Developers Guidelines
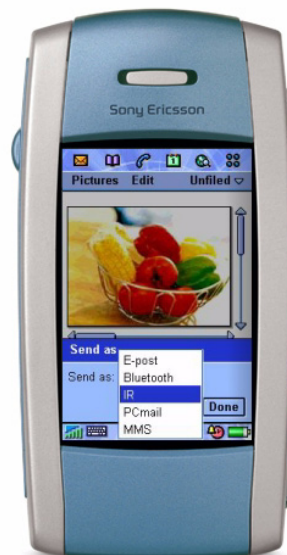
AT commands for P800/P900

Sony Ericsson

Preface

Purpose of this document

This manual describes the operation of the AT commands supported by the P800, P802, P900 and P908 Telephones, in the document called P800/P900. The information here is not relevant for day-to-day operation of the Telephone. This is described in the User Manual supplied with the P800/P900.

The On-line Reference Manual is for advanced users who require detailed information in order to:

– Develop new communications software

– Add the P800/P900 to an application's list of compatible modems

– Adjust the settings of their mobile telephone

This manual is designed to supplement the Ericsson P800/P900 Telephone User's Manual.

This guide describes the AT commands for P800/P900 briefly, and lists the AT commands used in P800/P900. For a detailed description on these AT commands, please refer to [1].

More information is available at Sony Ericsson Developer World website at http://www.sonyericsson.com/developer where upto-date information about technologies, products and tools can be obtained.

September 2003

Document conventions

The standard text in this manual is modified to distinguish between the text displayed on the screen, typed instructions and examples of command dialogue. The distinctions are as follows:

– Typed commands and option values are written in bold text; for example: **S2=**<esc>; <esc>=**0-127**

– Any key strokes are written in bold text in brackets; for example **<CR>**

– Examples of command dialogue, including keyboard entries and on-screen responses, are written in `Courier` text

– The default parameter setting used by a command is indicated by the text "**Default setting**"

Document history

Change history		
2003-09-30	Version R1A	Initial release

Abbreviations

ME   GSM Mobile Equipment

TA   Terminal Adapter, or Data Communicating Equipment i

TE   Terminal Equipment, or Data TE

SM   SIM Phonebook

Contents

September 2003

Introduction

Concepts and definitions

This chapter specifies concepts and definitions that are common to both ITU-T V.25ter [2] and ITU-T V.250 [3] recommendations (V.250 supersedes V.25ter), and are extended with Ericsson specific implementations.

Alphabet

The ITU-T T.50 (ref. [4]) International Alphabet 5, hereinafter cited as "IA5", is used in this specification. Only the low-order seven bits of each character are significant to the TA; any eighth or higher-order bit(s), if present, are ignored for the purpose of identifying commands and parameters. Lower-case characters (IA5 values from 6/1 to 7/10) are considered identical to their upper-case equivalents (IA5 values from 4/1 to 5/10) when received by the TA from the TE. Result codes from the TA, which are defined in this Recommendation, are in upper case.

TE command lines

In the descriptions that follow in this chapter, words enclosed in **<angle brackets>** are references to syntactical elements defined in this Specification. When they appear in a command line, the brackets are not used. Words enclosed in **[square brackets]** represent optional items; such items may be omitted from the command line at the point where they are specified, and when they appear the square brackets are not included in the command line. Other characters that appear in syntax descriptions appear in the places shown.

In the following sub-clauses regarding TE commands, references are made to responses issued by the TA, which are defined in "TA responses" on page 13. In order to provide a clearer presentation, TA responses are mentioned in terms of their alphabetic format; the actual response issued will depend on the setting of parameters that affect response formats (e.g. **Q** and **V** commands).

Command line general format

A command line is made up of three elements: the prefix, the body, and the termination character.

The command line prefix consists of the characters **"AT"** (IA5 4/1, 5/4) or **"at"** (IA5 6/1, 7/4). The body is made up of individual commands as specified later in this Recommendation. Space characters (IA5 2/0) are ignored and may be used freely for formatting purposes, unless they are embedded in numeric or string constants ("Numeric constants" on page 9 or "String constants" on page 9). The termination character may not appear in the body. The TA is capable of accepting at least 40 characters in the body.

The termination character may be selected by a user option (parameter **S3**), the default being CR (IA5 0/ 13).

Command line editing

The character defined by parameter **S5** (default, BS [IA5 0/8]) is interpreted as a request from the TE to the TA to delete the previous character. Any control characters (IA5 0/0 through 1/15, inclusive) that remain in the command line after receipt of the termination character is ignored by the TA.

The TA checks characters from the TE, first to see if they match the termination character **(S3)** then the editing character **(S5)**, before checking for other characters. This insures that these characters will be properly recognized even if they are set to values that the TA uses for other purposes. If **S3** and **S5** are set to the same value, a matching character will be treated as matching **S3 (S3** is checked before **S5)**.

Command line echo

The TA may echo characters received from the TE during command state and online command state back to the TE, depending on the setting of the **E** command. If so enabled, characters received from the TE are echoed at the same rate, parity, and format as received.

Types of TE Commands

There are two types of commands: action commands and parameter commands. Action commands may be "executed" (to invoke a particular function of the equipment, which generally involves more than the simple storage of a value for later use), or "tested" (to determine whether or not the equipment implements the action command, and, if subparameters are associated with the action, the ranges of subparameter values that are supported). Parameters may be "set" (to store a value or values for later use), "read" (to determine the current value or values stored), or "tested" (to determine whether or not the equipment implements the parameter, and the ranges of values supported).

TE Command

Subclause "Basic Command" on page 8 defines Basic Syntax TE commands, which are implemented in common TA. This specification also defines Extended Syntax TE commands in "Extended commands" on page 8. Commands of either type may be included in command lines, in any order.

