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Information technology — Document processing and related communication — User interface to telephone-based services — Voice messaging applications

Technologies de l'information — Traitement de documents et communication connexe — Interface de l'utilisateur et des services à base de téléphone — Applications de messagerie vocale



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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 13714 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 18, *Document processing and related communication.*

Annexes A and B of this International Standard are for information only.

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Introduction

Voice messaging systems allow telephone users to leave recorded messages for people who are unable to answer their telephone, either because they are absent or busy, or because they are currently engaged on another telephone call. This is commonly referred to as call answering. Voice messaging systems can also allow users to send voice messages directly, without accessing call answering.

Voice messaging systems are increasingly available and accessed from homes and offices, as well as from public and mobile telephones. With callers leaving messages on many different systems and subscribers increasingly likely to have mailboxes on more than one system, there is a need for users to have a common interface for the basic features of voice messaging systems.

Experience has shown that consistent and predictable human interfaces benefit users. Benefits can include faster learning, greater productivity, and greater satisfaction. Consistent human interfaces can also benefit an industry by promoting greater acceptance for products and services.

The DTMF interface provides a highly restricted user interface, as there are only 12 different keys available for input, and output is via an audio channel, whose performance is constrained by speed and users' limited short-term memory capabilities. For these reasons, users are particularly likely to benefit from common user interface features both within and across different voice messaging systems they encounter, as they can learn a common set of input and output protocols, which will maximise the efficiency and usability of these interfaces.

This International Standard includes only some of the features in DTMF-controlled systems used for voice messaging (see clauses 5, 6, 7, 8, and 9, following) but, as described later in this International Standard (see clause 1 and Figure 1) there exist large areas of commonality with important functions in other telephone-based (i.e., interactive voice response) systems and services. Many of the user interface features specified in this International Standard will be usable for and implemented in other interactive voice response applications. Annex B of this standard summarises the subset of the telephone user interface features described in the body of this standard that are generally applicable in DTMF-controlled telephone-based interfaces beyond voice messaging.

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Information technology — Document processing and related communication — User interface to telephone-based services — Voice messaging applications

1 Scope

This International Standard will provide users of voice messaging systems with a consistent mode of interaction in a way that is independent of the underlying system implementations. The interface is based on a set of design guidelines annexed to this International Standard.

The interface supports the ability of all users described in the user-system model (see Figure 2) to access the features of voice messaging systems. In a call answering application, the interface allows callers to leave messages from all types of telephones. It also allows callers to access additional features through the use of DTMF devices. In the voice mail application, through the use of DTMF devices, the interface allows subscribers to send and receive voice messages, and to manage stored data, and allows non-subscribers to leave voice messages for subscribers.

This International Standard addresses the following six functional areas:

- a caller leaving a voice message, when the call is answered by a voice messaging system call answering facility;
- a caller leaving a voice message, when a message is sent to a subscriber by a subscriber or non-subscriber through direct messaging;
- a subscriber listening to and processing voice messages received;
- a subscriber creating and sending voice messages through the voice mail application;
- the sending and receiving of messages via voice message delivery applications; and
- the use of voice bulletin boards.

Within these functional areas, only certain features are defined in this International Standard. However, standard-conforming systems are not limited to these functions and features, and this International Standard does not preclude alternative methods of invoking features specified in this International Standard, providing that these alternatives do not conflict with the standard interface specified for other features covered in this International Standard.

In this International Standard, the direct messaging functional area is covered in the clause specifying the call answering application.

In addition, this International Standard specifies two requirements to be satisfied in all voice messaging contexts, not just the application contexts specified earlier in this clause: the use of # as a delimiter (see 5.6.1), and the access to and presence of the control menu (see 5.6.2) and its associated functionality.

This International Standard does not address the user/system interface for administrators, who have responsibility for the management and maintenance of the voice messaging system.

This International Standard also does not address the proactive method, if any, employed by a voice messaging system to notify a user that a voice mailbox contains a message. Notification is, at present, typically achieved by a message waiting light, a distinctive dial-tone, or a pager device.

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This International Standard does not specify a non-DTMF user interface for Integrated Services Digital Network (ISDN) terminal access to voice messaging applications; however, if a user's ISDN terminal or switching equipment has the capability for full simulation of DTMF tones after call connection, the user interface specified in this International Standard will operate a conforming voice messaging system.

Figure 1 shows a taxonomy of telephone-based services, with shaded boxes indicating the services within the scope of this International Standard:

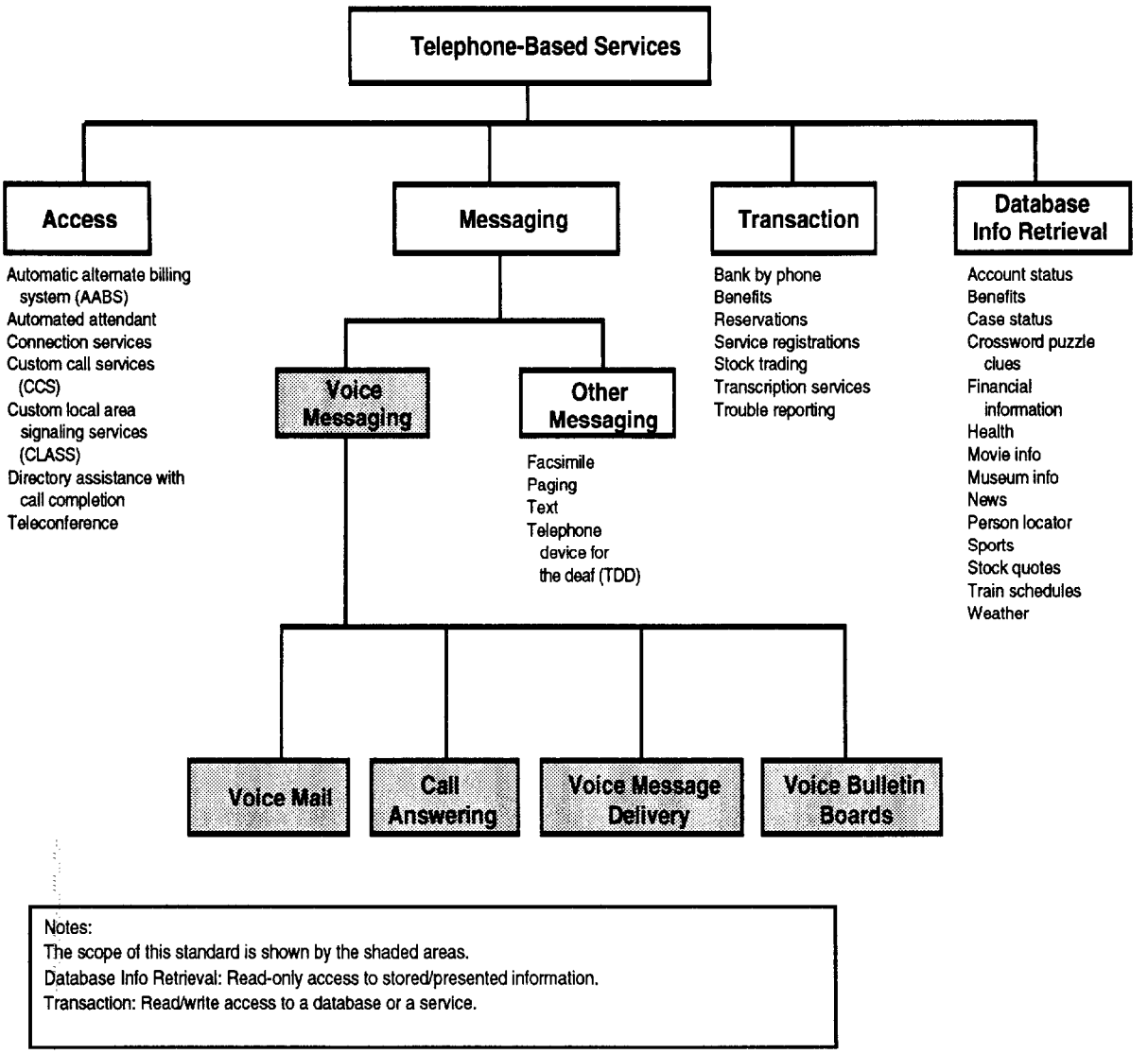

Figure 1- Taxonomy of telephone-based services

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Figure 2 shows a user/system model of the scope of this International Standard:

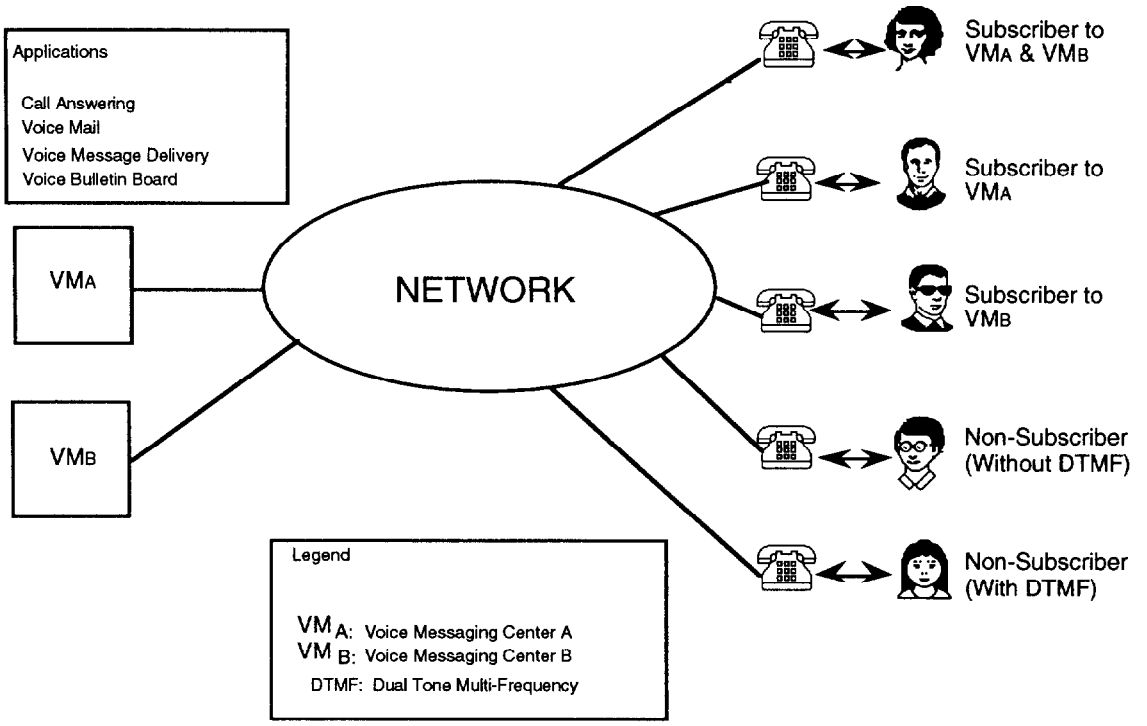

Figure 2 - The user/system model of this International Standard

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2 Conformance

The user interface to a conforming voice messaging system shall conform to clause 5. Additionally, the user interface to a conforming call answering application shall conform to clause 6; the user interface to a conforming voice mail application shall conform to clause 7; the user interface to a conforming voice bulletin board application shall conform to clause 8; and the user interface to a conforming voice message delivery application shall conform to clause 9. The only requirement for conformance with respect to callers using non-DTMF telephones is as specified in 6.1.

A conforming system may also provide one or more additional, alternative user interfaces which are inconsistent with any or all of clauses 5, 7, 8, and 9, but only to logged-in subscribers who have chosen that alternative interface. The interface specified in this International Standard shall be the default configuration of the system when supplied.

A voice messaging system in which the call answering application conforms to clauses 5 & 6, but in which the other voice messaging applications covered by the scope of this International Standard do not conform may be described as having a conforming call answering application.

Throughout clauses 5, 6, 7, 8, and 9, the following conventions are used to indicate levels of conformance required of compliant systems:

Mandatory/reserved:	Conforming systems shall have this function/feature and the function/feature shall be accessible in (at least) the way specified.
Optional/reserved:	Conforming systems may or may not have this function/feature. If the function/feature is offered, it shall be accessible in (at least) the way specified. If the function/feature is not offered the access mechanism specified shall not be used to access any other function/feature.
Optional/not reserved:	Conforming systems may or may not have this function/feature. If the function/feature is offered in the system state and menu level concerned, it shall be accessible in (at least) the way specified at the menu concerned. If the function/feature is not offered, the access mechanism may be used to access another function/feature.

