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Facsimile routing utilizing the Subaddress

ITU-T Recommendation T.33

(Previously «CCITT Recommendation»)

FOREWORD

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ITU-T Recommendation T.33 was prepared by ITU-T Study Group 8 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 3rd of July 1996.

NOTE

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

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SUMMARY

This Recommendation defines application rules for the routing of Group 3 facsimile messages using the Subaddress (SUB) signal as defined in Recommendation T.30. The aspects which are addressed include placement of telephone address components (phone extensions and secondary dialling numbers) within the SUB frame, encoding and decoding rules, and an outline of the facsimile routing procedure.

KEYWORDS

Facsimile, Group 3, Routing.

Recommendation T.33

FACSIMILE ROUTING UTILIZING THE SUBADDRESS

(Geneva, 1996)

1 Introduction and scope

There is a requirement within the marketplace to provide reliable routing of facsimile messages which are received by a Group 3 facsimile terminal and then require further routing to reach the final recipient. Environments where this requirement exists include Local Area Networks, facsimile mailbox systems and facsimile services. Related applications may entail use of telephone extensions or secondary telephone numbers to enable this routing. This Recommendation is intended to address these requirements.

This Recommendation defines optional encoding methods for the routing of Group 3 facsimile messages using the Subaddress (SUB) signal as defined in the Recommendation T.30. This Recommendation addresses the following aspects of facsimile message routing within the Group 3 facsimile procedure:

- Definition of a Subaddress representation whose contents may include phone extensions, a phone number or a combination of these elements.
- Placement, encoding and decoding of telephone number and extension information within the Facsimile Information Frame of the Subaddress signal.
- Outline and a flow diagram of a facsimile routing procedure.

Definitions of the method and user interface to be used for the entry of telephone number and subaddress information by an operator of a facsimile device or facsimile software are beyond the scope of this Recommendation. The methods by which a facsimile message may be routed after reception by a facsimile terminal are also beyond the scope of this Recommendation.

2 Normative References

The following Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations aand other references are subject to revision: all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- CCITT Recommendation E.123 (1988), *Notation for national and international phone Numbers*.
- CCITT Recommendation E.164 (1991), *Numbering plan for the ISDN era*.
- CCITT Recommendation T.6 (1988), *Facsimile coding schemes and coding control functions for Group 4 facsimile apparatus*.
- ITU-T Recommendation T.4 (1993), *Standardization of Group 3 facsimile apparatus for document transmission*.
- ITU-T Recommendation T.30 (1993), *Procedures for document facsimile transmission in the general switched telephone network.*
- CCITT Recommendation T.434 (1992), *Binary file transfer format for the telematic services*.
- ITU-T Recommendation F.551 (1993), *Service Recommendation for the telematic file transfer within Telefax 3, Telefax 4, teletex services and messaging handling services*.

3 Definitions

For the purposes of this Recommendation, the following definitions apply:

3.1 **telephone number**: This is a multiple digit string with dial modifiers as defined in Recommendation E.123.

3.2 **extension**: For the purposes of this Recommendation, this is defined as string of one or more digits representing a unique destination assigned to a specific person for receipt of facsimile messages. This is commonly known as a "phone extension".

3.3 **telephone address**: This is an address entity which shall include a telephone number and may include one or more extensions.

3.4 **second stage telephone number**: This is a telephone number which is reserved for use after the initial dialling of the telephone number in the facsimile procedure.

3.5 **subaddress signal (SUB)**: This is a signal defined in Recommendation T.30 which is intended to provide further routing in the Group 3 facsimile procedure.

3.6 **subaddress content**: This is information content which may be transferred using the Subaddress signal (SUB) within Group 3 facsimile Recommendation T.30. For purposes of this Recommendation, the information content to be transferred may consist of one or more telephone extensions, a second stage dial number or a combination of these elements.

3.7 **subaddress facsimile information field**: This is a character string whose size, encoding and permissible characters are defined generically in Recommendation T.30. As of the publication date of this Recommendation, these permissible characters are numeric digits 0-9 and the *, # and SPACE characters and the total length of the Subaddress FIF is 20 octets. The SPACE character is reserved for use in padding to fill up to the full permitted length of the subaddress.

