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TELEGRAPHY

ALPHABETICAL TELEGRAPH TERMINAL EQUIPMENT

CONNECTION TO THE TELEX NETWORK OF AN AUTOMATIC TERMINAL USING A V.24 DCE/DTE INTERFACE

ITU-T Recommendation S.16

(Previously "CCITT Recommendation")

FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation S.16 was revised by the ITU-T Study Group IX (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

2 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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CONNECTION TO THE TELEX NETWORK OF AN AUTOMATIC TERMINAL USING A V.24 DCE/DTE INTERFACE

(Former Recommendation V.11, Mar del Plata, 1968;
amended at Geneva, 1980; Malaga-Torremolinos, 1984 and at Helsinki, 1993)

1 General

1.1 This Recommendation describes a method of originating and answering calls on the 50-baud telex network by means of an automatic terminal that uses interchange circuits defined in Recommendation V.24 [1] for the interface between the data terminal equipment (DTE) and the data circuit terminating equipment (DCE). In addition this Recommendation covers manual calling with automatic switching to data processing or other off-line equipment and reply by teleprinter with automatic switching to a DTE.

1.2 A distinction is drawn between the two types of automatic calling in national telex networks – dial selection (using dial pulses in accordance with Recommendation U.2 [2]) and keyboard selection using 50-baud teleprinter signals [International Telegraph Alphabet No. 2 (ITA2)].

2 DCE/DTE interface

2.1 The interchange circuits used for the interface between the DCE and the DTE are defined in Recommendation V.24 [1] and comply with the technical specifications in either Recommendation V.28 [3] or Recommendation V.10 [4]. Thus the correspondance between the voltages and the significant states is as shown in Table 1.

TABLE 1/S.16

Correspondence between significant states

Circuit condition	Logic level	Voltage level		Signal	Condition
		Recommendation V.28	Recommendation V.10		
ON	0	$\geq +3$ V	$\geq +0{,}3$ V	Start	A
OFF	1	≤ -3 V	$\leq -0{,}3$ V	Stop	Z

2.2 The circuits used for automatic reply (see Figures 1 and 2) are CT 102, 103, 104, 107, 108/2, 125 and 132.

2.3 The circuits used for automatic calling with dial selection (see Figure 1) are those listed in 2.2 supplemented by CT 202, 206, 207, 208, 209, 210, 211 and 213. The 200-series circuits are not connected directly to the DCE but to an automatic calling equipment (ACE) built into the DCE, which explains the presence of CT 202 to 213. These circuits may be used by a single DTE connected to a single DCE/ACE.

2.4 The circuits used for automatic calling with keyboard selection (see Figure 2) are those listed in 2.2 supplemented by CT 202, which is connected directly from the DTE to the DCE.

2.5 Where a DTE has access through a DCE to several telex lines of the public network, the DCE shall select for each call attempt one telex line and one only (which need not be the same one as for the preceding attempt) and in no case is the DCE allowed to present the same call simultaneously on more than one telex line. The calling and answering procedure and signalling between DTE and DCE are identical, after connection to a telex line, with those that are used when a DCE is connected to one telex line only, which are described in the diagrams below.

2.6 If several DTE are connected to the telex network through the same DCE, each DTE shall make its call attempts to the network using the procedure described in this Recommendation. On the other hand, when it is in the answering position for a call coming from the telex network, the DCE is responsible for handling the calls intended for the DTE concerned using the procedure described in Recommendation F.71 [5] on the interconnection of the telex network with private teleprinter networks. As soon as the DCE has selected the DTE concerned, the answering signal to the call at the DTE/DCE interface and the signalling on the telex line will be identical to those used in the case of a single DTE as described in the diagrams below.

2.7 In the timing diagrams below (see Annexes A to E), the ON condition in the interchange circuits is denoted by a solid line and the OFF condition by the absence of a line. For CT 103 and 104,* means that the DCE connects them to line and ∅ means that the DCE disconnects them from the line.

3 Signalling

3.1 These interfaces may be used with the three following types of telex signalling:

- type A (keyboard selection);
- type B (keyboard selection);
- type B (dial selection).