Note: In describing the effect of key-presses in a conforming interface, this International Standard uses a simple declarative mode (e.g. "the play command causes playback....."). The normative content of the standard is carried by the specification of "mandatory/reserved", "optional/reserved" and "optional/not reserved" in the associated table. Where the effect of user input is not specified, a conforming system may assign any effect to that user input, including an effect which is also available through a standard-specified means. For example, the help function as specified in this document on the control menu could additionally be presented as an option in other menus within that application.

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3 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

CCITT Volume VI: *General recommendations on telephone switching and signaling, Recommendation Q.23: Technical features of push-button telephone sets* (1988).

ITU-T: *The telephone network and ISDN operation, numbering, routing and mobile service, Recommendation E.161: Arrangement of digits, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network* (1993).

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4 Definitions

For the purpose of this International Standard the following definitions apply:

4.1 administration: *Voice messaging system* functions concerned with the establishment and management of *voice mailboxes* on a system-wide basis, the configuration of the system, and the definition of system-wide and initial default individual parameters.

4.2 administrator: A person charged with the *administration* of a *voice messaging system.*

4.3 call answering: That segment of a *voice messaging system* concerned with accepting incoming calls and allowing the *caller* to leave a *message* in a *voice mailbox.*

4.4 caller: A *voice messaging system* user who accesses the *system* and is provided with a capability to send, leave, or record *voice messages.* A caller need not be a *subscriber.* Callers may enter the system either through the *call answering* facility or by direct connection to the voice mail application.

4.5 cancel: Clear the current (i.e. not yet *delimited*) *DTMF* or *voice input.* Typically, the *system* will indicate the cancellation and reprompt for continuing.

4.6 control menu: A menu of control functions accessible from any state in the system. This menu is presented when the user presses the * key in any context other than the control menu itself.

4.7 data entry: Numeric *DTMF* input that the *system* does not interpret as commands.

4.8 delimit: Indicate or cause completion of an input.

4.9 dial-ahead: The ability to enter *DTMF* input before the *system* has requested it. It is commonly used for rapid entry of data or a series of *menu* choices. In dial-ahead, a user enters a *key-press* or *key-presses* in advance of the associated *prompt*(s) and the output of these further *prompt*(s) associated with the input *key-press*(es) is suppressed.

Note: this term may also be referred to as key-ahead, or type-ahead.

4.10 dial-through: The interruption of *system* output with *DTMF* input acted on just as if it had been entered at the end of *system* output.

Note: this term may also be referred to as key-through or cut-through.

4.11 direct messaging: The capability for a voice messaging system to allow a user (either subscriber or non-subscriber) to leave a message for a subscriber without using the call-answering facility or the send facility.

4.12 DTMF: Dual tone multi-frequency encoding of *key press* input. The definition of the encoding employed may be found in CCITT Volume VI, Q.23.

4.13 DTMF device: A device through which a user can generate (or, in the case of equipment such as digital telephones, duplicate the effect of) the *DTMF* tones associated with the keys 0-9, * and #. This device is typically a *DTMF*-telephone but may also be a tone generator, a digital telephone used to invoke *DTMF* signals from a telephone switch, or a digital telephone.

4.14 feedback: Information supplied by the *system* to indicate that user actions have had their intended effects, or have had unintended effects. Typically, feedback consists of a new *prompt* or

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message indicating that an action has had its intended effect, but feedback also includes error indications and tones.

4.15 forced disconnect: A user request to a *voice messaging system* for the *system* to disconnect from the call.

4.16 header: *System* supplied information associated with an individual *message*. This may include date, time, source and status information such as urgency and privacy.

4.17 help: Information provided, either automatically or upon request, to inform users of their available prompted and unprompted choices, and of their current place in the *system*.

4.18 inter-key time-out: The interval within which two *DTMF* signals must be input to be considered part of a single string.

4.19 interactive voice response: A telephone-based system or service where users enter information and make *menu* selections using *DTMF devices*, and receive information via *system prompts*.

4.20 interruptibility: Susceptibility of *system* output to *dial-through*.

4.21 key-press: The noun associated with the verb *press*.

4.22 mailbox access: A procedure required to gain access to the facilities of a *voice messaging system* for *subscribers*. *Mailbox access* typically involves use of a *security code* and of some form of *user identification*, but either or both of these may be available to the *voice messaging system* through other means than user input.

4.23 main menu: The *menu* typically presented after a *subscriber* has accessed a *voice messaging system* .

4.24 mandatory [feature/function]: A feature/function required by this International Standard.

4.25 menu: The presentation to the user of a list of possible actions. A menu typically consists of a set of *prompts* each describing an available function and the user action necessary to invoke that function.

4.26 message: Auditory data placed in a *voice mailbox*. Messages may be left by *callers*, *subscribers*, *systems*, or *system administrators*.

4.27 message originator: A *voice messaging system* user who sends *messages*. A message originator need not be the speaker of the original voice data.

4.28 message recipient: A *voice messaging system* user who receives *messages*.

4.29 non-reserved [feature/function]: The key assigned to this standard function in the given state may be used for other function(s) if the standard function is not provided at the given state.

4.30 non-subscriber: A user of a *voice messaging system* who is not acting as a *subscriber*.

4.31 not specified: Used in user action/effect tables to indicate that the effect of that action in the associated context is not addressed by this International Standard.

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4.32 optional [feature/function]: A conforming *system* is not required to have this feature/function.

4.33 press: The verb used to describe the user action that generates *DTMF* tones.

4.34 prompt: Auditory *system* output providing instructions or guidance to the users. Prompts consist of recorded or synthesised voice and/or tones.

4.35 record tone: A tone output by a *voice messaging system* when it expects a user to record *voice input.* A record tone is a type of *prompt.*

4.36 reserved key: In the given context, available for use only for the purpose specified in this International Standard.

4.37 security code: Data that authorises access to a specific *voice mailbox* or user function. May also be known as password, passcode, personal identification number, etc.

4.38 subscriber: A *voice messaging system* user who usually has the capability to originate and receive *voice messages* and to manage the stored voice data.

4.39 system: A *voice messaging system.* Note: In this International Standard, the word "system" used alone refers to a voice messaging system.

4.40 time-out: (1) An interval of no user input that causes the *system* to change state. (2) The state change resulting from such an interval. For example, a time-out during numeric input may be interpreted as end-of-string and cause the *system* to change from numeric input state to command state or some appropriate action state.

4.41 user-configurable: Of an option, able to be set by an individual user, or by an *administrator* on his/her behalf.

4.42 user identification (user ID): Data that identify a *subscriber* to a *voice messaging system.*

4.43 voice input: Auditory input by a user.

4.44 voice mailbox: A descriptive term for those functions of a *voice messaging system* that receive and store voice *messages* for a *subscriber,* or for the logical storage itself.

4.45 voice message: A *message.*

4.46 voice messaging system: An automated system for the recording, storage, and retrieval of *voice messages.*

4.47 #: The *DTMF* key or button located at the lower right-hand corner of the standard 12-key pad on a *DTMF telephone.* Common names for this symbol are listed in annex A.2.2. Acceptable graphic representations for this symbol are shown in CCITT Recommendation E.161 (1993).

4.48 *: The *DTMF* key or button located at the lower left-hand corner of the standard 12-key pad on a *DTMF telephone.* Common names for this symbol are listed in annex A.2.3. The acceptable graphic representation for this symbol is shown in CCITT Recommendation E.161 (1993).

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5 Standard elements of user/system dialogue

Voice messaging functions are invoked and controlled by a dialogue, or series of exchanges, between the system and a user. This International Standard addresses the following three general states of a voice messaging system: voice input by the user, DTMF input by the user, and system output. Depending upon the context, user input to the voice messaging system may be either voice or DTMF tones. For the purposes of this International Standard, voice input generally refers to any auditory input other than DTMF, and all DTMF input is assumed to result from a DTMF device.

The system portions of the dialogue contain voice or other auditory output. Other auditory output controlled by the system, such as music-on-hold, is outside the scope of this International Standard. Auditory feedback that accompanies DTMF input by the user is not considered to be part of the user/system dialogue and is outside the scope of this International Standard. Voice input by the user leaving messages is also outside the scope of this International Standard, except as specified in 5.1. Some command/response sequences employ time-outs. The length and details of these time-outs are specified in 5.4 and in the description of the affected sequences.

The tables in this and subsequent clauses show standard-conforming DTMF input for the functional areas specified in clause 1. This International Standard does not preclude the use of alternative methods of invoking the functions described, as long as the standard methods are also available.

5.1 Voice input

5.1.1 This International Standard does not require voice input to be interpreted by the voice messaging system. However, annex A provides some informative guidelines for using voice input to control the system.

5.1.2 During all voice input states, DTMF input as specified in this clause shall delimit the recording of ongoing voice input, with the indicated effects. During voice input the # key delimits the input state. The * key interrupts the input state and takes the user to the control menu (see 5.6.2).

5.1.3 When a pause is used to delimit the voice input state, the length of the time-out for no action (see 5.4.2.1) should be used as a guideline as to whether the pause should delimit or be ignored.

5.1.4 During all voice input states, the handling of sound interpreted by the system as invalid DTMF input is outside the scope of this International Standard.

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5.2 DTMF input

5.2.1 General

5.2.1.1 DTMF input shall be accepted at any time, except as specified in 5.3.2, 5.3.3.4, and 5.3.6.3. Any key press will interrupt system output except as specified in 5.3.3.4 and 5.3.6.3. If the DTMF input is valid in the current system state, the indicated action is taken. If the DTMF input is not valid in the current system state, an appropriate error indication should be output to the user.

5.2.1.2 In data-entry contexts, a string of DTMF signals that is valid input to the voice messaging system in its current state, but that includes a signal-free period greater than that specified in 5.4.3.1, shall result in an inter-key time-out and shall cause output of an appropriate indication to the user.

5.2.1.3 If the system receives more key presses than it can treat as valid input in a data entry state, these should be considered as dial-ahead. Effects of DTMF input received during voice input states are specified in 5.1.

5.2.1.4 The presence and nature of audible key-press feedback to users as they make DTMF input is not considered to be part of the user/system dialogue, and is outside the scope of this International Standard.

5.2.2 Dial-through

5.2.2.1 Dial-through means the interruption of system output with DTMF input acted on just as if it had been entered at the end of system output. Except as specified in 5.3.2 and 5.3.6.3 all system output shall allow dial-through.

5.2.2.2 When dial-through is enabled, user DTMF input shall terminate the current system output as specified in 5.5.1.

5.2.2.3 DTMF input that is invalid in a current system context and that causes dial-through shall result in the same error message as would apply if the system output had been completed prior to the input.

5.2.3 Dial-ahead

5.2.3.1 Dial-ahead is the entry of a sequence of key presses providing input to several successive system states. Dial-ahead of valid commands shall be possible in all contexts. Intervening interruptible prompts should be suppressed by dial-ahead.

5.2.3.2 If an invalid input is included in a dial-ahead buffer, all buffered key presses subsequent to the one causing the error should be discarded (also see 5.3.6.3).

5.2.3.3 If a dial-ahead sequence includes user input which delimits recording, the system need not consider this delimiter as valid input.

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5.3 System output

5.3.1 General

System output in a voice messaging system consists of various forms of auditory output provided by the system to facilitate the dialogue. System output may include system prompts, menus, status indications, error indications, help, warnings, confirmations, and other feedback. The exact specification of the content of system output is beyond the scope of this International Standard.

5.3.2 Interruptibility

5.3.2.1 System output may have an interruptible portion (during which dial-through is enabled) and a non-interruptible portion (during which dial-through is disabled).

5.3.2.2 Non-interruptible system output should be as brief as practicable and should only be used for information that the user would normally consider urgent or important.

5.3.3 Record tone

5.3.3.1 When a voice messaging system is ready to accept voice input in any of the call answering, voice mail, voice message delivery, or voice bulletin board applications within the scope of this International Standard, it shall signal the user with a record tone.

5.3.3.2 This International Standard recommends use of the record tone specified in 5.3.3.3. It is clearly distinguishable from current record tones. Users, primarily callers, will learn that it indicates that the system they are using provides standard access to many features.

If a system uses a record tone different than that specified, it should be easily discriminable from the specified tone.