3.8 **facsimile message**: This is any information which can be communicated between Group 3 facsimile terminals per Recommendations T.4 and T.30 and optionally per Recommendations T.6, T.30, T.434 and F.551.

3.9 **BNF**: All objects defined in this Recommendation are described using a Backus Naur Form (BNF) style of grammar. A definition of these production rules is contained within Annex A.

4 Representation of Subaddress

4.1 Rules for use of delimiters in Subaddress

For consistency with current trends in use of telephone keypad characters as expressed in Recommendation E.164 and other ITU-T Recommendations, the # character shall be used within the subaddress FIF as a delimiter between multiple extensions and two consecutive # characters (i.e. ##) shall be used as a delimiter between telephone addresses. The * character shall be reserved for user applications.

For compact representation, the first character to be represented in a Subaddress FIF shall be the first numeric digit for the case of an extension and a single # for the case of a telephone address.

4.2 Representation of Subaddress Facsimile Information Field

The Subaddress Content to be placed within the Subaddress Facsimile Information Field (FIF) shall be represented as defined in this subclause for compliance with this Recommendation. The representation of the Subaddress Content and its components is provided in BNF form.

The information content of the Subaddress FIF may be composed of the following components which were defined in clause 3:

<Extension> **::=** **Extension**

<Second_Stage_Number> **::=** **Second Stage Telephone Number**

The combination of a Second Stage Telephone Number and the extensions associated with that telephone number make up a Telephone Address, which is signified in the BNF notation below as a Complete Address. One or more occurrences of these components may be encoded within the Subaddress FIF per the rules defined below.

Components

<Digit> ::= 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | *

<Extension> ::= <Digit>{<Digit>}

<Multi_Extension> ::= <Extension>{#<Extension>}

<Second_Stage_Number> ::= <Digit>{<Digit>}

<Complete_Address> ::= <Second_Stage_Number>{#<Multi_Extension>}

<Multi_Complete_Address> ::= <Complete_Address>{##<Complete_Address>}

<First_Address> ::= <Multi_Extension> | #<Complete_Address>

Subaddress FIF Representation

<Subaddress> ::= <First_Address>{##<Multi_Complete_Address>}

5 Encoding of the Subaddress Facsimile Information Field

This clause defines how to encode and place Subaddress Content within the Facsimile Information Field (FIF) of the SUB signal within the Group 3 facsimile procedure. The sending facsimile terminal shall build the FIF for the SUB signal. The routing information to be placed within the Subaddress FIF shall be in the form of Subaddress Content as defined in clause 4.

The octets of the Subaddress FIF shall be coded per Table 3/T.30. The Subaddress Content shall be right justified and placed in the least significant octets of the SUB FIF frame. Per Recommendation T.30, the unused octets in the FIF shall be padded from the left and filled with the "space" character. The least significant bit of the least significant digit shall be the first bit transmitted.

5.1 Example of Subaddress FIF construction

An example is provided to illustrate the process of constructing a Subaddress FIF and the order of transmission of SUB octets. This example assumes a fixed length FIF of 20 octets, where padding characters used to fill up the SUB FIF to its full length.

In the sample case, suppose that the Subaddress Content to be placed in the FIF frame is as follows:

#1234567890#1234

In placing the Subaddress content into the FIF octets, the SPACE character (shown below as “S”) shall be used to pad from the left as shown in Table 1:

TABLE 1/T.33

Placement of octets in Subaddress FIF

S	S	S	S	#	1	2	3	4	5	6	7	8	9	0	#	1	2	3	4

In hexadecimal representation, this can be represented as shown below in Figure 1:

