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TELEPHONE NETWORK AND ISDN

**OPERATION, NUMBERING, ROUTING
AND MOBILE SERVICE**

**SUBSCRIBER CONTROL PROCEDURES FOR
SUPPLEMENTARY TELEPHONE SERVICES**

ITU-T Recommendation E.131

(Extract from the *Blue Book*)

NOTES

1   ITU-T Recommendation E.131 was published in Fascicle II.2 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2   In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Recommendation E.131

SUBSCRIBER CONTROL PROCEDURES FOR SUPPLEMENTARY TELEPHONE SERVICES

1   General

1.1   Many Administrations are planning to introduce supplementary telephone services which are likely to be viable only if controlled by the user (a list of possible supplementary telephone services is given in Supplement No. 1 at the end of this fascicle). It is therefore necessary to consider means of providing users with procedures by which such control can be achieved. The purpose of this Recommendation is to prevent an undesirable proliferation, in various countries, of subscriber control procedures for such services. Descriptions are given below of three control procedures schemes now in use or in various stages of evolution. Guidelines are offered to Administrations planning to offer subscriber controlled supplementary services. Reference is made to Annex A for a glossary of terms used in this Recommendation.

1.2   It is recognized that not all aspects of all supplementary services will affect the international telephone service, but a degree of international coordination is considered necessary because:

   a)   the same or similar supplementary services will exist on national and international networks; it is desirable to have similar control procedures for both applications;

   b)   a supplementary service which is only national now may be international in the future; in that case changes in control procedures might be impossible or expensive;

   c)   subscribers who travel or move will be less inconvenienced if control procedures for supplementary services do not change from one country to another;

   d)   compatibility between control procedures for telephone services and simple parallel end-to-end data transmission is highly desirable, because the same telephone instrument is used in both cases;

   e)   standardized control procedures make possible lower equipment and customer instruction costs.

1.3   Access to individual services requires that the supplementary service numbering plan have a sufficient capacity to meet all reasonable future needs; control of the services requires the ability to define functional requirements to the system.

         The introduction of push-button telephones providing signals in addition to the normal decimal range (0-9) offers a means of providing the necessary function signals. Since the 12-button instrument is likely to be used by most subscribers, only two additional non-numerical signals will be available for control purposes. Study therefore has been directed towards evolving schemes for control procedures which are acceptable both from the human factors and technical aspects and do not require more than two non-numerical signals.

1.4   The same push-button telephone set that is used in dedicated telephone networks may be used as a subscriber instrument in service integrated networks. It is desirable that in this case the control procedures for a given supplementary telephone service still apply.

         Where the normal 12-button telephone set is also used for services other than telephony, e.g. for data, video-telephone, etc., the control procedures used for these services should be compatible with the control procedures used for supplementary telephone services.

2   Schemes for control procedures

         Recognizing that:

   –   the CCITT has not as yet recommended a unique scheme of subscriber control procedures for supplementary telephone services;

   –   the CCITT is still studying such control procedures;

   –   further proliferation of schemes is undesirable because this would result in subscriber confusion, less efficient use of the telephone network and might make it more difficult to work towards an optimum scheme;

it is recommended that:

- Administrations contemplating the introduction of services which require new control procedures join actively with the ongoing study;

- Administrations wishing to adopt a scheme of subscriber control procedures should apply one of those detailed below to the maximum extent feasible rather than establish a new scheme.

3   Description and analysis of code schemes for supplementary telephone services

3.1   *General*

3.1.1   Three code schemes for supplementary telephone services, currently in use or under study will be briefly described and analyzed. They are:

1) AT&T code scheme (USA);

2) CEPT code scheme (Europe);

3) NTT code scheme (Japan).

3.1.2   It is intended that Recommendation E.131 should be reviewed when experience of the three code schemes is available. It may then be possible to determine if one of them, or perhaps a fourth which incorporates the best features of all three, is to be prefered.