5.3.3.3 The record tone is a sequence:

- a 150 ms, 500 Hz sound
- a pause of 75 ms
- a 150 ms, 620 Hz sound

The tones should be of a single frequency (pure sine wave). Frequencies and durations of the components of the sequence should be accurate to +/- 2 %. The total distortion power (harmonics and noise) of the record-tone sequence should be at least 33 dB less than the tone power.

5.3.3.4 The system's record tone shall not be interruptible. User input occurring during the record tone, whether voice or DTMF, need not be saved.

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5.3.4 Other tones

A tone or tone sequence indicating one status or function should be easily discriminable from tones or tone sequences indicating different status or functions. The necessary discrimination may be achieved through differentiation in pitch or rhythmic pattern, but should not depend on length alone.

5.3.5 Completeness of prompts

A menu prompt need not include all system-defined user actions available at that point in the user/system dialogue. However, if a menu prompt does not include information about all valid actions available at that point, such information should be available in or via the help message associated with that menu, or in the control menu output (see 5.6.2.1).

5.3.6 Error indications

5.3.6.1 Voice messaging systems shall provide context-sensitive error indications in response to invalid user input, except during voice recording (see 5.1.4).

5.3.6.2 Error indications may include any of the following:

- an error tone;
- a statement of the nature of the error;
- a description of the current system status;
- what to do, including repeating the original prompt;
- what to do, including more information or options than in the original prompt.

If an error tone is included in the error indication, it shall be presented first.

5.3.6.3 Error indications, whether tone(s) or system auditory output, shall terminate dial-ahead sequences. The error tone shall be non-interruptible. A statement of the nature of the error may include a non-interruptible portion. Other portions of an error indication shall be interruptible.

After some system-determined number of consecutive errors or of total errors, including periods of no input from the user, the system may take some special action (e.g., disconnecting or connecting to an attendant), after informing the user that such action will occur.

At the conclusion of, or as part of, the error indication, a prompt should be played that indicates the options available at the state that was reached when the error was encountered.

5.3.7 Output of messages

Message output can consist of up to three parts: a system-supplied header, the message as supplied by the message originator, and a system-supplied end-of-message prompt.

5.3.7.1 A message header or end-of-message prompt is not required; however, if one is provided, it shall be interruptible. A message header may include information about the type of message, the date and time a message was delivered, and whatever is known about the message originator (e.g., name, telephone number, etc.). If automatic playback of headers is implemented, the choice

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between automatic playback and suppression of the message headers should be user configurable, and the interface should provide a way to move directly from the header to the message content.

5.3.7.2 The message itself shall be interruptible.

5.3.8 System help

5.3.8.1 Help shall be available in all input contexts and interruptible output contexts, except as specified in 5.3.8.3 and 5.3.8.7. Menu prompts and titles alone are not considered help.

5.3.8.2 Help shall consist of one or more of the following parts:

- a statement of the current activity;
- a repetition of the prompted choices;
- further descriptions of menu choices;
- descriptions of additional (originally unprompted) available options.

5.3.8.3 The effect of a help request during the playing of a help message itself may be system and context dependent.

5.3.8.4 All valid menu choices available in the system state from which pre-recorded help was requested shall be operable during the entire help output, and key presses selecting such options shall immediately terminate the help output and effect the choice selected. This implies that only keys which are not assigned in the state from which help was requested shall be available for other functions which apply to help itself.

5.3.8.5 If a time-out for no action occurs after a pre-recorded help prompt, the system shall prompt the user with appropriate choices (see 5.4.2).

5.3.8.6 The help message associated with a main menu shall describe access to the control menu.

5.3.8.7 When help is accessed via the control menu, the help message shall be appropriate to the context from which the control menu was accessed, and may include help about the control menu functions accessible from that context.

5.3.8.8 When a system returns from help to a data entry context or a voice input context, interrupted user input may be retained or discarded. The user should be informed of this disposition.

5.4 Time-outs

5.4.1 General

A time-out is a voice messaging system state change in response to a period in which no user input is detected (see annex A.10). Voice messaging systems shall provide an inter-key time-out (5.4.3) and a time-out for no action (5.4.2).

5.4.2 Time-out for no action

5.4.2.1 The time-out for no action is the time the system waits before continuing after a prompt requiring user input, if no user input is received. In data entry states, voice input need not be

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detected or considered. The range for the time-out for no action for functional areas within the scope of this International Standard should be no shorter than 3 s and should be no greater than 30 s. See annex A.10 for further guidance on use of time-outs in different contexts.

5.4.2.2 In DTMF data entry and voice input contexts, a time-out for no action should normally result in the user being reprompted. After some system-determined number of consecutive time-outs, the system may take some special action (e.g., disconnecting or connecting to an attendant), typically after informing the user.

5.4.2.3 At a menu or prompt, the time-out for no action should lead to repetition of the original menu or prompt, or to more detailed information.

5.4.3 Inter-key time-out

5.4.3.1 The inter-key time-out is the time allowed between key presses during multi-digit data entry states. The range for the inter-key time-out shall be at minimum 3 s, and should be at maximum 8 s.

5.4.3.2 After an inter-key time-out occurs during a data entry state, the system may interpret the time-out as a delimiter, or may prompt the user to explicitly delimit the data, or take other appropriate action.

5.4.3.3 This International Standard does not specify the disposition of DTMF input occurring after the inter-key time-out and before the time-out for no action. Such disposition may be both context-dependent and system-dependent.

5.4.4 Behaviour after repeated time-outs

After some system-determined number of consecutive time-outs or of total time-outs, the system may take some special action (e.g., disconnecting or connecting to an attendant), after informing the user that such action is about to occur.

5.4.5 Time-outs during voice input

If a time-out for no action is detected during a voice input context after some voice input has been received, it should be interpreted as a delimiter.

5.5 System response times

5.5.1 Response time on dial-through

In normal operation, the time from receipt of DTMF causing dial-through to the cessation of ongoing system output shall be less than 0,5 s on 95% of occasions, and should never exceed 1 s.

5.5.2 Feedback response time

In all situations where DTMF input is explicitly or implicitly delimited, either because it is of fixed length or through the entry of an explicit delimiter, the time from system receipt of the last key press to the beginning of the next system output (e.g. confirmation of entry, comfort message etc.) shall be less than 3 s on 95% of occasions, in normal operation.

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If the wait is likely to be longer than 6 s, the system should inform the user of such delays.

5.5.3 Minimum response time

The minimum delay from receipt of DTMF entry to the audible start of the resulting system response should be sufficient to accommodate the needs of users with DTMF keypads built into telephone handsets and those with separate DTMF senders.

5.6 Basic use of the # and * keys

This subclause defines the key sequences corresponding to a small number of navigational and user guidance functions that apply generally within the system.

The two keys corresponding to * and # on a DTMF telephone are used, alone or in conjunction with other keys, to invoke basic navigational and user guidance from any point in the user/system dialogue, unless otherwise specified in individual clauses of this standard.

5.6.1 Use of the # key

In general, the # key indicates that the user has completed the current activity or entry and instructs the system to delimit this activity and move on to the next activity or state of the user/system dialogue.

5.6.1.1 When a delimiter is required for voice input or for various forms of numeric or data entry, # shall indicate the end of input and cause the system to begin the next system output. A time-out may also serve as a delimiter (see 5.4.3.2). A redundant # entered in a fixed-length data entry context (i.e., entered after the expected number of characters but within the inter-key time-out) shall be ignored.

5.6.1.2 If the user is listening to messages, pressing # shall delimit the current message, and result in a skip to the next logical state.

5.6.1.3 In call answering, when a user is listening to a subscriber's greeting, pressing # shall end the greeting and skip to the record tone or a prompt indicating other available options, if there are any.

5.6.1.4 No delimiter should be required for a single key menu selection.

5.6.2 Basic use of * to access the control menu

Whenever DTMF is enabled, except within the control menu itself, pressing * at any point in the system shall give the user access to the control menu except as detailed in 5.3.2, 5.3.3.4, and 5.3.6.3.

It should be noted that there is a large installed base of terminals which use the * key to switch from pulse to DTMF signaling on a per-call basis. This may result in a system receiving a * when the user did not intend to send one, or not receiving one when the user did intend to send one. System designers should consider this carefully, especially when specifying the effect of the cancel/backup function (i.e., a user enters * *) when no prior DTMF input has been received from the caller.

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5.6.2.1 Control menu

Table 1 and Figure 3 list the functions accessible from the control menu:

Table 1 - Results of user input at the control menu

User action	Effect	Conformance level
1,2,3,4,5,6	Not specified	
7	Go to top level menu	Optional/reserved
8	Select language	Optional/reserved
9	Forced disconnect	Mandatory/reserved
*	Cancel/backup	Mandatory/reserved
0	Help	Mandatory/reserved
#	Return to prior context	Mandatory/reserved
No action	Reprompt	Mandatory/reserved
Disconnect	Same as in context in which control menu was invoked	Mandatory/reserved

1	2	3
4	5	6
7 Go to top level menu	8 Select language	9 Forced disconnect
* Cancel/backup	0 Help	# Return to prior context

Figure 3 - Control menu key allocations

Functions on the control menu are accessed directly from any system state other than the control menu by pressing * and then the key-press specified in Table 1. This is an example of dial-ahead. Alternatively, users can access the control menu (unless already in the control menu) by pressing * and then listening to all or part of the menu prompt and then making the single key-press selection from Table 1.

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The conformance levels used in Table 1 and all other tables in which conformance levels appear are explained in clause 2 (conformance).

Selecting go to top level menu positions the user at the highest level menu in the application and presents the associated menu prompt. For example, within a stand-alone voice messaging application, selecting go to top level menu moves the user to the main menu (see 7.5). If the voice messaging application was itself selected from within another higher level application, the effect of the function is system dependent, and may, for example, move the user to the top level menu in that higher level application.

Selecting select language invokes the functionality described in 5.7.

Selecting forced disconnect causes the system to disconnect the call.

Selecting cancel/backup invokes a context and system dependent backup. Some examples of what this function might do in different contexts are given below:

- If from a menu, go back one step or menu level.
- During data entry, if there is undelimited data, clear it and reprompt for the data (see 5.4.2.3). Otherwise go back one prompt or menu level.
- During voice input, if there is undelimited voice input, clear it and reprompt with at least the record tone. Otherwise go back one step or menu level.
- In other contexts, the result is system-dependent.

Selecting help shall invoke the help function, as described in 5.3.8.

Selecting return to prior context shall exit the control menu and return the user to the point from which the control menu was invoked.

If the user makes no input at the control menu before the expiry of a time-out for no action, the user is reprompted as specified in 5.4.

Note: Due to the context- and system-dependent nature of some control menu functions, consideration should be given to providing context-specific prompts for these functions.

5.7 Language of system prompts

5.7.1 System behaviour where language selection is not available

If a system offers only one language, it shall respond to the "select language" command with an error indication, including an error tone if the system uses one. The system shall then return to the state from which the control menu was accessed, or, if the "select language" function was provided and accessed from another menu, to that menu.

5.7.2 Language selection by users at the control menu

When users select the language option from the control menu, they shall be prompted with a series of interruptible prompts in each of the available language choices, each describing the user action required to select that language. For example:

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- *For instructions in English, press 1*
- *Pour les instructions en français, appuyer sur le 2*
- *Para instrucciones en español, marque el 3.*

When the last language prompt has been played, the system shall wait the duration of the "time-out for no action". If no action is taken by the user, the menu shall repeat once. After a second "time-out for no action" expires, the system shall return to the state from which the control menu was accessed.

Note: The example given is not intended to specify a particular set or order of presentation of languages, nor specific prompt wording.

5.7.3 Language selection for voice messaging system subscribers

Once a subscriber to a voice messaging system has accesed the system, it shall present the system prompts in the spoken language chosen by the subscriber. This language selection may be implemented by the system administrator, or directly by the subscriber.

5.8 Navigation between functions

This International Standard allows various methods of navigation between functional areas of a voice messaging service. For example, navigation from "listen" functions to "send" functions may be achieved by:

a) return to top-level menu using *7 followed by 2 (this shall be provided: see 5.6.2.1);

b) use of an unreserved key on the "listen" menu to move directly or via a subordinate navigation menu, to the "send" function;

c) use of an unreserved key on the "control" menu to move directly, or via a subordinate navigation menu, to the "send" function (see 5.6.2.1).

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6 Call answering

6.1 General

A typical call-answering sequence consists of:

a) the direction of an incoming call to the system;
b) a greeting output by the system to the caller;
c) a record tone;
d) the voice input of a message by the caller;
e) disconnect by the caller.