Basic Command

Basic Command Format

The format of Basic Syntax commands, except for the D and S commands, is as follows:

- <cmd>[...<number >]
- <cmd>[=][<number>]

where **<cmd>** is either a single character, or the **"&"** character (IA5 2/6) followed by a single character. Characters used in **<cmd>** shall be taken from the set of alphabetic characters.

<number> may be a string of one or more characters from **"0"** through **"9"** representing a decimal integer value. Commands that expect a <**number**> are noted in the description of the command. If a command expects **<number>** and it is missing (**<cmd>** is immediately followed in the command line by another **<cmd>** or the termination character), the value **"0"** is assumed. If a command does not expect a **<number>** and a number is present, an **ERROR** is generated. All leading **"0"**s in **<number>** are ignored by the TA.

Additional commands may follow a command (and associated parameter, if any) on the same command line without any character required for separation. The actions of some commands cause the remainder of the command line to be ignored (e.g. A).

S-parameters

Commands that begin with the letter **"S"** constitute a special group of parameters known as "S-parameters". These differ from other commands in important respects. The number following the **"S"** indicates the "parameter number" being referenced. If the number is not recognized as a valid parameter number, an **ERROR** result code is issued.

Immediately following this number, either a **"?"** or **"="** character (IA5 3/15 or 3/13, respectively) shall appear. **"?"** is used to read the current value of the indicated S-parameter; **"="** is used to set the S-parameter to a new value.

- S<parameter_number>?
- S<parameter_number>=[<value>]

If the **"="** is used, the new value to be stored in the S-parameter is specified in decimal following the **"="**. If no value is given (i.e. the end of the command line occurs or the next command follows immediately), the S-parameter specified may be set to 0, or an **ERROR** result code issued and the.stored value left unchanged. The ranges of acceptable values are given in the description of each S-parameter.

If the **"?"** is used, the TA transmits a single line of information text to the TE. For S-parameters defined in this specification, the text portion of this information text consists of exactly three characters, giving the value of the S-parameter in decimal, with leading zeroes included.

Extended commands

Command naming rules

Both actions and parameters have names, which are used in the related commands. Names always begin with the character **"+"** (IA5 2/15). Following the **"+"**, from one to sixteen (16) additional characters appear in the command name. These characters are be selected from the following set:

- **A** through **Z** (IA5 4/1 through 5/10)
- **0** through **9** (IA5 3/0 through 3/9)

- **!** (IA5 2/1)
- **%** (IA5 2/5)
- **-** (IA5 2/13)
- **.** (IA5 2/14)
- **/** (IA5 2/15)
- **:** (IA5 3/10)
- **_** (IA5 5/15)

The first character following the **"+"** shall be an alphabetic character in the range of **"A"** through **"Z"**. This first character generally implies the application in which a command is used or the standards committee that defined it (e.g. command names beginning with **"F"** are generally associated with facsimile-related standards, promulgated by Study Group 8).

Ericsson Specific Commands

Both actions and parameters have names, which are used in the related commands. Names always begin with the two characters **"*E"** (IA5 2/10 and 4/5). Following the **"*E"**, from one to fiftheen (15) additional characters shall appear in the command name.

Values

When subparameters are associated with the execution of an action, or when setting a parameter, the command may include specification of values. This is indicated by the appearance of **<value>** in the descriptions below.

<value> shall consist of either a numeric constant or a string constant.

Numeric constants

Numeric constants are expressed in decimal, hexadecimal, or binary.

Decimal numeric constants shall consist of a sequence of one or more of the characters **"0"** (IA5 3/0) through **"9"** (IA5 3/9), inclusive.

Hexadecimal numeric constants shall consist of a sequence of one or more of the characters **"0"** (IA5 3/0) through **"9"** (IA5 3/h), inclusive, and **"A"** (IA5 4/1) through **"F"** (IA5 4/6) inclusive. The characters **"A"** through **"F"** represent the equivalent decimal values 10 through 15.

Binary numeric constants shall consist of a sequence of one or more of the characters **"0"** (IA5 3/0) and **"1"** (IA5 3/1).

In all numeric constants, the most significant digit is specified first. Leading **"0"** characters is ignored by the TA. No spaces, hyphens, periods, commas, parentheses, or other generally-accepted numeric formatting characters are permitted in numeric constants; note in particular that no **"H"** suffix is appended to the end of hexadecimal constants.

String constants

String constants shall consist of a sequence of displayable IA5 characters, each in the range from 2/0 to 7/15, inclusive, except for the characters **"""** (IA5 2/2) and **"\"** (IA5 5/12). String constants shall be bounded at the beginning and end by the double-quote character (**"""**, IA5 2/2).

A **"null"** string constant, or a string constant of zero length, is represented by two adjacent delimiters (**""**).

Compound values

Actions may have more than one subparameter associated with them, and parameters may have more than one value. These are known as "compound values", and their treatment is the same in both actions and parameters.

A compound value consists of any combination of numeric and string values (as defined in the description of the action or parameter). The comma character (IA5 2/12) shall be included as a separator, before the second and all subsequent values in the compound value. If a value is not specified (i.e. defaults assumed), the required comma separator shall be specified; however, trailing comma characters may be omitted if all associated values are also omitted.

Action Command

Action execution command

There are two general types of action commands: those that have associated subparameter values that affect only that invocation of the command, and those that have no subparameters. If subparameters are associated with a command, the definition of the action command indicates, for each subparameter, whether the specification of a value for that subparameter is mandatory or optional. For optional sub-parameters, the definition indicates the assumed (default) value for the subparameter if no value is specified for that subparameter; the assumed value may be either a previous value (i.e. the value of an omitted subparameter remains the same as the previous invocation of the same command, or is determined by a separate parameter or other mechanism), or a fixed value (e.g. the value of an omitted subparameter is assumed to be zero).

