokia OTA Settings specification	WAP Account (Account name and WAP Gateway information) ISP Settings (Bearer information, username, password) Bookmark (name and URL) SyncML settings MMS Settings
WAP Forum specifications	WAP Account ISP Settings
Smart Messaging Specification	ISP Settings E-Mail account

Games

Solitaire
Chess, including multi-player games over SMS

Table - CommuniCorder video formats

Video Quality	Video codec*	Audio codec	File Type	Notes
Low *(Message Video)*	H.263 Profile 0 level 10 @ 51.8kbps, QCIF*	AMR @ 4.75 (low) or 12.2 kbps (high)	.3GP	Maximum total bitrate** = 64 kbps, maximum file size is 95 KB
Medium	MPEG4 Visual Simple Profile Level 0 @ 96kbps, QCIF*	AMR @ 4.75 (low) or 12.2 kbps (high)	.MP4	Total bitrate = 96kbps + audio bitrate
High	MPEG4 Visual Simple Profile Level 0 @ 128kbps, QCIF*	AMR @ 4.75 (low) or 12.2 kbps (high)	.MP4	Total bitrate = 128kbps + audio bitrate

*The video codec bitrates exceed the 3GPP specifications. This provides better quality than the 3GPP specifications allow, and will play on most newer devices and PC video player software.

**Total Bit Rate = overall bitrate of audio + video.

For a suitable PC Player please refer to http://www.sonyericsson.com/p900/videoplayer.