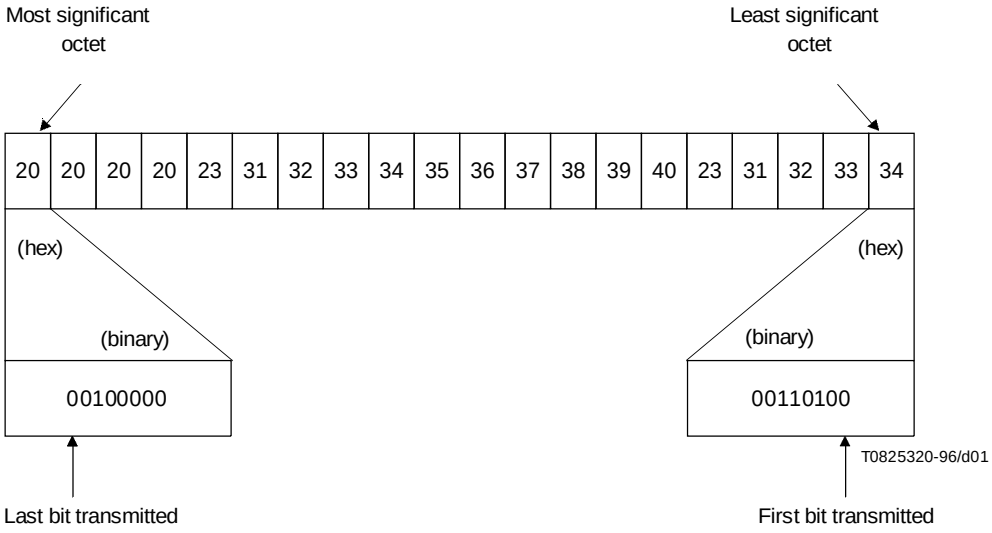


FIGURE 1/T.33

Order of transmission of SUB FIF octets

According to the rules of Recommendation T.30, the least significant octet (<34> or (0011 0100) in this example) is the first octet transmitted and the least significant bit of the least significant octet is transmitted first. In turn, the most significant octet (<20> or (0010 0000) in this example) is the last octet transmitted.

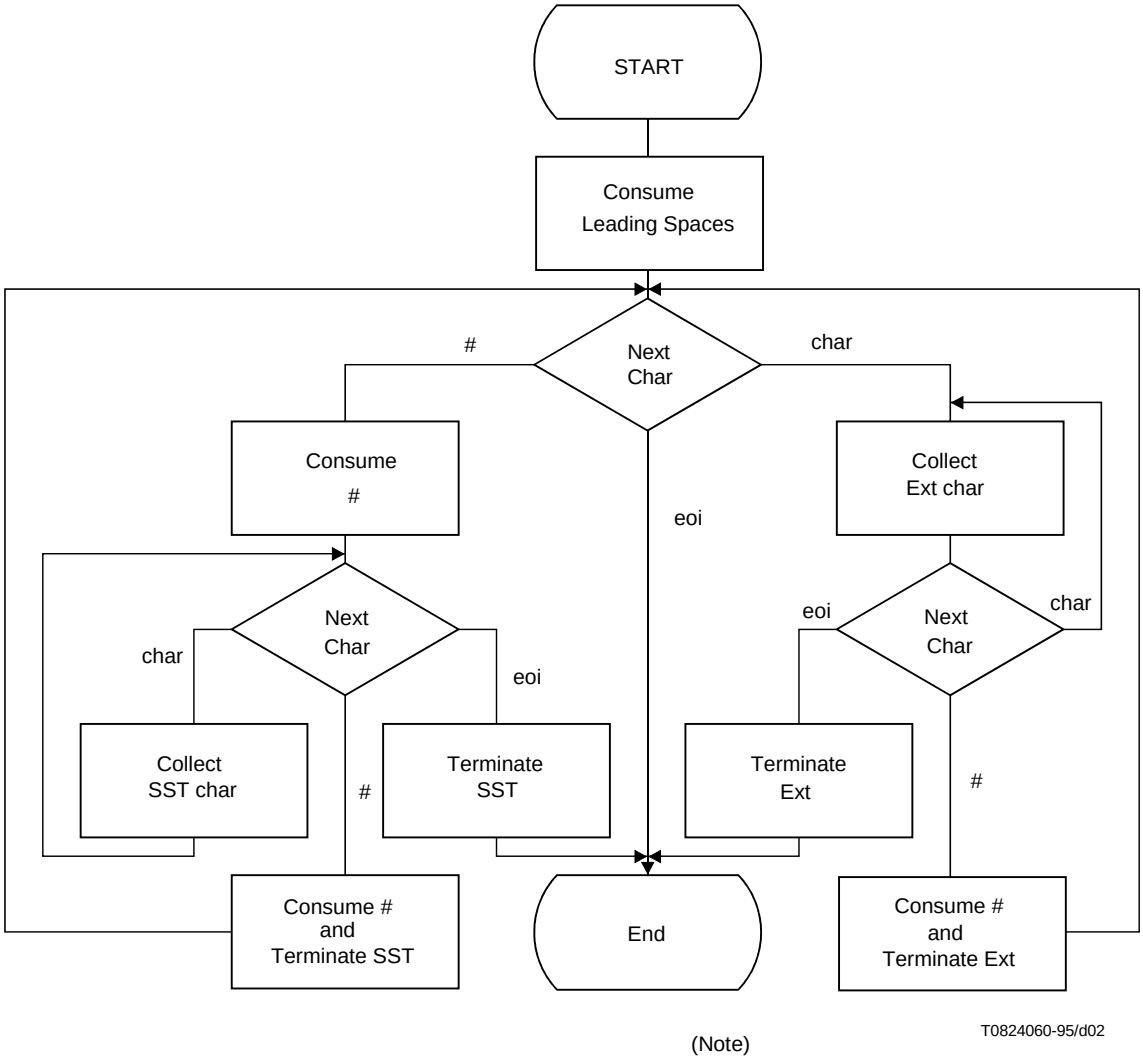
6 Decoding of the Subaddress Facsimile Information Field