Generally, the default value for numeric sub-parameters is 0, and the default value for string sub-parameters is **""** (empty string).

The following syntax is used for actions that have no sub-parameters:

* +<cmd

* *E<cmd>

The following syntax is used for actions that have one subparameter:

* +<cmd>[=<value>]

* *E<cmd>[=<value>]

The following syntax is used for actions that have two or more sub-parameters:

* +<cmd>[=<compound_value>]

* *E<cmd>[=<compound_value>]

For actions that accept sub-parameters, if all sub-parameters are defined as being optional, and the default values for all sub-parameters are satisfactory, the Data Terminal Equipment (TE) may use the first syntax above (i.e. omit the **""** from the action execution command as well as all of the subparameter value string).

If the named action is implemented in the TA and other relevant criteria are met (e.g. the TA is in the proper state), the command is executed with any indicated sub-parameters. If **<cmd>** is not recognized, the TA issues the **ERROR** result code and terminates processing of the command line.

An **ERROR** is also generated if a subparameter is specified for an action that does not accept subparameters, if too many subparameters are specified, if a mandatory subparameter is not specified, if a value is specified of the wrong type, or if a value is specified that is not within the supported range.

Action test command

The TE may test if an action command is implemented in the TA by using the syntax:

- +<cmd>=?

- *E<cmd>=?

If the TA does not recognize the indicated name, it returns an **ERROR** result code and terminate processing of the command line. If the TA does recognize the action name, it returns an **OK** result code. If the named action accepts one or more subparameters, the TA sends an information text response to the TE, prior to the **OK** result code, specifying the values supported by the TA for each such subparameter, and possibly additional information. The format of this information text is defined for each action command; general formats for specification of sets and ranges of numeric values are described in "Responses" on page 13 and "Extended syntax result codes" on page 14.

Parameter Command

Parameters may be defined as "read-only" or "read-write".

"Read-only" parameters are used to provide status or identifying information to the TE, but are not settable by the TE; attempting to set their value is an error. In some cases (specified in the description of the individual parameter), the TA may ignore attempts to set the value of such parameters rather than respond with an **ERROR** result code, if the continued correct operation of the interface between the TA and TE will not be affected by such action. Read-only parameters may be read and tested.

"Read-write" parameters may be set by the TE, to store a value or values for later use. Read-write parameters may be set, read, and tested.

Parameters may take either a single value, or multiple (compound) values. Each value may be either numeric or string; the definition of the parameter shall specify the type of value for each subparameter. Attempting to store a string value in a numeric parameter, or a numeric value in a string parameter, is an error.

Parameter set command

The definition of the parameter shall indicate, for each value, whether the specification of that value is mandatory or optional. For optional values, the definition shall indicate the assumed (default) value if none is specified; the assumed value may be either a previous value (i.e. the value of an omitted subparameter retains its previous value), or a fixed value (e.g. the value of an omitted subparameter is assumed to be zero). Generally, the default value for numeric parameters is 0, and the default value for string parameters is **""** (empty string).

The following syntax is used for parameters that accept a single value:

- +<cmd>=[<value>]

- *E<cmd>=[<value>]

The following syntax is used for parameters that accept more than one value:

- +<cmd>=[<compound_value>]

- *E<cmd>=[<compound_value>]

If the named parameter is implemented in the TA, all mandatory values are specified, and all values are valid according to the definition of the parameter, the specified values is stored. If <**cmd**>is not recognized, one or more mandatory values are omitted, or one or more values are of the wrong type or outside the permitted range, the TA issues the **ERROR** result code and terminates processing of the command line. An **ERROR** is also generated if too many values are specified. In case of an error, all previous values of the parameter are unaffected.

Parameter read command syntax

The TE may determine the current value or values stored in a parameter by using the following syntax:

- +<cmd>?

- *E<cmd>?

If the named parameter is implemented in the TA, the current values stored for the parameter are sent to the TE in an information text response. The format of this response is described in the definition of the parameter. Generally, the values will be sent in the same form in which they would be issued by the TE in a parameter setting command; if multiple values are supported, they will generally be separated by commas, as in a parameter setting command.

Concatenating commands after extended syntax commands

Additional commands may follow an extended syntax command on the same command line if a semicolon ("**;**" IA5 3/11) is inserted after the preceding extended command as a separator. The semicolon is not necessary when the extended syntax command is the last command on the command line.

Concatenating commands after basic format commands

Extended syntax commands may appear on the same command line after a basic syntax command without a separator, in the same manner as concatenation of basic syntax commands.

Issuing commands

All characters in a command line shall be issued at the same data rate, and with the same parity and format.

If the maximum number of characters that the TA can accept in the body is exceeded, an **ERROR** result code is generated after the command line is terminated.

The TE shall not begin issuing a subsequent command line until at least one-tenth of a second has elapsed after receipt of the entire result code issued by the TA in response to the preceding command line.

Executing commands

Upon receipt of the termination character, the TA commences execution of the commands in the command line in the order received from the TE. Should execution of a command result in an error, or a character be not recognized as a valid command (or command string), execution is terminated, the remainder of the command line is ignored, and the **ERROR** result code is issued. Otherwise, if all commands execute correctly, only the result code associated with the last command is issued; result codes for preceding commands are suppressed. If no commands appear in the command line, the **OK** result code is issued.

Handling of invalid numbers and S-parameter values

The TA reacts to undefined numbers and S-parameter values in the following way: issue the **ERROR** result code, and leave the previous value of the parameter unchanged;

TA responses

While in command state and online command state, the TA issues responses using the same rate, word length, and parity as the most recently received TE command line. In the event that no TE command has yet been received, rate, word length, and parity used will depend on the capabilities of the TA.