Figure 4 illustrates a sample flow for call answering.

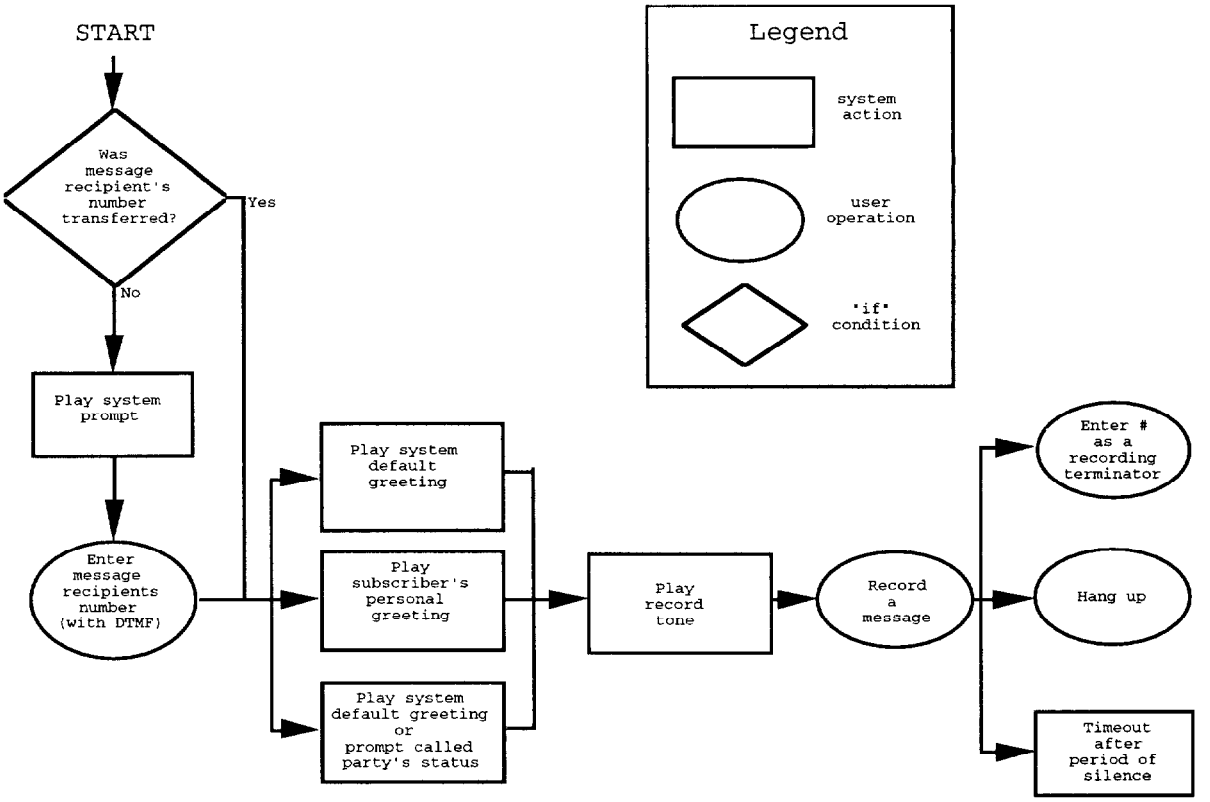

Figure 4 - Sample call flow for call answering

The mechanism by which a call is directed to the system is outside the scope of this International Standard.

The system shall allow callers using non-DTMF telephones, including rotary or dial-pulse telephones, to leave messages, when the system is provided with the telephone number of the subscriber whose telephone was called.

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6.2 Language of prompts

Subscriber greetings may be recorded in any language or combination of languages.

Subclauses 6.2.1 to 6.2.3 apply only to systems with multiple languages.

6.2.1 Unless the caller has made a specific selection with the select language command on the control menu, any system prompts played to the caller shall be in the language selected for callers by that subscriber.

6.2.2 The system shall permit the subscriber to select the language to be heard by their callers independently from the language selected by the subscriber for their own use in interacting with voice mail.

6.2.3 As some subscribers may commonly have callers with differing languages, it is recommended that systems provide the ability for a subscriber to select a set of prompts that combines multiple languages. For example, a subscriber in a bilingual area could choose either of the two languages, or both, for the prompts to be heard by their callers.

6.3 Default greeting

The system shall provide a default greeting that instructs callers on the procedures for leaving a message.

The default greeting may be replaced by or combined with a subscriber-defined greeting. Subscriber-defined greetings are outside the scope of this International Standard.

The greeting, whether system default or subscriber-defined, shall be interruptible by user action, in accordance with Table 2 in 6.5.

6.4 Mailbox access from call answering

In the call answering application, if a method is provided for allowing subscribers to switch from the call answering dialogue to mailbox access, pressing *7 shall invoke a dialogue that allows this access.

6.5 Results of user input before the record tone during call answering

Table 2 and Figure 5 show the results of user input before the record tone during call answering.

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Table 2 - Results of user input before the record tone during call answering

User action	Effect	Conformance level
1,2,3,4,5,6,	Not specified	
7	Skip backward	Optional/not reserved
8	Not specified	
9	Skip forward	Optional/not reserved
*	Access control menu	Mandatory/reserved
0	Connect to human, if available, or machine help	Mandatory/reserved
#	Stop greeting playback	Mandatory/reserved
No action	Play record tone	Mandatory/reserved
Disconnect	Not specified	

1	2	3
4	5	6
7 Skip backward	8	9 Skip forward
* Access control menu	0 Connect to human or help	# Stop greeting playback

Figure 5 - Key allocations before the record tone during call answering

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In voice messaging system states described in Table 2, connect to human disconnects the caller from the messaging system and attempts to transfer the caller to a pre-determined or caller-specified destination. Where the connect to human function is not available, the system shall provide pre-recorded machine help.

The skip backward command causes the output of the greeting to jump back to an earlier point. The temporal extent of the jump is system dependent. Where the requested jump extends back before the start of the greeting, output shall continue from the start.

The skip forward command causes the output of the greeting to jump forward to a later point. The temporal extent of the jump is system dependent, but should be the same as for the skip backward command. Where the requested jump extends beyond the end of the greeting, call answering should proceed as if the stop greeting playback function had been requested.

The stop greeting playback command causes the system to take the action that would normally occur after the greeting ended, e.g. play the record tone or prompt for other options.

6.6 Content of voice user input

The content of user voice input is outside the scope of this International Standard.

6.7 System action after the record tone

The system action after the record tone depends on the user action in accordance with Table 3 and Figure 6.

Table 3 - Results of user input after the record tone during call answering

User action	Effect	Conformance level
1,2,3,4,5,6,7,8,9	Not specified	
*	Access control menu	Mandatory/reserved
0	Connect to human, if available, or machine help	Mandatory/reserved
#	Delimit message	Mandatory/reserved
No action	Stop recording and reprompt user	Optional/not reserved
Pause in voice input	Delimit input and skip to next logical state	Optional/not reserved
Disconnect	Place message in mailbox, unless no message input	Mandatory/reserved

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1	2	3
4	5	6
7	8	9
* Access control menu	0 Connect to human or help	# Delimit message

Figure 6 - Key allocations after the record tone during call answering

In Table 3, connect to human disconnects the caller from the messaging system, depositing a message if one was left, and attempts to transfer the caller to a pre-determined or caller specified destination. Where the "connect to human" function is not available, the system then provides pre-recorded machine help.

6.7.1 Any form of disconnect shall cause the message-in-progress to be placed in the voice mailbox associated with the called number, except if there is no voice content to the message, in which case the system may discard the message.

6.7.2 If, after recording is delimited, the system provides the caller with any options, the control menu and its functions shall also be accessible. Also, if the connect to human function was available before the record tone, it shall be available at this point. If the caller is given the option to correct or replace their message, the system should provide the same interface to features as specified in Table 6.

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7 Voice mail application

7.1 General

A typical sequence for listening to messages in the voice mailbox and sending messages is for the user to access the system, access his/her voice mailbox and then request the desired action.

7.2 Notification of new messages

The system may notify a mailbox owner of the presence of messages or of new messages in the mailbox; this notification may be part of the system access procedure or may exist independently of it. The medium and form of this notification are beyond the scope of this International Standard.

7.3 Mailbox access

Access to the voice mailbox is typically via entry of a security code and user ID pair. Security code and user ID entries may, but need not, be delimited with the # key. Beyond this, this International Standard does not cover access to the voice mailbox.

This International Standard does not require that the security code and user identification be entered in a particular order.

Figure 7 shows a typical flow for mailbox access.

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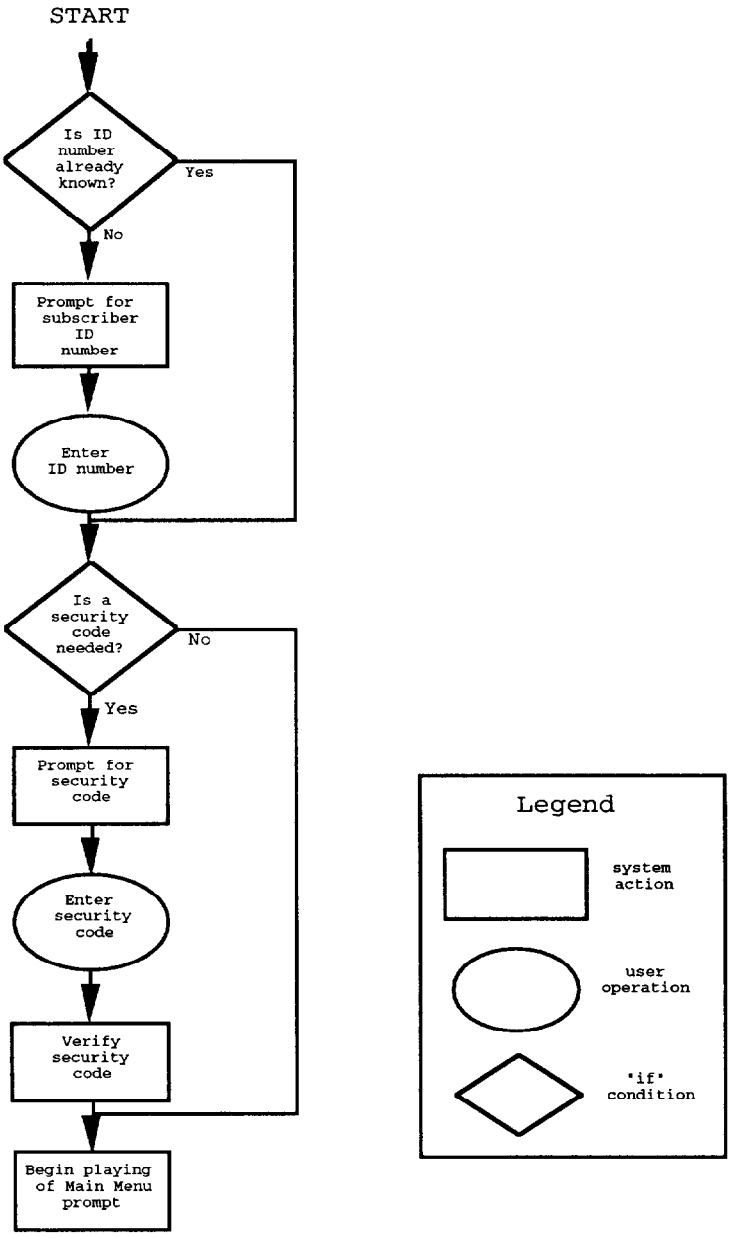

Figure 7 - Typical flow for mailbox access.

7.4 New messages announcement

The system shall inform the user of the presence of new message(s) in the voice mailbox before presenting the main menu. The form of this announcement is beyond the scope of this International Standard. No announcement is required if there are no new messages in the voice mailbox.

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7.5 The main menu

After a valid mailbox access sequence and announcement of new messages, if any, the system shall prompt the user with available options, such as listening to messages and, possibly, sending messages. This is considered the main menu.

Voice messaging system action from the main menu shall depend on user action, in accordance with Table 4 and Figure 8:

Table 4 - Results of user input at the main menu

User action	Effect	Conformance level
1	Listen	Mandatory/reserved
2	Create/send	Optional/not reserved
3,4,5,6,7,8,9	Not specified	
*	Control menu	Mandatory/reserved
0	Not specified	
#	Not specified	
No action	Repeat prompt	Mandatory/reserved
Disconnect	End session	Mandatory/reserved

1 Listen	2 Create/send	3
4	5	6
7	8	9
* Control menu	0	#

Figure 8 - Main menu key allocations

7.5.1 The announcement of the presence of messages and the main menu prompt shall be interruptible, with results in accordance with Table 4.