3.1.3   These schemes are still evolving and are liable to changes in details as study progresses or experience is gained. The information presented is an outline only and presents the position at a point in time when the Recommendation is published. Administrations considering the implementation of supplementary services requiring control procedures should approach the appropriate Administration or authority to seek detailed and up-to-date information.

3.2   *Description of the code schemes*

3.2.1   The information sent by the subscriber to the exchange for the control of a service is made up of a number of basic functional elements, some or all of which may appear explicitly in a particular message. These basic functional elements are (see the glossary in Annex A):

1) mode or type of communication identification,

2)   access to supplementary services,

3) service identification,

4) function identification,

5) supplementary information,

6) block separation,

7) message suffix.

3.2.2   The mode or type of communication identification element is unlikely to be used for telephone services and allocation of codes for this purpose within these schemes is tentative. This element is therefore excluded from consideration for the present.

3.2.3   The main differences between the three code schemes are in the methods used to encode the various functional elements and the order in which they must be presented. In all code schemes a separate code is used for the dialling of abbreviated numbers.

3.2.4   For each of the three code schemes, Table 1/E.131 gives the format of the information sent by the subscriber to the exchange:

i)   without supplementary information,

ii) with one block of supplementary information,

iii) for the dialling of abbreviated numbers.

In the Table 1/E.131, the digits below each message identify the functional elements as listed in § 3.2.1 above.

TABLE 1/E.131

AT&T

i)	Information	∗ or 11	NN			
	Element No.	2	3 and 4			
ii)	Information	∗ or 11	NN	SDT	SI	(#)
	Element No.	2 and 4	3 and 4		5	7
iii)	Abbreviated dialing	N(N)	(#)			

CEPT

i)	Information	∗ or #	NN(N)	#		
	Element No.	2 and 4	3	7		
ii)	Information	∗ or #	NN(N)	∗ φ	SI	#
	Element No.	2 and 4	3	6	5	7
iii)	Abbreviated dialling	N(N)	#			
	or	∗ ∗	N(N)			

NTT

i)	Information	1 or #	NN	(SDT N)	(#)	
	Element No.	2	3	4	7	
ii)	Information	1 or #	NN	(SDT N)	(∗)	SI	(#)
	Element No.	2	3	4	6	5	7
iii)	Abbreviated dialing	∗	NN			

For φ, see § 3.2.5 (element 6, CEPT).

The symbols used in Table 1/E.131 are as follows:

N   =   a digit;

SI   =   supplementary information;

SDT   =   second dial tone;

(...)   =   not always used. For detailed explanations, see § 3.2.5 below;

∗   =   "star" button of telephone set as defined in Recommendation E.161;

=   "square" button of telephone set as defined in Recommendation E.161.

3.2.5   In the three code schemes the basic functional elements are realized in the following way:

Access to supplementary services (element 2)

AT&T: access prefix ∗. (Customers are permitted to dial the digits 11 in place of ∗.)

CEPT: service code prefix ∗ or #.

NTT: prefix digit 1 for services available from both dial and push-button telephones, prefix # for services available from push-button telephones only.

Service identification (element 3)

AT&T: a two-digit service code that is also used to indicate the function: codes 72-79.

CEPT: two-digit (or exceptionally, three digit) service codes beginning with 1-9 and 0 are reserved for CEPT allocation in both PABX and public exchange fields.

NTT: two-digit service codes.

Function identification (element 4)

AT&T: the function is expressed in the service code, different functions for the same service use consecutive codes.

CEPT: service code prefix *: activation and registration;

service code prefix #: deactivation and erasure.

NTT: a numerical function code that is only required for certain services. (If a function code is needed, the subscriber is informed by means of a dial tone).

0 = deactivation,

1 = activation,

2 = registration.

Block separation (element 6)

AT&T: no block separation required.