3.2 The signalling between the DCE and the national telex exchange is not standardized by the CCITT. The signalling protocol shown in the timing diagrams (see Annexes A to E) are only examples to indicate the interdependence between the signalling on the subscriber lines and the status of the interchange circuits.

3.3 Automatic calling with type B signalling and dial selection is described in Annex A. Automatic calling with either type A or B signalling and keyboard selection is described in Annex B. The other annexes are common to all types of signalling.

3.4 The **SSSS** sequence (four times combination No. 19 in ITA2), if required, is transmitted either after the exchange of answer-back codes and through-connection, if network-controlled, or, otherwise, after reception of the call-connected signal. The purpose of the **SSSS** sequence is to indicate that the exchange of "data" is about to start and that no further "telex" signals that might disturb the exchange of data should be transmitted or interpreted. It enables the equipment that is required for the exchange of data, which may then commence after a 500 ms delay, as specified in Recommendation S.15. This sequence may be omitted where an exchange of messages in ITA2 is to take place, providing disabling of the answer-back function is not considered necessary.

3.5 In the event of reply by teleprinter, the last character of the **SSSS** sequence initiates automatic switching to the DTE.

3.6 A special data signal may be sent by the DTE to cause the distant terminal to return to the telex mode of operation.

3.7 The DTE must comply with Recommendation U.40 [6] concerning ineffective attempts. It must be able to interpret at least the following service signals: OCC, ABS, NA, NP, NC, NCH, DER.

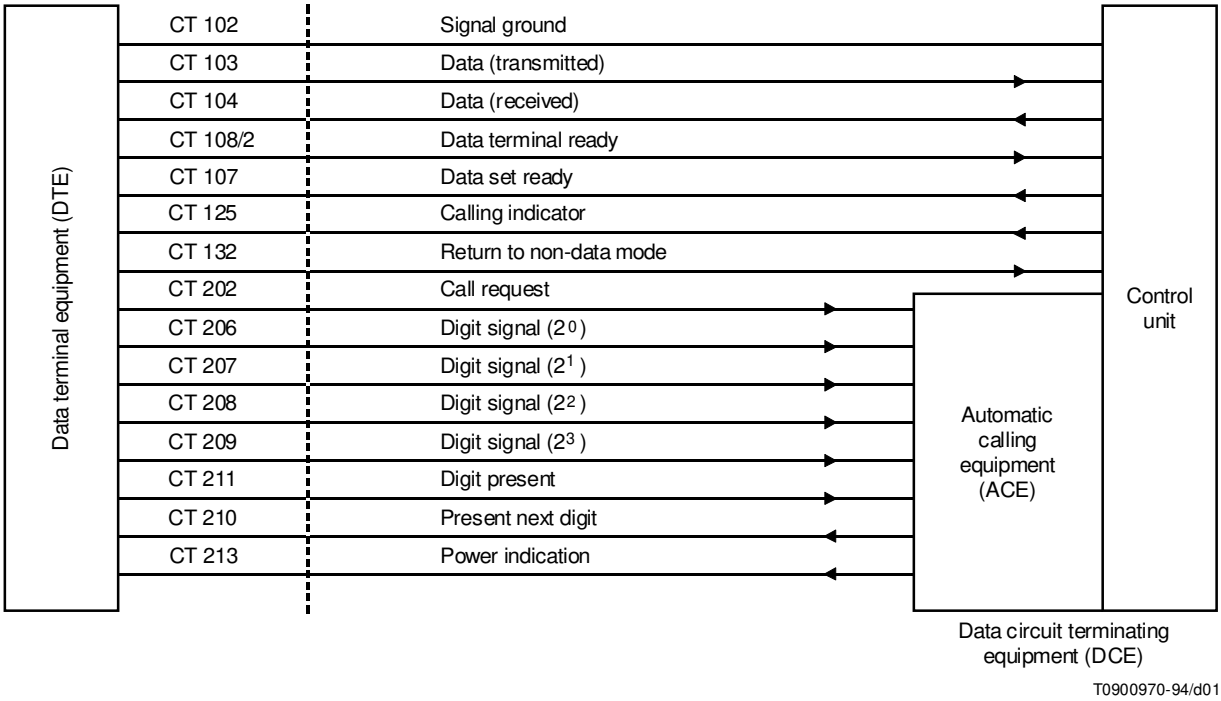


FIGURE 1/S.16

Interface for automatic calling (dial selection)