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7.5.2 Mailboxes may be configured such that playback of messages begins and/or continues automatically after mailbox access, and any new message announcement, without subscriber DTMF input. Such automatic operation should be user-configurable.

7.6 Listening to messages

A typical sequence for listening to and processing messages in the voice mailbox is:

a) the user selects listen from the main menu to request access to the messages;

b) the first/next message is played back (see 7.6.2);

c) when the message finishes, the system prompts for the disposition of the message or other response options;

d) the user indicates the disposition of the message or invokes other response options;

e) if there are additional messages, b), c), d), and e) are repeated as needed;

f) the user can leave the sequence at any time by disconnecting or invoking any other system function.

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Figure 9 illustrates a typical flow for listening to messages:

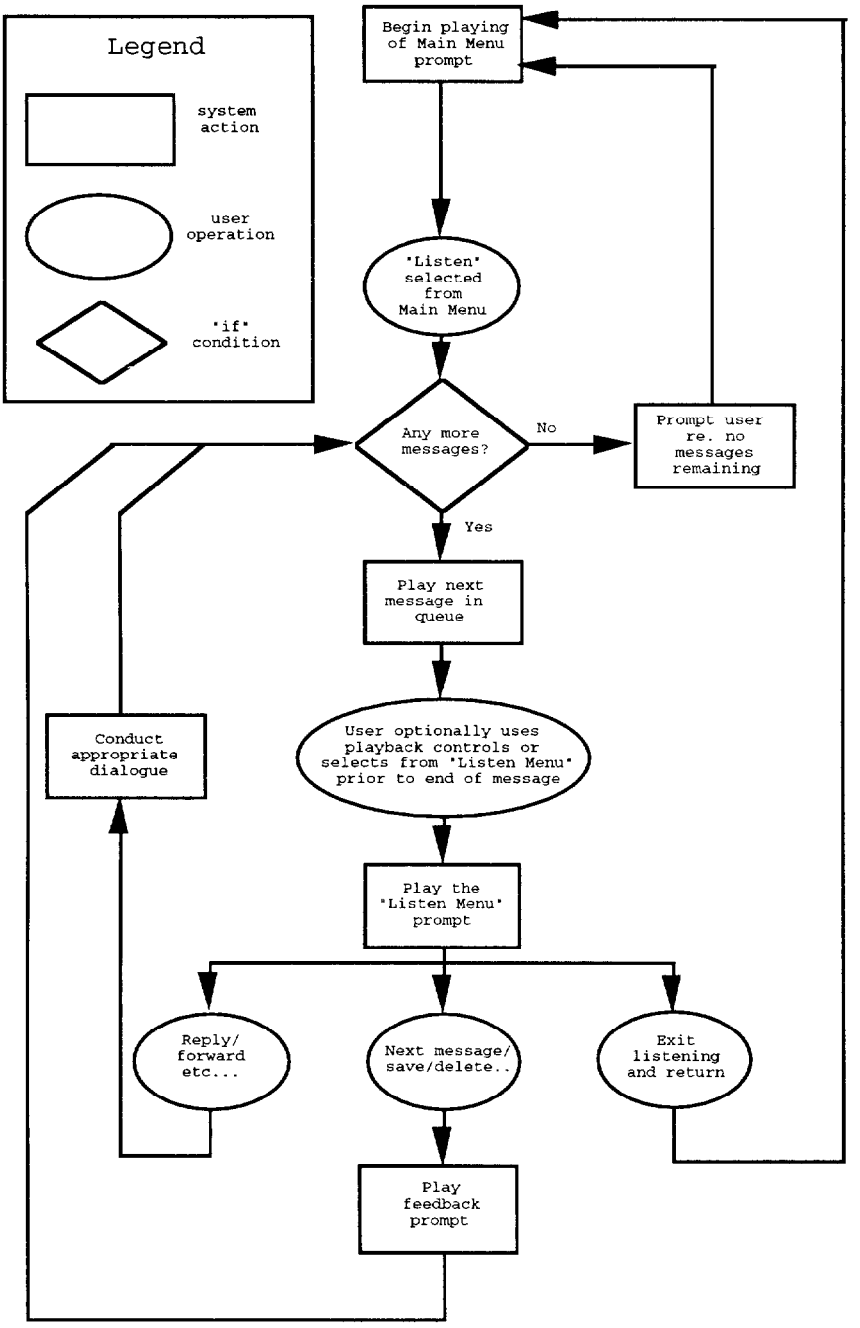

Figure 9 - A typical flow for listening to messages

7.6.1 A user shall be able to dial through message playback, by selecting from the listen menu (See 7.6.3).

7.6.2 The order in which messages are presented during playback (e.g., chronological order, reverse chronological order, precedence order) is outside the scope of this International Standard.

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7.6.3 In the basic subscriber exchange for listening to messages, the menu prompt shall be interruptible, with results in accordance with Table 5 and Figure 10. The action taken upon termination of the dialogue for each message shall depend on the user's DTMF input during or after message playback in accordance with Table 5 :

Table 5 - Results of user input at the listen menu

User action	Effect	Conformance level
1	(Re) Play message	Mandatory/reserved
2	Save message	Optional/reserved
3	Delete message	Optional/reserved
4,5,6	Not specified	
7	Skip backward	Optional/not reserved
8	Not specified	
9	Skip forward (during listening)	Optional/not reserved
*	Control menu	Mandatory/reserved
0	Not specified	
#	Skip to next message	Mandatory/reserved
No action	Reprompt user	Mandatory/reserved
Disconnect	End session with no change to state of current message	Mandatory/reserved

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1 (Re)Play	2 Save	3 Delete
4	5	6
7 Skip backward	8	9 Skip forward during listening
* Control menu	0	# Skip to next message

Figure 10 - Listen menu key allocations

Note: Functions assigned to keys that are not specified in Table 5 and the key (9) assigned to skip forward may have different effects during and after playback in listen contexts. It should be noted that these options, although unprompted, are implicitly available during message output. This implicit menu and the prompted menu that applies after listening to a message are logically distinct.

The play command causes playback of the current message from the beginning. Where there is no current message (i.e., there are no messages at all or the user has gone beyond the last message) an appropriate system message is output.

The save command causes the current message to be explicitly saved in the user's mailbox, and the system to advance to the next message (if any). The exact details of the user actions involved in subsequently retrieving the message are not described in this standard.

The delete message command causes the current message to be deleted from the user's mailbox, and the system to advance to the next message (if any). This International Standard does not specify whether the message will be immediately deleted or marked for later deletion. The system should provide a mechanism for a user to recover a message which has been deleted prior to the user disconnecting. The means by which a user recovers a message which has been deleted by mistake is system dependent, and is outside the scope of this International Standard.

The skip backward command causes the output of the current message to jump back to an earlier point in the same message. The temporal extent of the jump is system dependent. Where the requested jump extends back before the start of the message, output continues from the start of the message. When a skip backward is requested after the message has ended, playback resumes as if the function was requested immediately prior to the message ending.

The skip forward command causes the output of the current message to jump forward to a later point in the same message. The temporal extent of the jump is system dependent, but should be the same as for the skip backward command. Where the requested jump extends beyond the end of the current message, output stops as if the end of the message had been reached. When fast-forward is requested after the message has ended, no action is taken except that the system may prompt the user appropriately. If the fast forward function is provided and the 9 key is assigned a different

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function after a message has finished playing, careful consideration should be given to the selection of this function since users fast forwarding through a message will often invoke it inadvertently.

The effect of a # at the listen menu is to go to the next message or its associated header, if there is a next message. The status of the skipped message should not change.

7.6.4 Voice messages that are skipped or not explicitly deleted shall be saved. This International Standard does not specify whether they shall be saved as old messages or left as new messages.

7.6.5 Playback of header information should be user configurable. Also see 5.3.7.

7.7 Sending messages

A typical sequence for a subscriber sending a message is:

a) the user invokes the send function from the main menu;
b) the system begins the message creation dialogue;
c) the user provides the message (as voice input), the desired destination(s), and then empowers the system to send the message.

This International Standard does not specify the relative ordering of addressing and recording a message.

7.7.1 After input of the message and the address(es), the system shall present the send menu, which shall be interruptible. The action taken by the system shall depend on user action, in accordance with Table 6 and Figure 11:

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Table 6 - Results of user input at the send menu

User action	Effect	Conformance level
1	(Re) Play from beginning	Mandatory/reserved
2	Save message	Optional/not reserved
3	Delete message	Optional/reserved
4	Send message	Optional/reserved
5,6	Not specified	
7	Skip backward	Optional/not reserved
8	Not specified	
9	Skip forward	Optional/not reserved
*	Control menu	Mandatory/reserved
0	Not specified	
#	Skip to next state	Mandatory/reserved
No action	Reprompt user	Mandatory/reserved
Disconnect	Send message	Mandatory/reserved



Figure 11 - Send menu key allocations

Note: Functions assigned to keys that are not specified in Table 6 and the key (9) assigned to skip forward may have different effects during and after (re) play of a previously recorded message in the send context. It should be noted that these options, although unprompted, are implicitly available during message output. This implicit menu and the prompted menu that applies after listening to a previously recorded message in the send context are logically distinct.

The effects of the play, save, skip backward, and skip forward commands are as specified in 7.6.3.

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The delete command deletes only the voice input. This command should allow re-recording of the message. It is also recommended that users be provided with a means for modifying or deleting addresses of a message.

The send command causes the system to send the current voice message (typically the one which the user has just recorded) to the required destination address(es).

7.7.2 During message recording, the functions shown in Table 7 and Figure 12 shall be available.

Table 7 - Results of user input after the record tone during message recording

User action	Effect	Conformance level
1,2,3,4,5,6,7,8,9	Not specified	
*	Control menu	Mandatory/reserved
0	Not specified	
#	Delimit message	Mandatory/reserved
No action	Stop recording and reprompt user	Optional/not reserved
Pause in voice input	Delimit input and skip to next logical state	Optional/not reserved
Disconnect	If message recorded and address entered, send message	Mandatory/reserved

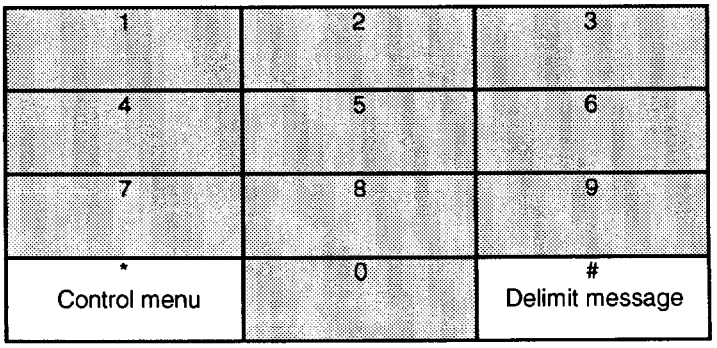

Figure 12 - Key allocations after the record tone during message recording

The effects of time-outs are described in 5.1.3 and 5.4.

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7.7.3 Any form of disconnect, once both address and message are complete, shall cause the message to be sent, unless the system provides a user-configurable option to not send messages on disconnect and the user has selected this option.

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8 Voice bulletin boards

8.1 Access to bulletin boards

Access to bulletin boards is typically via entry of a security code and user ID pair. Security code and user ID entries may, but need not, be delimited with the # key. Beyond this, this International Standard does not cover access to bulletin boards.

This International Standard does not require that the security code and user identification be entered in a particular order.