When the TA transitions from the command state or online command state to the online data state, the result code **CONNECT** should be issued at the bit rate and parity used during the command state. When the TA transitions from the online data state to the command state or online command state, the result codes should be issued at the bit rate used during the online data state. Thereafter, any unsolicited result codes should use the bit rate and parity of the last command line issued by the TE to the TA.

The characters of a response is contiguous, with no more than 100 milliseconds of mark idle issued between characters in addition to stop elements.

Responses

There are two types of responses that may be issued by the TA: information text and result codes.

Information text responses consist of three parts: a header, text, and a trailer. The characters transmitted for the header are determined by a user setting (see the **V** command). The trailer consists of two characters, being the character having the ordinal value of parameter **S3** followed by the character having the ordinal value of parameter **S4**.

Result codes consist of three parts: a header, the result text, and a trailer. The characters transmitted for the header and trailer are determined by a user setting (see the **V** command). The result text may be transmitted as a number or as a string, depending on a user-selectable setting (see the **V** command).

There are three types of result codes: final, intermediate, and unsolicited.

A final result code indicates the completion of a full TA action and a willingness to accept new commands from the TE.

An intermediate result code is a report of the progress of a TA action. The **CONNECT** result code is an intermediate result code (others may be defined by manufacturers). In the case of a dialing or answering command, the TA moves from command state to online data state, and issues a **CONNECT** result code. This is an intermediate result code for the TA because it is not prepared to accept commands from the TE while in online data state. When the TA moves back to the command state, it will then issue a final result code (such as **OK** or **NO CARRIER**).

Unsolicited result codes (such as **RING**) indicate the occurrence of an event not directly associated with the issuance of a command from the TE.

The table indicates result codes that are implemented by the TA, their numeric equivalents, and a brief description of the use of each. In clause 6, the description of each command includes the specific result codes that may be issued in relation to that command and the circumstances under which they may be issued.

Result code (ATV1)	Numeric (ATV0)	Description
OK	0	Acknowledges execution of a command
CON-NECT	1	A connection has been established; the TA is moving from command state to online data state
RING	2	The TA has detected an incoming call signal from the network
NO CAR-RIER	3	The connection has been terminated or the attempt to establish a connection failed
ERROR	4	Command not recognized, command line maximum length exceeded, parameter value invalid, or other problem with processing the command line
BUSY	7	Engaged (busy) state detected

Extended syntax result codes

Extended syntax result codes may be issued in response to either basic or extended commands, or both. The appropriate responses are specified in the definitions of the commands, the responses, or both.

The general format of extended syntax result codes is the same as result codes defined in TIA-602 with regard to headers and trailers. The characters specified in S-parameters **S3** and **S4** are used in headers and trailers of extended syntax result codes as they are in basic format result codes. The setting of the **"V"** command affects the headers and trailers associated with extended syntax result codes in the same manner as basic format result codes; however, unlike basic format result codes, extended syntax result codes have no numeric equivalent, and are always issued in alphabetic form.

Extended syntax result codes are subject to suppression by the **"Q1"** command, as with basic format result codes. The issuance of extended syntax result codes will not be affected by the setting of the **"X"** command.

Extended syntax result codes may be either final, intermediate, or unsolicited; the type is indicated in the definition of the result code.

Extended syntax result codes are prefixed by the **"+"** or " ***E"** character to avoid duplication of basic format result codes specified in TIA-602 and by manufacturers. Following the **"+"** and " ***E"** character(s), the name of the result code appears; result code names follows the same rules as command names (see 2.10.1).

Extended syntax result codes may include the reporting of values. The definition of the result code specifies whether or not values are appended to the result code, and, if so, how many, their types, and their assumed default values if omitted. When no values are to be reported, the result code appears in the simplest form:

*   +<cmd>

*   *E<cmd>

If a single value is to be reported, the form of the result code is:

*   +<cmd>:<space><value>

*   *E<cmd>:<space><value>

Note that a single space character (ASCII 20h) separates the colon character (ASCII 3Ah) from the <**value**>; no space appears between the result code name and the colon.

If multiple values are to be reported with the result code, the form is:

*   +<cmd>:<space><compound_value>

*   *E<cmd>:<space><compound_value>

where <**compound_value**>follows the rules specified in 2.10.6.

Information text formats for test commands

In general, the format of information text returned by extended syntax commands is specified in the definition of the command. This subclause describes recommended formats for information text returned in response to action test (for actions that accept one or more subparameters) and parameter test commands. The definitions of the responses to such testing commands, as described in the definitions of the associated commands in standards that reference this Recommendation, may use this recommended format or any other suitable format that is adequately specified.

Note that the TA may insert intermediate <CR characters in very long information text responses, in order to avoid overrunning TE receive buffers. If intermediate <CR characters are included, the TA will not include the character sequences "0 <CR " (3/0, 0/13) or "OK...CR " (4/15, 4/11, 0/13), so that TE can avoid false detection of the end of these information text responses.

Range of values

When the action accepts a single numeric subparameter, or the parameter accepts only one numeric value, the set of supported values may be presented in the information text as an ordered list of values. The list will be preceded by a left parenthesis (**"**(", IA5 2/8), and is followed by a right parenthesis (**"**)", IA5 2/9). If only a single value is supported, it appears between the parentheses.

If more than one value is supported, then the values may be listed individually, separated by comma characters (IA5 2/12), or, when a continuous range of values is supported, by the first value in the range, followed by a hyphen character (IA5 2/13), followed by the last value in the range. The specification of single values and ranges of values may be intermixed within a single information text. In all cases, the supported values will be indicated in ascending order.

For example, the following are some examples of value range indications:

(0) Only the value 0 is supported.

(1,2,3) The values 1, 2, and 3 are supported.

(1-3) The values 1 through 3 are supported.

(0,4,5,6,9,11,12) The several listed values are supported.

(0,4-6,9,11-12) An alternative expression of the above list.