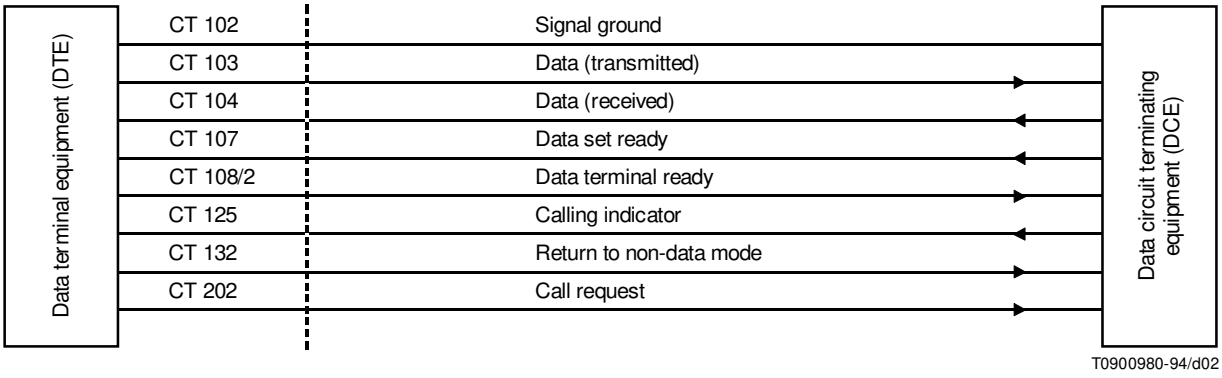


FIGURE 2/S.16

Interface for automatic calling (keyboard selection)

NOTES to Figures 1/S.16 and 2/S.16

1 CT 106 and 109, which are unnecessary for telegraph operation, have been suppressed. CT 107 indicates that the DCE is ready to receive the selection information.

2 With keyboard selection, the selection signals (start-stop ITA2) are of the same type as the "data" signals. They are therefore transmitted serially by the DTE on CT 103.

3 CT 108/2, which is mainly used to indicate that the DTE is ready to receive a call, also serves, when OFF, to initiate clearing of a call.

4 CT 203 is not essential since the proceed-to-select signal is indicated by CT 107 and, in the event of call collision in automatic calling, the simultaneous ON condition of CT 125 and 202 informs the DTE that it must abandon its call attempt to permit acceptance of the incoming call.

5 CT 202 may also be suppressed by assigning the calling function to CT 108/2. The latter, which should then be designated CT 108/1, would fulfil the functions of CT 108/2 and 202.

4 Modes of operation – Timing diagrams

4.1 The various modes of operation and equipment configurations are illustrated in the annexes below as follows:

Annex	*Subject*	*Signalling*
A	Automatic call by DTE (dial selection)	Type B (dial selection)
B	Automatic call by DTE (keyboard selection)	Types A and B (keyboard)
C	Teleprinter + DTE (manual call with manual or automatic switching to DTE)	All types
D	Answering by DTE	All types
E	Teleprinter answering (with automatic switching to DTE)	All types