Figure 13 shows a typical flow for access to bulletin boards:

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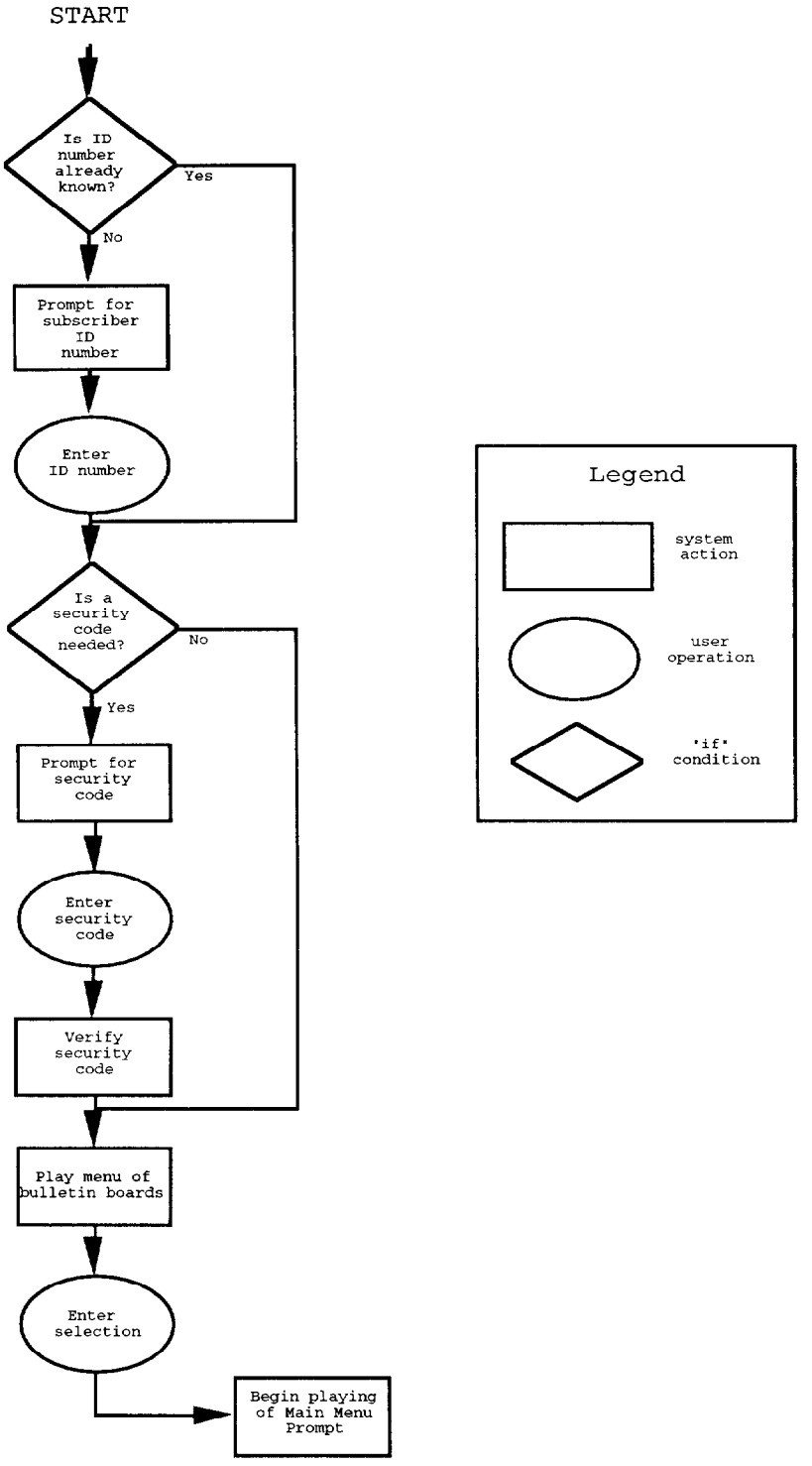

Figure 13 - Typical flow for access to bulletin boards

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8.2 Management of bulletin boards

A bulletin board system can inform the users of the list of available bulletin boards by means of prompts. However, the number of available bulletin boards is often very large, and information about the available bulletin boards may instead be offered by means of another medium, such as a printed directory.

Usually a system administrator will carry out management activities associated with the maintenance of the bulletin boards, such as the creation of new boards, or the deletion of old ones.

This International Standard does not cover the way in which users are informed of the list of available bulletin boards, nor administration/management activities.

8.3 New message announcement

The system shall inform the user of the presence of new message(s) in the bulletin board before the main menu is presented. The form of this announcement is beyond the scope of this International Standard.

8.4 The main menu

After a valid mailbox access sequence and selection of a board, the system shall prompt the user with basic options, including listening to messages and leaving messages in the bulletin board. This set of basic options is referred to as the main menu.

In a bulletin board system, action from the main menu shall depend on user action, in accordance with Table 8 and Figure 14:

Table 8 - Functions accessible from the bulletin board main menu

User action	Effect	Conformance level
1	Listen	Mandatory/reserved
2	Leave a message	Optional/not reserved
3,4,5,6,7,8,9	Not specified	
*	Control menu	Mandatory/reserved
0	Not specified	
#	Not specified	
No action	Reprompt	Mandatory/reserved
Disconnect	Exit system	Mandatory/reserved

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1 Listen	2 Leave a Message	3
4	5	6
7	8	9
* Control menu	0	#

Figure 14 - Bulletin board main menu key allocations

8.5 Interruption of new messages announcement

The announcement of the presence of messages and the menu prompt shall be interruptible, with results in accordance with Table 8.

8.6 Listening to messages

A typical sequence for listening to and processing messages currently in the bulletin board is:

a) the user selects "Listen" from the main menu to request access to the messages;

b) the first/next message is played back;

c) when the message finishes, the system prompts for the disposition of the message or other response options;

d) the user deals appropriately with the current message, or skips over it;

e) if there are additional messages, b), c), d), and e) are repeated as needed;

f) the user can leave the sequence at any time.

Subscribers can save messages into their own mailboxes and remove (cancel) messages which are created by themselves. Non-subscribers may have limited access to functions. Figure 15 illustrates a typical flow for listening to messages:

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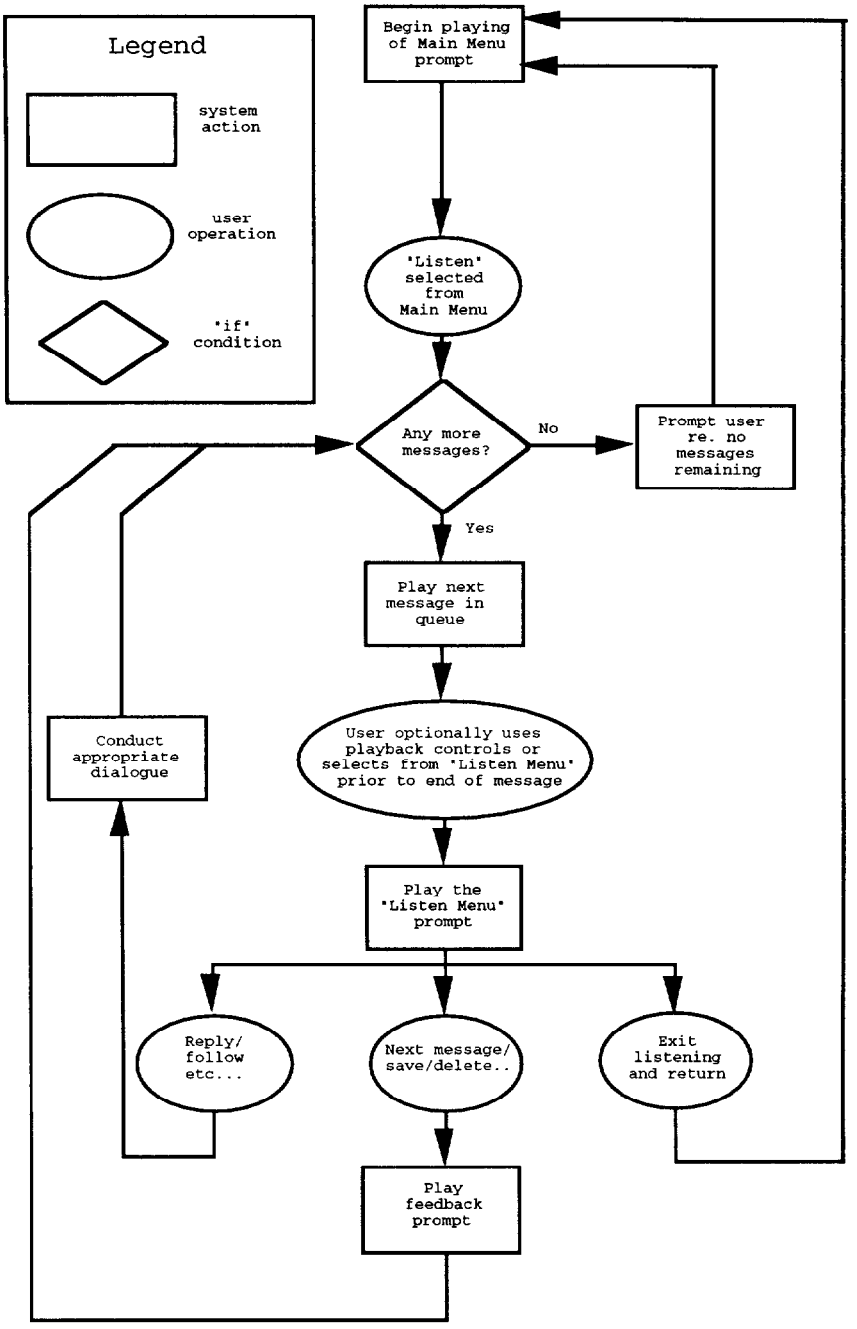

Figure 15 - Typical flow for listening to voice bulletin board messages

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8.6.1 A user shall be able to dial-through message playback.

8.6.2 The order in which messages are presented during playback (e.g., chronological order, reverse chronological order, precedence order) is outside the scope of this International Standard.

8.6.3 In the basic subscriber exchange for listening to messages, the menu prompt shall be interruptible, with results in accordance with Table 9 and Figure 16. The action taken upon termination of the dialogue for each message shall depend on the user's DTMF input during or after message playback in accordance with Table 9.

Table 9 - Results of user input at the bulletin board listen menu

User action	Effect	Conformance level
1	Play message	Optional/reserved
2	Save message (i.e. copy message to user's mailbox)	Optional/reserved
3	Delete message (only message creators allowed access to this function)	Optional/reserved
4,5,6	Not specified	
7	Skip backward	Optional/not reserved
8	Not specified	
9	Skip forward (during listening)	Optional/not reserved
*	Control menu	Mandatory/reserved
0	Not specified	
#	Skip to next message	Mandatory/reserved
No action	Reprompt user	Mandatory/reserved
Disconnect	End session with no change to status of current message	Mandatory/reserved

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1 Play	2 Save message	Delete message
4	5	6
7 Skip backward	8	9 Skip forward (during listening)
* Control menu	0	# Skip to next message

Figure 16 - Bulletin board listen menu key allocations

Note: Functions assigned to keys that are not specified in this table and the key (9) assigned to skip forward may have different effects during and after playback in listen contexts. It should be noted that these options, although unprompted, are implicitly available during message output. This implicit menu and the prompted menu that applies after listening to a message are logically distinct.

8.6.4 Bulletin board messages that are skipped or not explicitly deleted shall be saved; this International Standard does not specify whether they shall be saved as old messages or left as new messages.

8.6.5 Playback of header information should be user configurable. Also see 5.3.7.

8.7 Leaving messages

A typical sequence for a subscriber leaving a message is:

a) the user invokes the leave function from the main menu;

b) the system provides a menu prompt for the leave function;

c) the user provides the message, as voice input;

8.7.1 In the basic subscriber exchange for leaving messages, the menu prompt shall be interruptible.

8.7.2 During the message recording portion of leaving a message, the functions shown in Table 10 and Figure 17 shall be available:

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Table 10 - Results of user input after the record tone during bulletin board message recording

User Action	Effect	Conformance level
1,2,3,4,5,6,7,8,9	Not specified	
*	Control menu	Mandatory/reserved
0	Not specified	
#	Delimit message	Mandatory/reserved
No action	Stop recording and reprompt user	Optional/not reserved
Pause in voice input	Delimit input and skip to next logical state	Optional/not reserved
Disconnect	Accept message for posting	Mandatory/reserved

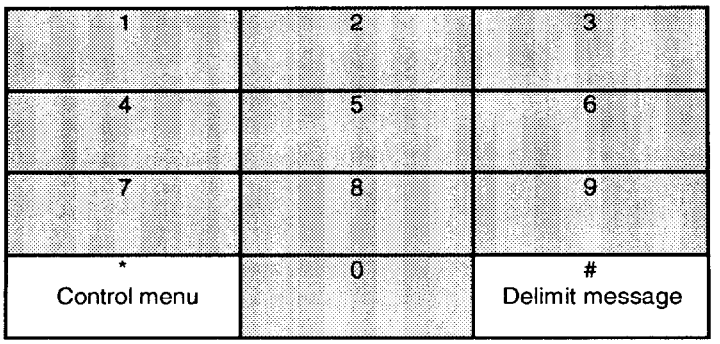

Figure 17 - Key allocations after the record tone during bulletin board message recording

8.7.3 Once recording has begun, any form of disconnect shall cause the message to be left as a new one, unless the system provides a user-configurable option not to post in case of a disconnect and the user has selected this option.