Compound range of values

When the action accepts more than one sub-parameter, or the parameter accepts more than one value, the set of supported values may be presented as a list of the parenthetically-enclosed value range strings described in 5.7.3.1 above, separated by commas. For example, the information text in response to testing an action that accepts three sub-parameters, and supports various ranges for each of them, could appear as follows:

(0),(1-3),(0,4-6,9,11-12)

This indicates that the first sub-parameter accepts only the value 0, the second accepts any value from 1 through 3 inclusive, and the third sub-parameter accepts any of the values 0, 4, 5, 6, 9, 11, or 12.

Behavioural differences

This is intended to limit behaviour differences between different implementations:

- Handling of unsolicited result codes while a command is being entered.
  The device ties to transmit unsolicited result codes while a command line is received. If this is not possible, the result code will be transmitted when the command line is received.

- Answering of incoming calls while a command line is being entered.
  The device answers a call when instructed by an A command, or other device specific means (such as the operator hitting a key on the keyboard). If this is not possible, the device answers the call when the command line is received.

- Handling of loss of carrier during online command state.
  The device reports NO CARRIER.

- Handling of undefined command numbers, and S parameter values.
  The device returns ERROR. The previous parameter values are retained.

- Execution time of actions.
  The device will execute AT commands within varying lengths of time, depending on if the commands are executed in the phone or remotely.

- Handling of variations in command line format and editing.
  The device will handle the situations as follows:
  –AT and at are both accepted.
  –The length of the command line buffer of the device is minimum 40 or 80 characters. The maximum length of the buffer is undefined.
  –If a command line is too long, the device returns ERROR.
  –Space and control characters are not stored in the command buffer.
  –All characters are echoed, including unrecognized characters, and characters received prior to receiving the AT prefix. For command lines, changing the TE rate, format, or parity, the change takes effect after sending the result codes.

- Displaying of S parameter values which cannot be expressed as three decimal digits.
  The device only supports three decimal digits values.

- States of connection establishment (e.g. handshaking) in which attempts to abort a command by transmitting a character to the TA may not be recognized.
  Commands can be aborted until the connection is established by the TA. If necessary, the TE can terminate the data session with an ATH command.

- Carry-over of the effect of P and T data modifiers from one string to the next.
  The device ignores the P and T dial modifiers.

In-band Escape mechanism

An in-band escape mechanism is an identifiable sequence of characters sent from the TE to the TA that when received, causes the TA to switch from on-line data mode to on-line command mode. These characters are called escape sequence.

This specification specifies the use of the Time Independent Escape Sequence (TIES) by Ventel.

The TIES method is as follows:

- Start with the esqape sequence (three +)
- Followed by **"AT"**
- Followed by an optional AT-command
- Followed by the terminating character stored in **S3**

Control and Identification Commands

In the following syntax tables the final result codes **"OK"**, **"ERROR"**and **"CME ERROR"** are implied and are omitted from the command syntax

Z - Reset to Factory Defined Configuration

Action command syntax

Command	Possible response(s)
Z	

Description

This command resets the modem values to **user default** settings and closes all connections. If the TA has a data-call in progress, it is disconnected from the call, terminating any (GSM CS) data-connection in progress. GPRS connections isn't affected by this command

All of the functions of the command are completed before the TA issues the result code.

An **OK** result code for this command is issued using the same rate, parity, and word format as the TE command line containing the command, but using the new values for parameters that affect the format of result codes (e.g. **Q, V, S3, S4**).

Comments

ATZ is the same as ATH&F.

The TE should not include additional commands on the same command line after the **Z** command because such commands may be ignored.

Because this command may take into consideration the settings of non-volatile parameter storage, it does not necessarily return the TA to a "known state". In particular, the TA may, as a result of execution of this command, be placed in a state in which it appears to not respond to TE commands, or respond in a completely different format than was being used prior to execution of the command.

&F – Reset to Default Configuration

Action command syntax

Command	Possible response(s)
&F	

Description

This command instructs the TA to set all parameters to factory default values.

Comments

An **OK** result code for this command is issued using the same rate, parity, and word format as the TE command line containing the command, but using the factory-defined values for other parameters that affect the format of result codes (e.g. **Q, V, S3, S4**) and dependent upon other commands that may follow on the same command line.

Request HW Version

Action command syntax

Command	Possible response(s)
ATI<value>	<information>

Description

This command causes the TA to transmit one or more lines of information text, determined by the manufacturer.

Parameter-Values

<u><Value></u>   <u><Information></u>

0   Same info as +GMM.

1   Same info as +GMR.

3   Modem model description.

5   Active settings.

7   Modem configuration profile (brief listing of the modem functionality).

9   PnP (Plug and Play) information.

Comments

Hardware revision is stored so it does not change when the software is upgraded.

+CGMI (+GMI) - Request Manufacturer Identification

Action command syntax

Command	Possible response(s):
+CGMI	<manufacturer>
+CGMI=?	

Action command syntax

Command	Possible response(s)
+GMI	<manufacturer>
+GMI=?	

Description

The +CGMI command is used to get the identity of the manufacturer of the phone (ME).

AT+GMI command is used to get the identity of the manufacturer of the modem (TA). The +GMI command will never give an ERROR response.

Test command is used to determine if the command is supported.

Parameter-Values

<u>manufacturer</u> "SONY ERICSSON"

+CGMM (+GMM) - Request Model Id

Action command syntax

Command	Possible response(s)
+CGMM	<model-type><model-name>
+CGMM=?	

Action command syntax

Command	Possible response(s)
+GMM	<model-name>
+GMM=?	

Description

The +CGMM command is used to get the model of the phone (MS) determined by the manufacturer.

The +GMM command is used to get the model of the modem (TA). The +GMM command will never give an ERROR response.

Test command is used to determine if the command is supported.