CEPT: the standard CEPT control procedure will assume the use of a block separator * after the service code and between blocks of supplementary information. As a national option, the deletion of the block separator after the service code is allowed; however, if in this case the subscriber dials a block separator after the service code, the exchange should accept the message.

NTT: the block separator * may be used between the function code and the first block of supplementary information, and between successive blocks of supplementary information for push-button telephones only.

Message suffix (element 7)

AT&T: the message suffix # may be replaced by a time-out.

CEPT: the message suffix # is mandatory.

NTT: the message suffix # is used for push-button telephones only.

Abbreviated dialling

AT&T: abbreviated numbers: 2-9 and 20-49 available.

CEPT: N(N) # abbreviated numbers: 0-9 and 00-99 available;

**N(N) abbreviated numbers: 0-9 or 00-99 available.

NTT: abbreviated numbers: 00-99 available.

3.3 *Features of each of the code schemes*

The features of each of the code schemes compared with one or both of the other two are given below.

3.3.1 *AT&T code scheme*

1) The * symbol is used for access to supplementary services.

2)   Control procedures from rotary dial and push-button telephones are compatible.

3)   The messages sent by the subscriber to the exchange are short.

4)   Some two-digit codes have been reserved so as to permit three- digit (or longer) service codes to be introduced in the future without changes in the existing service codes.

5)   The message suffix is not essential.

6)   One, two and more digit abbreviated numbers are possible without the need to use different initial digits.

3.3.2   *CEPT code scheme*

1)   When only prefixes are used, the telephone numbering plan is not influenced by the code scheme for supplementary services.

2)   When only prefixes are used, exchange logic is simplified.

3)   When only prefixes are used, the use of similar control procedures in PABXs and the public network is facilitated.

4)   The abbreviated dialling numbering plan is divorced from the service code numbering plan and does not impose restrictions on it.

5)   The service code remains the same irrespective of the function required.

6)   Each important function is defined by a unique prefix.

7)   Other prefixes are available for new service functions.

8)   A mandatory message suffix avoids the need for time-out, fixed message length or complex programming.

9)   When the message suffix method for abbreviated dialling is used, one, two and more digit abbreviated numbers are possible without the need to use different initial digits.

3.3.3   *NTT code scheme*

1)   The use of a prefix simplifies exchange logic.

2)   The use of a prefix facilitates the use of similar control procedures in PABXs and the public network.

3)   Other prefixes are available for future use.

4)   A measure of compatibility between the control procedures from rotary dial and push-button telephones is possible.

5)   The abbreviated dialling numbering plan is divorced from the service code numbering plan and does not impose restrictions on it.

6)   The service code remains the same irrespective of the function required.

7)   Each important function is defined by a unique function code.

8)   Ten function codes are available.

9)   Allocating a function code after a service code makes it possible to separate basic switching functions from supplementary service processing functions. This facilitates the application of new services to an existing old-type exchange.

10) The control procedures are similar to the control procedures in the NTT end-to-end communication services.

11) The function code can be deleted if not required.

ANNEX A

(to Recommendation E.131)

Glossary of terms

This glossary gives the meanings currently allocated to various terms to facilitate the study and evaluation of control procedures. They are subject to review as the code schemes evolve.

A.1 **supplementary telephone service**

F: service téléphonique supplémentaire

S: servicio telefónico suplementario

Any service provided by the telephone network in addition to the fundamental telephone service.

A.2 **control procedure**

F: procédure de commande

S: procedimiento de control

A method in which information is exchanged in a predetermined forward order and backward order between subscriber and exchange to effect control of a service.

A.3 **command**

F: commande

S: instrucción (de control)

A single specific manipulation at the subscriber set causing transmission of a signal which specifically indicates the manipulation to the exchange. For certain control procedures either one single command or a succession of commands are required.

A.4 **character**

F: caractère

S: carácter

A single specific symbol, number or letter used to designate the diallable signal caused by a command.