If subaddress information has been exchanged during the Group 3 facsimile procedure, the receiving facsimile terminal shall receive the optional SUB signal during T.30 negotiations. The Facsimile Information Field for the SUB signal shall contain the Subaddress octets. The Subaddress Content may be extracted from the SUB FIF by processing octets from left to right, ignoring leading "space" characters used for padding.

The Subaddress Content may then be decoded for routing purposes. As defined in 4.2, the Subaddress Content may consist of one or more phone extensions, one or more second stage phone numbers or combinations of these components. Where the subaddress FIF includes phone extensions, it may be assumed that these extensions are associated with the preceding telephone number. Where the first components in the SUB FIF are one or more extensions, these are associated with the previously dialled telephone number. The formal representation of Subaddress Content has been defined in 4.2. The rules for the decoding of Subaddress Content shall include the following:

- The first non-SPACE character to be represented in a Subaddress FIF shall be the first numeric digit for the case of an extension and a single # for the case of a telephone address.
- A single # is the delimiter between multiple extensions.
- Two consecutive # characters are the delimiters between multiple addresses.

A state diagram for the decoding of the Subaddress FIF is shown in Figure 2:



(Note)

SST Second Stage Telephone Number
Ext Phone Extension
eoi End of Input

NOTE – Implementors may check the validity of the collected address information from the Subaddress FIF frame.

FIGURE 2/T.33

State diagram for decoding Subaddress FIF

Annex A

Description of Backus-Naur Notation

(This annex forms an integral part of this Recommendation)

The following provides a description of the Backus-Naur style syntax which is used in the body of this Recommendation.

Symbol	Description of use
literal	A token (or component) is noted by a literal.
::=	This is the production assignment operator.
|	This symbol is used to separate alternative tokens or groups of tokens.
< >	A non-terminal token is noted by a literal enclosed by the "<" and ">" characters.
[ ]	An optional token or group of tokens is enclosed by the "[" and "]" characters.
{}	A group of tokens enclosed in "{" and "}" may be repeated 0, 1 or more times.

Annex B

Outline of the Facsimile Routing Procedure

(This annex forms an integral part of this Recommendation)

This annex provides an outline of a facsimile routing procedure utilizing the subaddress for informative purposes.

B.1 Definitions

The following signals used during Group 3 facsimile negotiations are referenced in this annex. The signals are defined in Recommendation T.30.