4.2 The following abbreviations and signs are used in Annexes A to E:

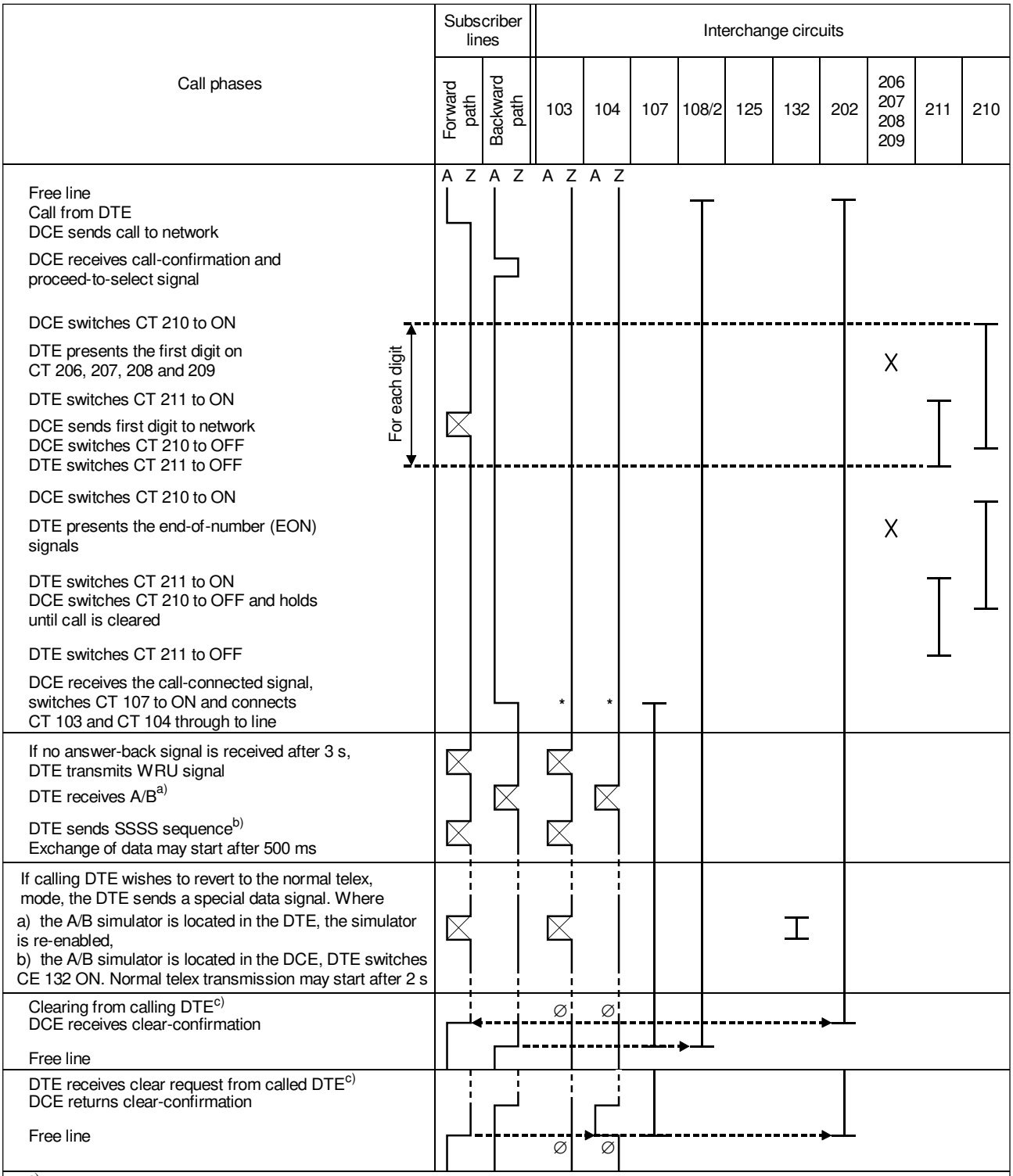
A/B	Telex answer-back code
DCE	Data circuit terminating equipment
DTE	Data terminal equipment
ms	Millisecond
SSSS	Transfer sequence (see 3.4 above)
s	Second
WRU	"Who are you?" signal (combinations Nos. 30 and 4)
*	CT 103 and 104 connected to line
∅	CT 103 and 104 disconnected from line
- - - -	A broken line indicates that the circuit may be either ON or OFF

Annex A

Automatic call by DTE

(Dial selection)

(This annex forms an integral part of this Recommendation)



a) If an A/B simulator is provided in the DCE, then this must not respond to the WRU signal.

b) This SSSS sequence is recognized by:

a) the DTE, il the A/B simulator is located in the DTE;

b) the DCE, il the A/B simulator is located in the DCE.