8.7.4 After the message recording portion of leaving a message, the functions shown in Table 11 and Figure 18 shall be available:

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Table 11 - Results of user input after leaving a recorded message in a bulletin board

User action	Effect	Conformance level
1	(Re) play from beginning	Mandatory/reserved
2	Save message	Optional/not reserved
3	Delete message	Optional/reserved
4,5,6,7,8,9	Not specified	
*	Control menu	Mandatory/reserved
0	Not specified	
#	Skip to next logical state	Mandatory/reserved
No action	Repeat prompt	Mandatory/reserved
Disconnect	Accept message for posting	Mandatory/reserved

1 (Re) Play	2 Save Message	3 Delete Message
4	5	6
7	8	9
* Control menu	0	# Skip to next logical state

Figure 18 - Key allocations after leaving a recorded message in a bulletin board

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9 Voice message delivery

9.1 General

A typical sequence for message delivery is:

a) a caller gets a busy signal or receives no answer (alternatively, a caller calls a special access number specifically for message delivery and provides the number to which the message is to be delivered);

b) the caller requests or is offered the opportunity to record a message; optionally, the caller may be able to specify special delivery options, e.g. delaying the delivery time, requesting a reply, specifying the language of the system prompts to be used in delivery, etc.;

c) the system then calls the originally dialed number, repeatedly, at intervals, if necessary, until the call is answered; and,

d) when the number is answered, the system plays the message. Optionally, the recipient may be given an opportunity to send a reply.

9.2 Creating a message

This subclause of the standard shall govern both the original creation of a message for message delivery, and creation of a "reply" that a recipient of such a message may make using the message delivery service.

9.2.1 Delimiting voice input is described in 5.1.3, 5.4.2 and 5.6.1.1.

9.2.2 After initial input of the message, the system shall present the post-recording menu, which shall be interruptible. The action taken by the system shall depend on user action, in accordance with Table 12 and Figure 19:

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Table 12 - Results of user input at the post-recording menu

User action	Effect	Conformance level
1	(Re) Play from beginning	Mandatory/reserved
2	Not specified	
3	Delete message	Optional/reserved
4	Send message	Optional/reserved
5,6	Not specified	
7	Skip backward	Optional/not reserved
8	Not specified	
9	Skip forward during listen	Optional/not reserved
*	Control menu	Mandatory/reserved
0	Connect to human or help	Mandatory/reserved
#	Skip to next logical state	Mandatory/reserved
No action	Reprompt user	Mandatory/reserved
Disconnect	If message recorded and address input, send message	Mandatory/reserved

1 (Re)Play	2	3 Delete
4 Send	5	6
7 Skip backward	8	9 Skip forward during listen
* Control menu	0 Connect to human or help	# Skip to next state

Figure 19 - Key allocation for post-recording menu commands

Note: Functions assigned to keys that are not specified in this table and the key (9) assigned to skip forward may have different effects during and after (re) play of a previously recorded message in the send context. It should be noted that these options, although unprompted, are implicitly available during message output. This

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implicit menu and the prompted menu that applies after listening to a previously recorded message in the send context are logically distinct.

The effects of the play, save, delete, skip backward and skip forward commands are as specified in 7.6.3.

The send command causes the system to accept the voice message for delivery.

9.2.3 During the message recording portion of sending a message, the functions shown in Table 13 and Figure 20 shall be available:

Table 13 - Results of user input after the record tone during message recording

User action	Effect	Conformance level
1,2,3,4,5,6,7,8,9	Not specified	
*	Control menu	Mandatory/reserved
0	Not specified	
#	Delimit message	Mandatory/reserved
No action	Stop recording and reprompt user	Optional/not reserved
Pause in voice input	Delimit input and skip to next logical state	Optional/not reserved
Disconnect	If message recorded and address input, send message	Mandatory/reserved

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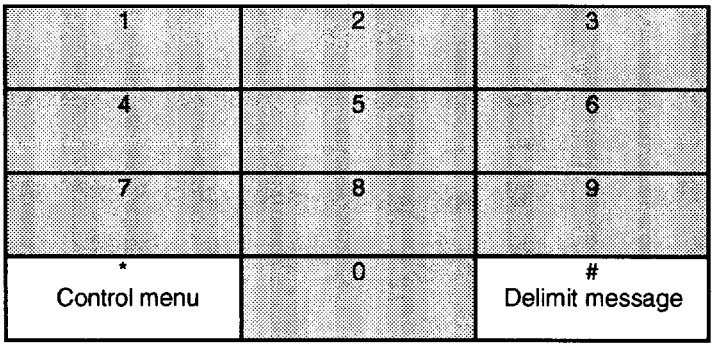

Figure 20 - Key allocations after the record tone during message recording

The effects of time-outs are described in 5.1.3, 5.4.2 and 5.6.1.1.

9.2.4 Any form of disconnect, once a message has been recorded, shall cause the message to be accepted for delivery, unless the system provides a user-configurable option not to send in case of a disconnect and the user has selected this option.

9.3 Receiving and listening to the message

A typical sequence for receiving and listening to a Message Delivery message is:

a) the recipient's number is answered;
b) optionally, the system requests confirmation that the correct person has answered the telephone;
c) the message is played back;
d) when the message finishes, the system prompts with options.

9.3.1 A user shall be able to dial-through message playback, by selecting from the Playback Menu. The Playback Menu prompt shall be interruptible with results in accordance with Table 14 and Figure 21:

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Table 14 - Results of user input at the playback menu

User action	Effect	Conformance level
1	(Re) Play from beginning	Optional/reserved
2,3,4,5,6	Not Specified	
7	Skip backward	Optional/not reserved
8	Not Specified	
9	Skip forward (during listening)	Optional/not reserved
*	Control menu	Mandatory/reserved
0	Connect to human or help	Mandatory/reserved
#	Not Specified	
No action	Repeat prompt	Mandatory/reserved
Disconnect	System and implementation dependent	

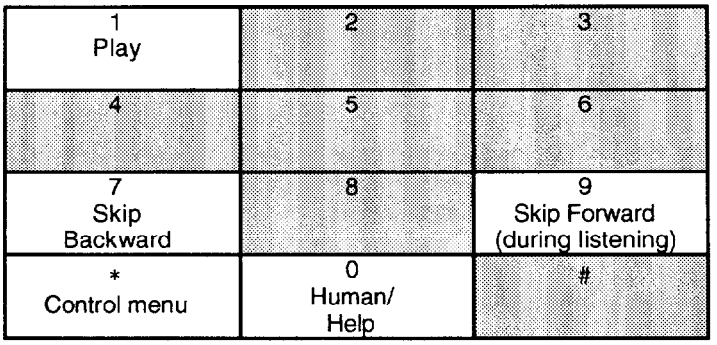

Figure 21 - Key allocations for playback menu commands

Note: Functions assigned to keys that are not specified in this table and the key (9) assigned to skip forward may have different effects during and after playback in listen contexts. It should be noted that these options, although unprompted, are implicitly available during message output. This implicit menu and the prompted menu that applies after listening to a message are logically distinct.

The effects of the play, skip backward and skip forward commands are as specified in 7.6.3.

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Annex A

(Informative)

Dialogue design guidelines

A.1 General

The following guidelines have been used to develop the user interface to the voice messaging system features specified in this International Standard. It is recommended that they also be used for extending the user interface to features not covered in this International Standard. These guidelines and guidelines were selected because they represent best current practice and cover the most important aspects of the user interface to DTMF-controlled applications. As is the case with most sets of ergonomic guidelines, where different guidelines appear to conflict, the user interface designer must make decisions based on their understanding of the users' need, the tasks, and the environment.

A.2 Terminology

A.2.1 General guidelines for terminology

All output from the system should use clear and concise language. Technical jargon should be avoided; terms familiar to a majority of users should be used.

Terms should be used consistently throughout the system. Written documentation should use the same terms as are used in the verbal prompts, tutorials, and system messages.

A.2.2 Terms used for the # key

The key in the lower right-hand corner of the standard 12-key DTMF pad is shown in this document as #. The name of this key depends on the culture and language of the user.

The table A.1 gives examples of some typical names used for this key in a small number of different countries:

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Table A.1 - Different terms used for the # key

Name	Country	English Translation
croisillon	France	window mullions
dièse	France, Canada	sharp
fyrkant	Sweden	square
gate	U.K.	
hash	U.K.	
number sign	U.S., Canada	
pound	U.S., Canada	pound (weight)
quadrat	Germany	square
sha-pu	Japan	sharp
square	U.K.	
tas de fagots	France	pile of sticks

A.2.3 Terms used for the * key

The key in the lower left-hand corner of the standard 12-key DTMF pad is shown in this document as *. The name of this key depends on the culture and language of the user.

Table A.2 gives examples of some typical names used for this key in a small number of different countries:

Table A.2 - Different terms used for the * key

Name	Country	English Translation
asterisk	Canada, U.K., U.S.	
étoile	Canada, France	star
kome jiru shi	Japan	rice
star	Canada, U.K., U.S.	
stern	Germany	star
stjärna	Sweden	star

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A.3 Language of prompts

A.3.1 Language selection menus

Language selection menus should be ordered with consideration to the users' most frequent language choices, if known, with these presented first in the menu. Prior to re-ordering such a menu, consideration should be given to existing users who have memorised this step in the dialogue.

Language selection menus should use single-digit selection when less than 10 options are being presented, and dual-digit selection when 10 or more options are being presented.

When a user makes no selection from a language-selection menu, the prompts should continue in the original language or, if no language has been pre-determined, in the users' most common language.

A.3.2 Initial language selection for applications

When the user's desired language of interaction must be determined before the application can begin, the following two mechanisms are both widely used:

A.3.2.1 Initial language selection menu

When the system answers the call, it provides a language selection menu to the caller (see example in 5.7.2). The caller's choice determines the language to be used for the remainder of the interaction.

A.3.2.2 Language determination by number called

Each supported language for the application is provided with a different access number. Users select a language implicitly when they dial a specific access number.

A.3.3 Language of subscriber greetings

Subscribers should be encouraged to record their call answering greeting(s) in the language or languages appropriate for their callers.

A.4 Feedback

A.4.1 General

Several kinds of feedback are possible, including repetition of user input, status and error prompts, and requests for confirmation. Feedback should be short enough not to frustrate expert users yet clear enough to be useful to novice users. In addition, varying levels of feedback detail may be available as a user or system selection.

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A.4.2 Points where feedback may occur

Feedback to all user actions should be provided. Specific feedback points include the following:

- after selection from a menu;
- after a confirmation;
- after the user changes his or her security code;
- after entering times or dates;
- after entering addresses;
- after the creation, deletion, or alteration of objects.

A.4.3 Terms to be used for user feedback

System feedback to user input should be stated in context-relevant terms. For example, for English, if the user enters "1-0-0-0" and the context is time, the system could state "10 o'clock", if the context is quantity, the system could state "1,000 units ".

A.4.4 Use of subscriber name

Wherever possible, the system should respond with the associated recorded name following input of a subscriber's number/address.

A.4.5 Use of relevant feedback in context

In general, system output indicating that user input was successful will be indicated by beginning the next prompt, menu, or announcement. For system actions that will take more than a few seconds, a feedback message indicating the delay should be provided. Deletions of messages or greetings should be confirmed with feedback. For complicated user input (e.g., dial by name) feedback indicating that a requested action is taking place should be provided.

A.4.6 Avoidance of destructive actions

The system should take measures to protect users from inadvertent destructive actions. These measures could include requests for confirmation of potentially destructive actions, or delay of actual destruction, or provision of an "undelete" or "undo" mechanism.

A.4.7 User guidance

It is important that adequate guidance is provided to users of systems. This guidance may take the form of prompts encountered during normal use, as well as error messages and help messages. Information about the production of appropriate user guidance may be found in 5.3 of this International Standard.

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A.4.8 Discriminability of auditory feedback

Auditory feedback that indicates one status or function should be easily discriminable from auditory feedback that indicates any different state or function.

A.4.9 Voice quality

The quality of prompts and recorded speech should be deemed acceptable by a representative sample of users of a system.