DCS Digital Command Signal

DIS Digital Identification Signal

DTC Digital Transmit Command

FIF Facsimile Information Field

SUB Subaddress

Other terms used in this annex are defined below.

B.1.1 facsimile address: A Facsimile Address shall be defined as the combination of a facsimile telephone number and an optional subaddress. A representation of the facsimile address is defined in I.1.

B.2 Procedure for Facsimile Routing

The procedure described in this annex utilizes the subaddress (SUB) signal and the Facsimile Address as defined within this annex for purposes of routing facsimile messages beyond the called facsimile terminal. A flow diagram of this procedure is contained in this annex.

When routing via this procedure is desired, the operator of the calling facsimile device or facsimile software shall enter the Facsimile Address or its components by some means. The facsimile terminal or software shall parse the Facsimile Address into its components if required, using the telephone number to dial the remote facsimile terminal and reserving the Subaddress Content to build the Facsimile Information Field (FIF) for a Subaddress (SUB) signal.

The sending facsimile terminal shall build the FIF for the SUB signal, converting the subaddress as entered by the operator into the FIF. The SUB as contained within the Facsimile Address shall be placed in the least significant octets of the SUB FIF frame (right justified) and then padded on the left by adding SPACE characters as required to fill the remaining octets of the FIF.

During the Phase B identification of capabilities, if bit 49 of the DIS/DTC is set, indicating that the receiving machine supports subaddressing, the optional SUB signal may be sent preceding the DCS and bit 49 of the DCS should be set (for fax terminals which comply with Recommendation T.30 of 1995 or later). The FIF which follows the SUB signal shall contain the Subaddress octets, where the least significant bit of the least significant octet shall be the first bit transmitted. If bit 49 of the DIS/DTC is not set by the called fax terminal, this indicates that the subaddress capability is not supported. This is an exception condition when the calling device is attempting to transmit with a recipient whose facsimile address includes a subaddress. The action to be taken in this case shall be manufacturer specific. The calling terminal may optionally issue a DCN signal and disconnect the line in this situation. The manufacturer may alternatively elect to support a “Subaddress Override” capability which can be specified by the operator. As indicated by the flowchart in B.3, if the “Subaddress Override” has been specified by the operator, the calling terminal may issue a DCS signal (and other optional signals excluding the SUB) and continue the facsimile procedure.

If subaddress information has been exchanged during the facsimile procedure, upon completion of the fax transmission, the receiving facsimile terminal or system shall store both the facsimile message and the subaddress. The subaddress may then be used as a means to identify the intended recipient or recipients for the message. This can be accomplished by parsing the Subaddress FIF to obtain its components per the procedure described in clause 6. The components shall consist of one or more phone extensions, second stage dialling numbers, or complete addresses, which are combinations of these components. These components have been defined in clause 4. The actions to be taken by the receiving facsimile terminal or system upon receipt of the Subaddress information are application specific. The means by which routing may be accomplished are beyond the scope of this procedure.

B.3 Flow diagram of Routing Procedure

See Figure B.1.