Parameter-Values

<model-type> : "7130501-BV" (P800), "1021011-BV" (P900): A unique ASCII character/digit that may include blank characters. Always 10 characters long (padded with space if less than 10 digits long).

<model-name>: "P900" (P800), "P900" (P900): model name for the transceiver unit.

+CGMR (+GMR) - Request Revision Id

Action command syntax

Command	Possible response(s): ref. CXC123456 prgCXL...
+CGMR	<revision>
+CGMR=?	

Action command syntax

Command	Possible response(s)
+GMR	<revision>
+GMR=?	

Description

The +CGMR command is used to get the SW version of the phone (ME).

The +GMR command is used to get the SW version of the modem (TA). The +GMR command will never give an ERROR response.

Test command is used to determine if the command is supported.

Parameter-Values

<revision>: An ASCII string containing rev id, <space>, <software-identity>.

+CLAC - List All Available AT Commands

Action command syntax

Command	Possible response(s)
+CLAC	<AT Command-1> [<CR><LF><AT Command-2>[…]]
+CLAC=?	

Description

Execution command causes the ME to return one or more lines of AT Commands.

Parameter-Values

<AT Command-n>: Defines the AT command including the prefix AT.

Comments

This command is equivalent to AT*.

* - List All Available AT Commands

Action command syntax

Command	Possible response(s)
*	<Command-1> [<CR><LF><Command-2>[…]]

Description

This command is used to get the list of the supported commands.

Parameter-Values

<Commandx>: defines the AT Command.

+GCAP - Request Modem Capability List

Action command syntax

Command	Possible response(s)
+GCAP	+GCAP: (list of supported <capability>s)
+GCAP=?	

Description

This command is used to request the list of valid Modem Command Prefixes.

Parameter-Values

<capability>	Description
+CGSM	GSM commands
+DS	V.42bis, compression (P800 only)

Listing commands

To find out which commands are available in the phone, enter the commands **AT*** and **AT+CLAC**. A list of available commands is returned.

To find out information on a certain command, enter the command and end it with **=?** for example **AT+CPBS=?**. A description of the command will be returned, if applicable. The example command will return **+CPBS: ("SM")**.

AT commands

Introduction

Reading instruction for tables

Phone terminated

AT-cmd	Desc	P800	P900
ATÅ	Attention	Y	Y
ATÄ	Attention1	Y	Y[1]

Modem terminated

AT-cmd	Desc	P800	P900
ATÖ	Attention	Y	Y

Comment text

In the following section **Bold** text refers to the table in the example above.

AT-cmd column;
Contains the basic syntax-form (execute) of the command, including version information where necessary sometimes followed by a right-justified comment number. The following notifications of SIR revisions and versions have been used:

- No version indication is intended to suggest that there are no different versions of the command in SIR A9 in the DOORS database.

Desc column:

Contains the heading of a brief description and is sometimes followed by a comment number.

P800 column:

Y indicates that the command is available in P800 as documented in the referenced papers/publications.

P900 column:

Y indicates that the command is available in P900 as documented in the referenced papers/publications.

AT-commands in SIR Common Ensembles

C1 - Standard AT Syntax and Procedures

This ensemble describes the AT command syntax and procedures, such as error situations, timeouts etc.

Result Codes

Text	Num	Description	P800	P900
OK	0	Acknowledge execution of a command (final)	Y	Y
CON-NECT	1	A connection has been established; the TA is moving from command-state to online-state (Intermediate)	Y	Y
RING	2	The TA has detected an incoming call signal from the network (unsolicited)	Y	Y
NO CAR-RIER	3	The connection has been terminated or the attempt to establish the call has failed (final)	Y	Y
ERROR	4	Command not recognized, command line maximum length, parameter value invalid or other problem with processing the command (final)	Y	Y

BUSY	7	Engage, busy, signal detected (final)	Y	Y

C2 – Control and Identification

This ensemble describes the functionality for identification of the MS and the subscriber, functionality to test the communication between the MS and the accessory, functionality to list all implemented AT commands and functionality to reset the Mobile into default state.

Phone terminated

AT-cmd	Desc	P800	P900
AT	Attention	Y	Y
ATZ	Reset to default config	Y	Y
AT&F	Reset to factory defined config	Y	Y
AT+CLAC	List all available AT cmds	Y	Y
AT+CGMI	Request manufacturer ident.	Y	Y
AT+CGMM	Request model ident.	Y	Y
AT+CGMR	Request revision ident	Y	Y
AT+CGSN	Request product serial ident	Y	Y
AT*	List all supported AT cmds	Y	Y

Modem terminated

AT-cmd	Desc	P800	P900
AT	Attention	Y	Y
ATI	Ident info	Y[1]	Y[1]
ATZ	Reset to default config	Y	Y
AT&F	Reset to factory defined config	Y	Y
AT&W	Store user profile	Y	Y
AT+GCAP	Request modem capabilities	Y	Y
AT+CLAC	List all available AT cmds	Y	Y
AT+GMI	Request manufacturer ident	Y	Y
AT+GMM	Request model ident	Y	Y
AT+GMR	Request revision ident	Y	Y
AT*	List all supported AT cmds	Y	Y

September 2003

1 Value 9 = PnP string

C3 – Call control

This ensemble defines the set of commands needed to support mandatory call control functions.