A.5 **message**

F: message

S: mensaje

A defined entity of information from the subscriber to the exchange pertaining to a call or a control operation for a service sent in one sequence over the signalling medium. A message may consist of one or more characters transmitted in one or more blocks.

A.6 **code**

F: code

S: código

One character or a sequence of characters forming a part, or the whole, of a message with a specific meaning.

A.7 **mode or type of communication identification**

F: identification du type ou du mode de la communication

S: identificación del tipo o del modo de la communicación

Information used to give an instruction to the switching equipment to select the required network or mode of communication, for example in the use of a multifunction terminal (video-telephone, 48 kbit/s wideband switched-network service, etc.).

A.8   **access to supplementary services**

F: accès aux services supplémentaires

S: acceso a servicios suplementarios

Information used to instruct the switching equipment that the associated information relates to a supplementary service.

A.9   **service identification**

F: identification de service

S: identificación de servicio

Information designating a supplementary service.

A.10   **function identification**

F: identification de fonction

S: identificación de función

Information indicating the type or types of process to be applied to the service.

A.11   **block separation**

F: séparation des blocs

S: separación de bloques

Information indicating that the next character is the first character of a block of supplementary information.

A.12   **supplementary information**

F: information supplémentaire

S: información suplementaria

Any information, except the mode or type of communication identification, access to supplementary services, service identification, function identification, block separation and message suffix, which is required to be sent by the subscriber to the exchange for the performance of a control operation. The supplementary information may consist of one or more blocks.

A.13   **service code**

F: code de service

S: código de servicio

A numerical code designating a supplementary service.

A.14   **service code prefix**

F: préfixe de code de service

S: prefijo de código de servicio

A non-numerical code preceding the service code and indicating the type or types of process to be applied to the service.

A.15 **function code**

      F: code de fonction

      S: código de función

A code indicating the type or types of process to be applied to the service.

A.16 **block separator**

      F: séparateur de blocs

      S: separador de bloques

The character indicating that the next character is the first of a block of supplementary information.

A.17 **message suffix**

      F: suffixe de message

      S: sufijo de mensaje

The character indicating the end of the message.

A.18 **abbreviated number**

      F: numéro abrégé

      S: número abreviado

The numerical code sent by a caller using the Abbreviated Dialling Service which identifies the telephone number of the party to whom he wishes to be connected.

A.19 **abbreviated dialling prefix**

      F: préfixe de numérotation abrégée

      S: prefijo de marcación abreviada

The non-numerical code indicating that the information following is an abbreviated number.

ANNEX B

(to Recommendation E.131)

During the Study Period 1977-80, an international laboratory experiment comparing subscriber performance using two of the recommended code schemes and a previous code scheme of AT&T, which was defined in Volume II.2 of the *Orange Book*, was carried out under the auspices of Working Party II/2 (Human Factors). The experiment was conducted in five countries, Canada, Japan, Sweden, the United Kingdom and the United States of America. In the experiment, a sample of subscribers were brought into the laboratory and asked to carry out a number of tasks involving the use of three supplementary services. These tasks were carried out using a pushbutton telephone connected to a simulated telephone exchange. A different group of subscribers was tested using each of the code schemes. Errors committed while carrying out the tasks and the time required to complete them were recorded.

The results of this experiment revealed that there are no large differences in subscriber performance using the three code schemes. The experimental results did, however, reveal rather large differences among tasks. Those tasks that required entry of supplementary information blocks produced higher error rates. This suggests that guidance annoucements may be required to help subscribers at each step in complex control procedures. However, it should be pointed out that prior to carrying out the tasks only a brief explanation of the required manipulations was given. It would be desirable for experienced users to be able to override guidance announcements by dialling. One particular task, ordering an alarm call, produced quite high error rates in the entry of the time of day. These errors resulted from the use of a 24 hours clock format for entry of this information. This result suggests that a specific positive recorded announcement with supplementary information may be required to give the subscriber feedback on this point.