A.5 Interruptible messages

System output may have an interruptible portion (during which dial-through is enabled) and a non-interruptible portion (during which dial-through is non enabled). If both are present, the non-interruptible portion should precede the interruptible portion.

The non-interruptible portion of system output separated into interruptible and non-interruptible portions should be as brief as practicable, and should contain only critical error or potential error information.

A.6 Menus

A.6.1 General

A menu typically consists of several choices. This subclause describes some of the guidelines useful in combining single action prompts into menus.

Prompts should be short enough not to frustrate expert users yet clear enough to be useful to novice users. In addition, varying levels of prompt detail may be available as a user or system selection.

Prompts should be phrased as action-key-press pairs, e.g., in English, *"To save this message, press 2."*

Unavailable choices should not be presented within a menu. For example, the prompt *"To retrieve saved messages, press 2"* should not be played when there are no saved messages.

Where information is commonly required by users, it may be appropriate for the system to provide that information directly without an explicit user request.

A.6.2 Number of alternatives

Usually, no more than four choices should be presented in a single menu prompt. Not all available choices need be presented.

A.6.3 Commands

Normally, using letters mnemonically to indicate a function or command should be avoided. Among the reasons for this are the absence of letters on telephone keypads in many countries and the language dependence of function names.

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Minimise command sequences in order to minimise the number of stages which the user must go through to reach an objective.

A.6.4 Menu structure

When designing multi-level menu-based interactive telephone interfaces, careful thought must be given to the trade-off which exists between the number of options which are offered together in each menu, and the number of menus which are offered. The exact numbers of options per menu and menu levels appropriate for a particular system will depend on the characteristics of the task and the users.

A.7 Key assignment choices

A.7.1 Common assignment

When at all possible, it is recommended that a function which occurs in multiple menus be assigned to the same key in each of the menus.

A.7.2 Natural order

Choice should appear on menus by order of frequency (i.e., most common choice first), or in a "natural" order if such a strong order exists (e.g., creating an item before editing an item). In a multi-level system, commonly accessed functions should, where possible, be presented as high as possible in a menu tree.

A.7.3 Contiguous assignment

Where possible, menu options should be assigned in a logical order starting with key 1. Numerical skips within a menu prompt should be avoided. For example, if there are three choices, they should be numbered 1, 2, and 3; not 1, 2, and 4.

A.7.4 Spatial representation

It is generally recommended that commands associated with telephone-based interfaces are assigned to the keypad such that the left hand column of the keypad indicates regressive steps, and the right hand column indicates progressive steps. Internationally, audio equipment uses left and right for backwards and forwards; however this is not true for all cultures.

A.7.5 Single key

Whenever practical, menu choices should be available by pressing single keys rather by multiple keypresses.

A.7.6 Reservation of keys

When a system does not implement an optional non-reserved function it is recommended that consideration be given to reserving its assigned key for possible future implementation of that function.

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A.7.7 System expandability

The 12 key pad telephone device is very limited. This means that special consideration should be given to allocation of functions to keys to provide for expandability of the system.

A.7.8 Pause

It is recommended that a pause function be available during playback and recording. In contexts where 7 and 9 are used for skip backwards and forwards respectively, the 8 key may be a good choice for implementing a pause/resume toggle. It may also be desirable to implement a pause/resume function in other system states in the same way.

A.8 Recording

A.8.1 Limits on recording time

If the recording time is limited, a beep somewhat before the end of the allowed period may signal that the recording will soon end. The timing of the beep relative to the end should be such as to give the user a useful warning. This timing may vary to suit any system specific message length limit.

A.8.2 Silence removal

Normally, any long periods of silence within messages should be replaced with shorter periods upon playback.

A.9 Time dependency

Normally, avoid time-dependent (without user action) system state changes. (For example, a key shouldn't mean one thing while a message is playing and something totally different when the message finishes.) If a time-out does change the state, the system should inform the user.

If the user enters a # key after the expiry of a delimiting time-out or in situations where the length of the data is fixed, a trade-off must be made between accepting a late # as an unnecessary delimiter, or as a specific input meaning "skip to the next logical state".

A.10 Use of time-outs for no action in different contexts

Appropriate values for the "time-out for no action" vary significantly depending on the precise context and the user of the application.

Table A.3 provides typical ranges for the value of this time-out for general contexts:

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Table A.3 - Suggested time-out durations for different contexts

Context	Time-out (range, in seconds)
After menu prompt	3 - 15
After data entry prompt	3 - 15
After help prompt	3 - 15
After voice input prompt	2 - 15
After error message	3 - 15

A.11 Speech recognition for voice messaging systems

The main body of this standard contains normative clauses which relate only to voice messaging system user interfaces in which user interaction with the system takes place via DTMF key presses or the use of no user action as a time-out.

There are now an increasing number of voice messaging systems which make use of speech recognition as a means for user control.

Speech may allow a flatter interface structure with more commands available per menu level because users can be expected to remember command names (e.g. "erase") more easily than they can remember key bindings (e.g. "3-key" means "erase"). In some cases, users may prefer to use voice input rather than DTMF input.

It should be noted that speech recognition technology is changing very quickly. This information is intended as an aid to voice messaging system developers based on current capabilities. The use of connected speech input recognition may be used to facilitate entry of compound or long digit strings.

A.11.1 Types of speech recognition

There are two basic distinctions which are useful in considering speech recognition systems. These are briefly outlined below:

A.11.1.1 Speaker dependent vs. speaker independent recognition

Speech recognisers can be either speaker dependent or speaker independent.

A speaker dependent system is optimised to recognise the speech of a particular user and requires that user to train the system by speaking to it.

A speaker independent system can accept input in the appropriate language or dialect which the system is designed to recognise, without the need to train the system.

Speaker verification may be used to establish the identity of a user, thereby avoiding lengthy DTMF registration or access sequences.

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Speaker dependent systems typically have better recognition performance and/or a larger vocabulary of words which may be recognised, but need to be trained to recognise the sound characteristics of the individual user's voice. Speaker independent systems can potentially be used by any user without system training.

For voice messaging, speaker dependent recognition may be appropriate for the subscriber user interface, as, typically, a single user will be involved. If speech recognition is used for call answering or call delivery, it usually needs to be speaker independent, as a wide range of people may encounter the system in each case.

A.11.1.2 Isolated vs. connected word recognition

Speech recognition systems can either recognise only single words spoken in isolation (isolated word recognition) or whole strings of words spoken together (connected word recognition).

A technique called "word spotting" may also be used. This is a hybrid form of recognition where a single word is searched for in a longer speech utterance (e.g. the system might recognise the target "save" when a user says "yes.....I'd like to save it").

A.11.2 Talk-through

An important technical capability for telephone-based speech recognition systems is "talk through", where a user can speak during a system prompt or data output, and interrupt system output. In some cases, the system will require the user to enter the to-be-recognised command after the interruption, while in others, the system may have the capability to recognise the word(s) which are used to interrupt the output of the prompt as a valid command.

This capability is similar to the "dial through" capability described in the body of the standard. Where possible, "talk through" should be allowed, so that users of a voice messaging service are not forced to listen to long series of menu choices when they have already heard the choice they want to make.

A.11.3 Appropriateness of speech recognition vs. DTMF

Even where speech recognition can be provided, it may not always be appropriate as the means of user input for an entire system. Examples of cases where speech recognition may be more or less useful are given below:

Speech recognition is of benefit to users who do not have access to a DTMF terminal. These may be non-subscribers without DTMF equipment, or subscribers who normally use DTMF, but who are accessing the system from a different telephone instrument without DTMF.

Speech recognition may be more appropriate as the means of input to a voice messaging system where "hands free" operation is needed (e.g. when driving a car).

Speech recognition may become difficult as a means of user input in situations where there is a lot of background noise.

Users may find it more convenient to input a long digit string (e.g. a full international telephone number) using DTMF keys, even where voice input is available.

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If DTMF is available, users should not be required to speak a security code, or any other confidential data.

A.11.4 Uses of speech recognition

Three main classes of speech recognition dialogue for voice messaging may be identified. These are described in the following sections.

A.11.4.1 Speech recognition and DTMF-based services

In most cases, speech recognition input will be allowed in addition to DTMF input. This may take place in two ways as described in the following two subclauses.

A.11.4.1.1 Selected input mode services

Some services may implicitly or explicitly prompt the user to signal whether or not they have DTMF capable terminal equipment at the start of a dialogue with a service. For example, the user may be requested to press a particular key by the first prompt which is encountered. Depending on whether DTMF is detected, the dialogue will subsequently give prompts asking the user for spoken input or DTMF input. Once this branch has been made, all subsequent input will normally be made using the chosen mode of input, but see A.11.4.1.2. In some circumstances, it may be appropriate to change input modes, e.g., before entry of long digit strings and after such an entry has been completed.

A.11.4.1.2 Mixed initiative services

Some services may allow users to make inputs using a mixture of speech input and DTMF input. This may be done in one of two ways:

(i) users may be able to input either speech or DTMF at all points in the dialogue. This is a flexible approach, but may lead to difficulties in wording system prompts to be equally suitable for spoken and DTMF responses.

(ii) a system which uses voice input may additionally offer the user the choice of making particular inputs (e.g. a long telephone number) using DTMF keys where this is appropriate.

A.11.5 Design of dialogues for speech recognition services

As stated earlier, speech technology is currently undergoing rapid development and improvement. It is not always possible to move from a DTMF to a speech recognition user input without making changes to the dialogue. DTMF input is relatively limited (having only 12 keys plus time-out as user input options) but the recognition of these signals is typically highly accurate. The following sections give considerations which apply particularly to speech recognition dialogues as opposed to DTMF based dialogues.

A.11.5.1 Use of dialogue to increase effective recognition performance

Current speech recognisers can typically achieve high recognition of isolated words, such as commands (e.g. "save", "delete" etc.).

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In some cases, a speech recogniser may not be able to make an unambiguous match to a user input. It may therefore be necessary to confirm or clarify users' inputs.

The smooth flow of a voice input dialogue may also be improved by detecting and responding appropriately to silence from the user (i.e., a "time-out for no action") or the input by the user of an item not in the system's vocabulary (e.g. by prompting for a different word).

Speech recognition dialogues should also take account of the fact that substitution errors may occasionally occur, where, for example, the English command "save" might be recognised as "send". This can lead to considerable confusion for users, and care has to be taken to allow users to easily abandon a current function, and to always confirm major changes before execution (e.g. deletion of all messages in a mailbox).

A.11.5.2 Commands

Speech recognition systems should accept key words, such as "save" and "send". The use of keywords to make menu selections is preferable to the use of spoken numbers (e.g. "to save, say 1") to make menu choices.

Care should be used in selecting the set of words (vocabulary) to be recognised by the system, in order to minimise the likelihood of recogniser confusion.

A further consideration with key words is in the use of synonyms. Users may use words with the same meaning as the desired target item, such as saying "delete" or "remove" where the expected input is "erase". Designers need to be aware that this may occur, and either include synonyms for commands in the recogniser vocabulary, or take particular care in the user guidance and instructions to encourage users to use the required words.

Users who are unfamiliar with speech recognition technology may encounter particular difficulty with isolated keyword input systems where just a single word is wanted. It can be difficult to encourage a user to say simply the single word (e.g. "save") instead of a phrase (e.g. "yes....I'd like to save it..."). One way to avoid this problem is to indicate the expected format of users' input to the recogniser in the system prompt (e.g. "saying one word only, give your option....").

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Annex B

(Informative)

Use of this standard for services other than voice messaging

This annex lists clauses in the standard which are generally applicable to telephone-based services beyond voice messaging (see service taxonomy in clause 1 for a list of these services).

B.1 Definitions (clause 4)

The definitions are generally applicable across all telephone-based services.

B.2 Standard elements of user/system dialogue (clause 5)

This clause is generally applicable across all telephone-based services, except where an application-specific use of a key is mentioned (e.g. using # to skip to the next message).

The control menu may be useful in many telephone-based services.

B.3 Standard listen/playback functions (subclause 7.6.3)

Many telephone-based services involve listen/playback functions. Association of keys with listen/playback functions that are generally applicable across telephone-based services are given in Table B.1.

Table B.1 - Standard listen/playback functions

Key press	Effect	Reference (clause)
*	Control menu	5.6.2.1
1	(Re)Play from beginning	7.6.3
7	Skip backward	7.6.3
9	Skip forward	7.6.3

B.4 Dialogue design guidelines (annex A)

The guidelines in annex A are generally useful across all telephone-based services.

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