Phone terminated

AT-cmd	Desc	P800	P900
ATA RING CONNECT NO CARRIER	Answer	Y	Y
ATH	Hook control	Y	Y
ATD CONNECT NO CARRIER BUSY	Dial command	Y	Y
ATL	Monitor speaker loudness	Y[1]	Y[1]
AT+CFUN	Set phone functionality	Y[2]	Y[2]

Modem terminated

AT-cmd	Desc	P800	P900
ATA RING CONNECT NO CARRIER	Answer	Y	Y
ATH	Hook control	Y	Y
ATD CONNECT NO CARRIER BUSY	Dial command	Y[3]	Y[3]
ATO CONNECT	Return to on-line data mode	Y	Y
ATP	Select pulse dialling	Y[4]	Y[4]
ATT	Select tone dialling	Y[4]	Y[4]
AT+CVHU	Voice hang up control	Y	Y

1 For incoming ring signal

2 Value 2 = Flight mode

3 See also S15/B

4 Must exist but are ignored

C4 – Interface commands

This ensemble defines commands and responses for use by TE to control a V.series TA using serial data over an async interface.

Phone terminated

AT-cmd	Desc	P800	P900
ATS3	<CR> character	Y	Y
ATS4	<LF> character	Y	Y
ATS5	<BS> character	Y	Y
ATE	Command echo	Y	Y
ATQ	Result code suppression	Y	Y
ATV	TA response format	Y	Y

Modem terminated

AT-cmd	Desc	P800	P900
ATS0	Automatic answer	Y	Y
ATS2	<ESC> character	Y	Y
ATS3	<CR> character	Y	Y
ATS4	<LF> character	Y	Y[3]
ATS5	<BS> character	Y[3]	Y
ATS6	Blind dial modifier	Y	Y
ATS7	Connection completion time-out	Y	Y
ATS8	Comma dial modifier	Y	Y
ATS10	Auto disconnect delay control	Y	Y
ATE	Command echo	Y	Y
ATM	Monitor speaker control	Y[1]	Y[1]
ATQ	Result code suppression	Y	Y

ATV	TA response format	Y	Y
ATX	Call progress monitoring	Y	Y
AT&C	DCD control (DT109)	Y[1]	Y[1]
AT&D	DTR control (DT108)	Y[1]	Y[1]

1 Must exist but are ignored

C6 – Data Compression

This ensemble defines commands to control compression according to V.42bis.

Modem terminated

AT-cmd	Desc	P800	P900
AT+DR	Data compression reporting	Y	-
AT+DS	Data compression	Y[1]	-

1 The existence of this ensemble should be reflected in AT+GCAP

C20 – Audio Control

This ensemble defines a set of commands to support audio control.

Phone terminated

AT-cmd	Desc	P800	P900
AT*EALR	Audio line request	Y	Y
AT*EARS	Analogue ring signal	Y	Y
AT*EMIR	Music Mute indication	Y	Y
AT*EAMS	Audio mode selection	Y	Y
AT*EPHD	Portable hands free detection	Y	Y
AT*ECBP	CHF button pushed	Y	Y

C22 – Accessory Authentication

This ensemble defines the set of commands needed to support mandatory accessory authentication.

Phone terminated

AT-cmd	Desc	P800	P900
AT+CSCC	Secure control command	Y	Y

C37 – Electronic Label

This document describes the requirements for electronic label.

Phone terminated

AT-cmd	Desc	P800	P900
AT+CGSN	Request product serial ident	Y	Y

SIR Specific Ensembles

S1 – GSM TE-TA interface

Phone terminated

AT-cmd	Desc	P800	P900
AT+CSCS	Select TE character set	Y	Y

Only "SM" storage supported

S2 – GSM Call Control

This ensemble defines the set of commands needed for the GSM Call Control.

Phone terminated

AT-cmd	Desc	P800	P900
AT+CRC +CRING	Cellular result code	Y	Y
AT+CR +CR	Service reporting control	Y	Y
AT+VTS	DTMF tones	Y	Y

Modem terminated

AT-cmd	Desc	P800	P900
AT+CRC +CRING	Cellular result code	Y[1]	Y[1]
AT+CR +CR	Service reporting control	Y[1]	Y[1]

1 Including GPRS extensions

S3 – GSM Data

This ensemble defines the set of commands needed for the GSM data/fax.

Phone terminated

AT-cmd	Desc	P800	P900
AT+CBST	Select bearer service	Y[1]	Y[1]

Modem terminated

AT-cmd	Desc	P800	P900
AT+CRLP	Radio Link Protocol	Y	Y

1 required for HSCSD (and GPRS)

S4 – GSM extended error reporting

This ensemble defines the functionality to support GSM extended ERROR reporting.

Modem terminated

AT-cmd	Desc	P800	P900
AT+CEER	Extended error report	Y[1]	Y[1]

1 Including GPRS extensions

S5 – GSM High Speed Circuit Switched Data (HSCSD)

This ensemble defines the functionality to support HSCSD.

Phone terminated

AT-cmd	Desc	P800	P900

AT+CHSD	HSCSD device parameters	Y	Y
AT+CHSN	HSCSD-NT call config	Y	Y
AT+CHSC	HSCSD current call parameters	Y	Y

Modem terminated

AT-cmd	Desc	P800	P900
AT+CHSR +CHSR	HSCSD parameters report	Y	Y
AT+CHSU	HSCSD auto user init upgrade	Y	Y

S6 – GSM network services

This ensemble defines the set of commands needed for the GSM network services.

Phone terminated

AT-cmd	Desc	P800	P900
AT+CNUM	Subscriber number	Y[1,2]	Y[1,2]
AT+CREG +CREG	Network registration	Y	Y
AT+COPS	Operator selection	Y	Y
AT+CLIP +CLIP	Calling line ident presentation	Y	Y
AT+CLIR	Calling line ident restriction	Y	Y
AT+CCFC	Call forwarding nr and cond	Y	Y
AT+CCWA +CCWA	Call waiting	Y	Y
AT+CHLD	Call hold and multiparty	Y	Y
AT+CSSN +CSSI +CSSU	Supplement. Service notification <n> parameter <m> parameter	Y	Y
AT+CAOC	Advice of charge	Y	Y
AT+CAMM	Accumulated call meter maximum	Y	Y

AT*EPNR	Read SIM preferred network	Y	Y
AT*EPNW	Write SIM preferred network	Y	Y
AT+CPUC	price per unit and currency table	Y	Y

1 Requires character translation according to setting of AT+CSCS

2 Fax not supported

S8 – GSM Facility Lock

This ensemble defines the functionality to support GSM facility lock.