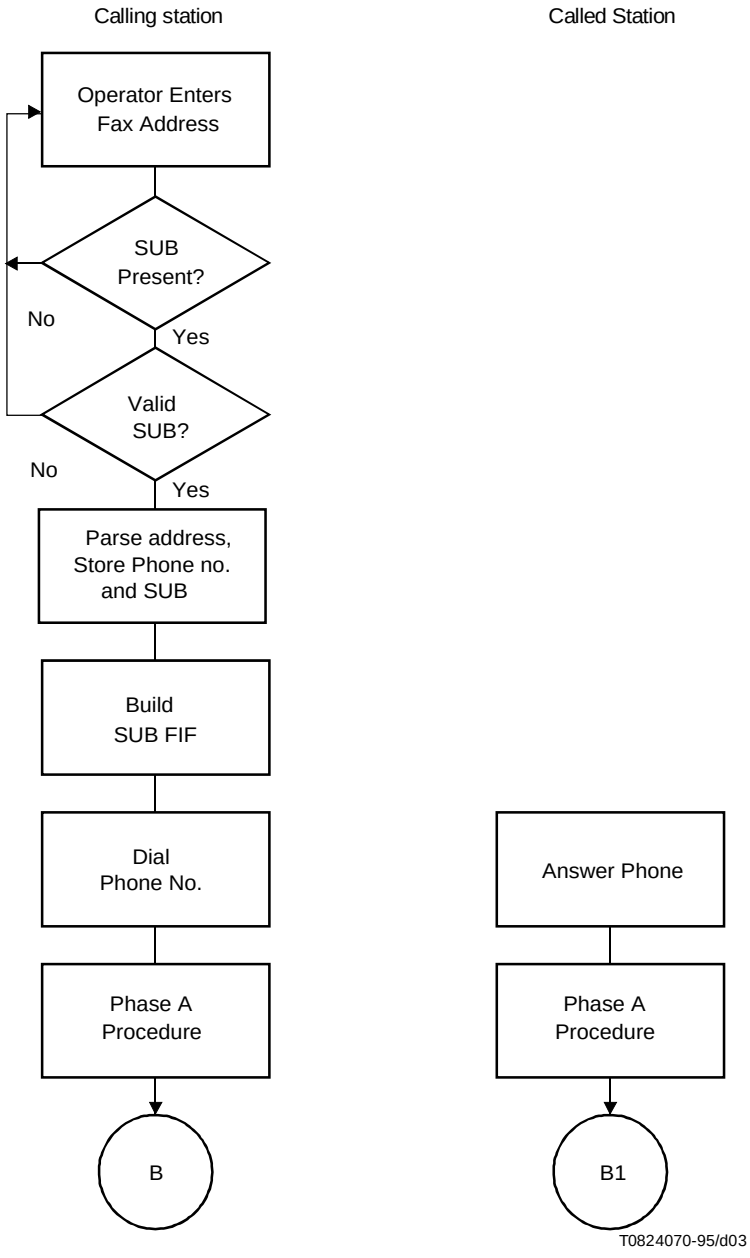


FIGURE B.1/T.33

Routing Procedure using Subaddress where calling station wishes to transmit

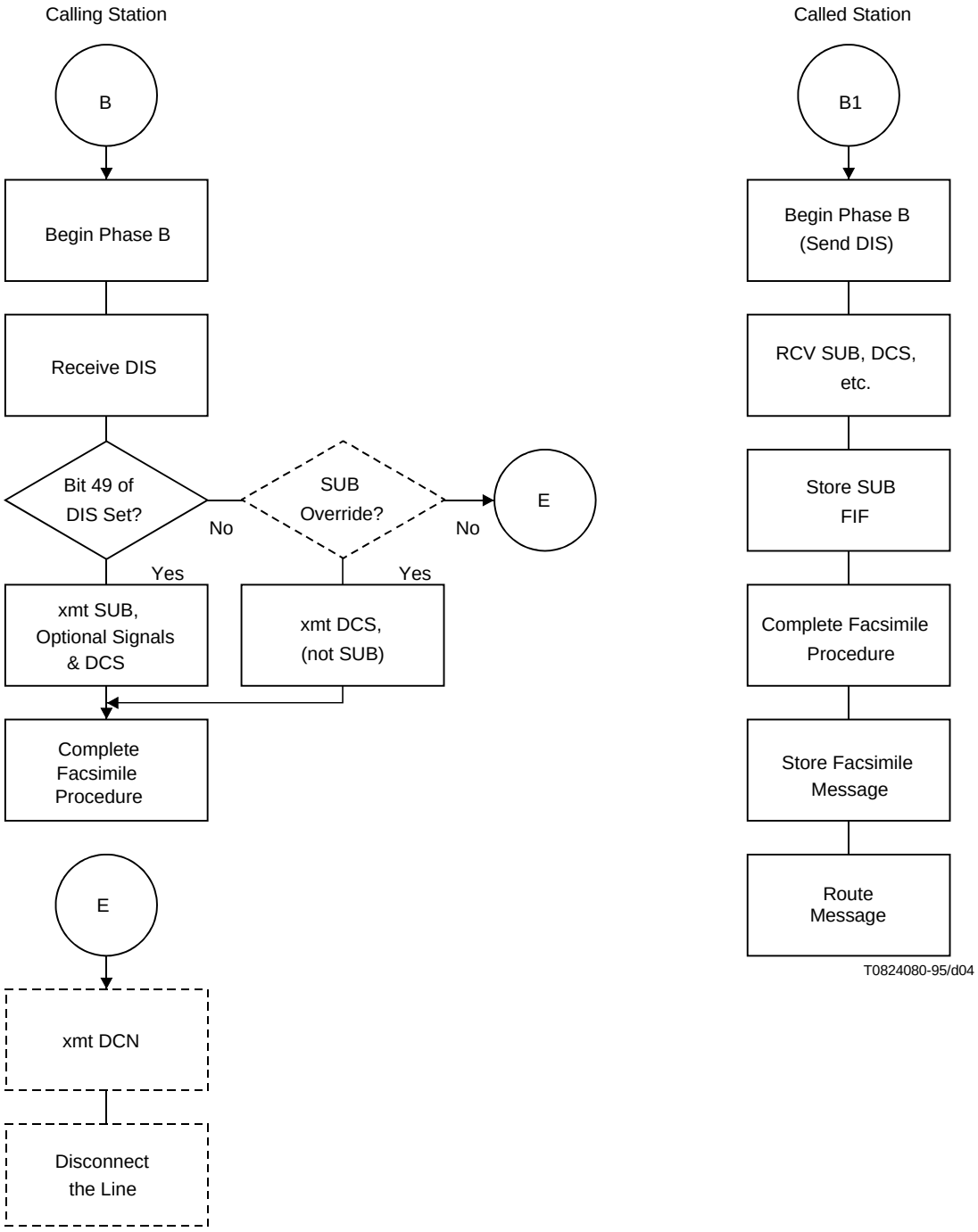


FIGURE B.1/T.33 (*concluded*)

Routing Procedure using Subaddress where calling station wishes to transmit

Appendix I

Representation of Facsimile Address

(This appendix does not form an integral part of this Recommendation)

I.1 Representation of Facsimile Address

A Facsimile Address may be represented as follows, using terms whose syntax are defined in the main body of this Recommendation and in normative references:

Facsimile Address ::= <Telephone Number>([#] | [#<Subaddress>])

I.2 Representation of Facsimile Address on printed materials

On printed materials, the Facsimile Address which includes a subaddress may be represented as follows:

Facsimile Address ::= <Telephone Number>#<subaddress>

where:

- The Telephone Number shall be printed in accordance with Recommendation E.123.
- The terminator of the telephone number shall be #, as specified in Recommendation E.123.
- The subaddress may contain characters up to the total length of the Subaddress FIF. The permissible characters for the subaddress are defined in Recommendation T.30.

Appendix II

Examples of Facsimile Address and Subaddress

(This appendix does not form an integral part of this Recommendation)

The purpose of this appendix is to provide examples for the printing of a facsimile address and examples of the coding of Subaddress content.

II.1 Examples of Facsimile Address

Examples of a Facsimile Address follow, showing the address as it could appear on printed materials and the coding of Subaddress FIF Content. Please note that the full Subaddress FIF shall be padded from the left with the SPACE character to fill the length for the field.

Exemple	**Printed Facsimile Address**	**Subaddress FIF Content**
Phone number plus extension	+1-203-234-2222#1234	1234
Phone number plus secondary Telephone Number	+1–203-234-2222##234-4444	#2344444

II.2 Additional examples of Subaddress FIF coding

Additional examples of coding for the Subaddress FIF Content are shown below. Please note that the full Subaddress FIF shall be padded from the left with the SPACE character to fill the length for the field.

Example	**Subaddress FIF Content**
Multiple extensions	1234#5678#8910
Secondary telephone number plus two extensions	#6174444100#1234#567
Two extensions followed by secondary telephone number	1234#5678##2032223
Two secondary telephone numbers	#2037445555##6446666