Phone terminated

AT-cmd	Desc	P800	P900
AT+CLCK	Facility lock	Y	Y
AT+CPWD	Change password	Y	Y

S9 – GSM ME control and status

This ensemble defines the set of commands needed for the GSM Mobile Equipment (ME) and control and status to provide the following functions:

Phone terminated

AT-cmd	Desc	P800	P900
AT+CSQ	Signal quality	Y	Y
AT+CKPD	Keypad control	-	Y[1]
AT*ECAM *ECAV	Call monitoring Call monitoring event	Y	Y
AT+CPIN	PIN control	Y	Y
AT+CBC	Battery charge	Y	Y
AT+CFUN	Set phone functionality	Y[2]	Y[2]

1 Only ":C" is supported (camera button)
   To be able to use the camera accessory, the phone must be set to a baud rate of 9600

2 Value 4 = Flight mode

S10 – ME Error Control

This ensemble defines the functionality to support GSM Report Mobile Equipment Error.

Phone terminated

AT-cmd	Desc	P800	P900
AT+CMEE +CME ERROR	Report ME error control ME error report	Y	Y

S15 – GPRS

Modem terminated

AT-cmd	Desc	P800	P900
AT+CGDCONT	Define PDP context	Y[1]	Y[1]
AT+CGQREQ	QoS profile request	Y	Y
AT+CGQMIN	QoS profile minimum accept-able	Y	Y
AT+CGATT	GPRS attach/detach	Y	Y
AT+CGACT	PDP context activate/deacti-vate	Y	Y
AT+CGDATA	Enter data service	Y	Y
AT+CGEREP +CGEV	GPRS event reporting	Y	Y
AT+CGREG +CREG	GPRS network registration status	Y	Y
AT+CGPADDR	Show PDP address	Y	Y
ATD	Request GPRS service	Y[2]	Y[2]
ATD	Request GPRS IP service	Y[2]	Y[2]
+CEER +CME ERROR +CRING +CR	result code extensions	Y[3]	Y[3]

1 Header and data compression not supported

2 Extension to ATD

3 Also see SIR S10

S16 – GSM Phonebook

This ensemble defines the set of functions needed to handle the phonebook inside the GSM terminal.

Phone terminated

AT-cmd	Desc	P800	P900
AT+CPBS	Phonebook storage	Y[1]	Y[1]
AT+CPBR	Read phonebook entry(s)	Y	Y
AT+CPBF	Find phonebook entry	Y	Y
AT+CPBW	Write phonebook entry	Y	Y

1 Only "SM" storage supported

S19 – GSM subscriber identification

This ensemble defines the set of functions to uniquely identify the subscriber.

Phone terminated

AT-cmd	Desc	P800	P900
AT+CIMI	Request IMSI	Y	Y

S20 – Ericsson specific AT commands for GSM

This ensemble defines a set of Ericsson specific AT commands for GSM.

Phone terminated

AT-cmd	Desc	P800	P900
AT*ECUR	Current report	Y	Y
AT*EPEE *EPEV	PIN event PIN code event	Y	Y
AT*EBCA *EBCA	Battery charging algorithm Indication algorithm	Y	Y

Bluetooth AT-commands

Identical to the cable commands.

K7 – Dial-up Networking Profile

According to the Bluetooth specification. Connect using Dial Up Networking (DUN), do not use serial profile.

IrDA AT Commands

Identical to the cable commands.

Examples

PC connection for AT Commands with P800/P900

USB/RS232

Settings needed in the P800/P900

1. Control panel > Connections > Cable

2. Select "Modem"

3. Select "Done"

Default Values can be used

- Baud rate = 115200

- Parity = None

- Stop Bit = 1

- Character length = 8

- Flow control = CTS/RTS

Settings needed in the PC

- Baud rate must match what is set in the MMI.

- See in "Device Manager" for correct Comport for USB

IrDA

Settings needed in the P800/P900

1. Control panel > Connections > Infrared

2. Select "Modem"

3. Select "ON" or "On for 10 minutes"

4. Select "Done"

Settings needed in the PC

- Place the P800/P900 with the "Power On" button facing the IR eye of the PC.

- Win2000/XP will install " Standard Modem over IR link". The driver can be updated with P800/P900 drivers.

- See in "Device Manager" for correct Comport for IrDA

Bluetooth

Settings needed in the P800/P900

1. Control panel > Connections > Bluetooth

2. Select "On"

3. Select "Visible to other devices"

4. Select "Done"

Settings needed in the PC

- Pair the P800/P900 with the PC.

- Connect to P800/P900 with the "Dial Up Networking" Profile.

- See the BT software in the PC for correct Comport for Bluetooth

- **Note!**
  Connect with the "Dial Up Networking" profile in the Bluetooth software in the PC. The "Serial Port" profile is dedicated for mRouter. (PC Connect)

- If "mRouter - Are you there?" appears instead of AT command, the P800/P900 is in a "PC Connect" mode, not a "Modem" mode

References

[1] EN/LZT 108 6507, AT commands Online Reference

[2] ITU T Draft new Recommendation V.25ter: "Data communication over the telephone network; Serial asynchronous automatic dialing and con-trol".

[3] ITU-T Recommendation V.250: "Data communication over the tele-phone network; Control Proce-dures; Serial asynchronous automatic di

[4] ITU T Recommendation T.50: "International Reference Alphabet (IRA) (Formerly International Alpha-bet No. 5 or IA5) Information technology 7 bit coded character set for information exchange".

Index

September 2003