In either case, the A/B simulator is disabled.

c) If the A/B simulator is located in the DCE and is disabled, it is re-enabled.

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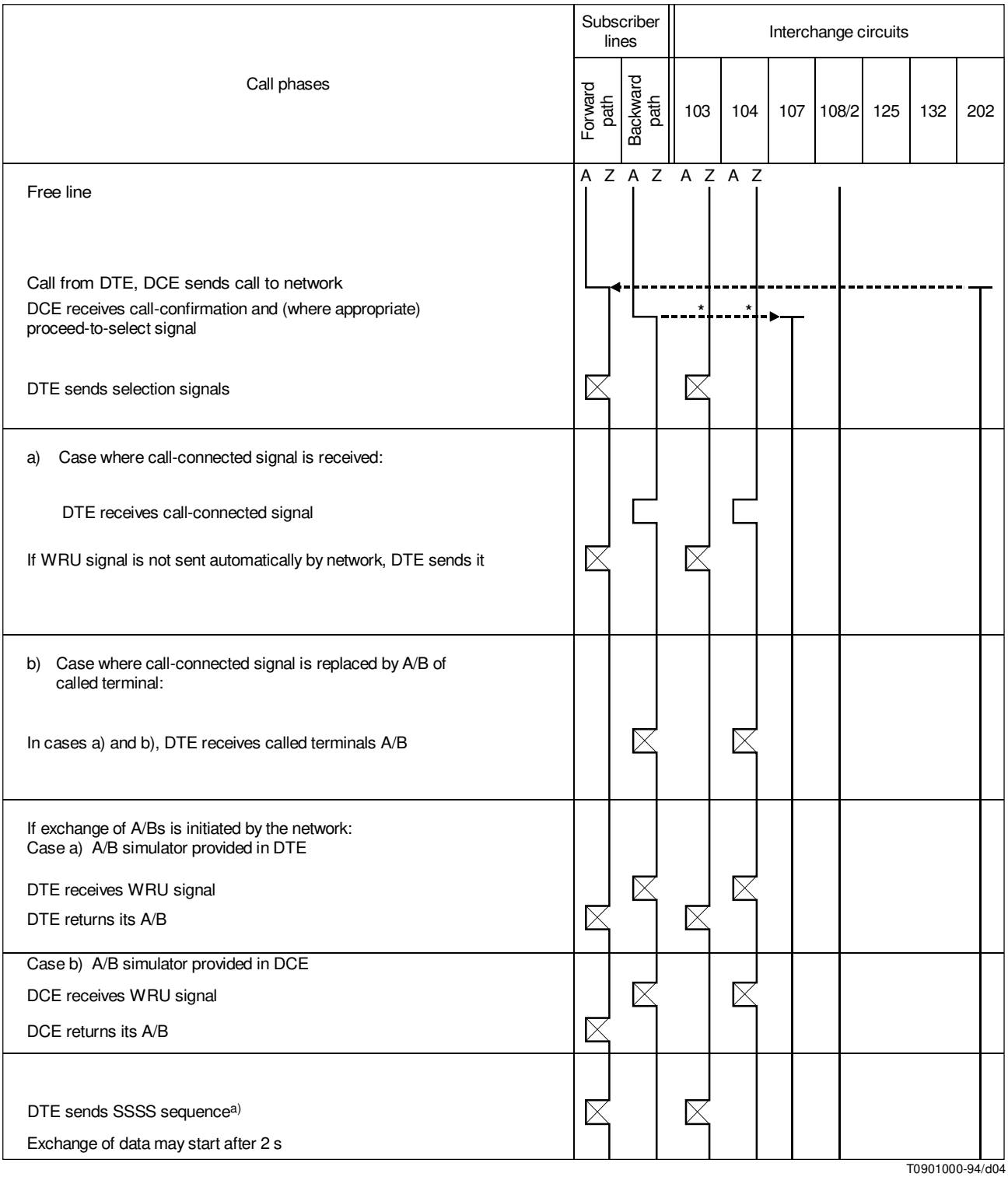
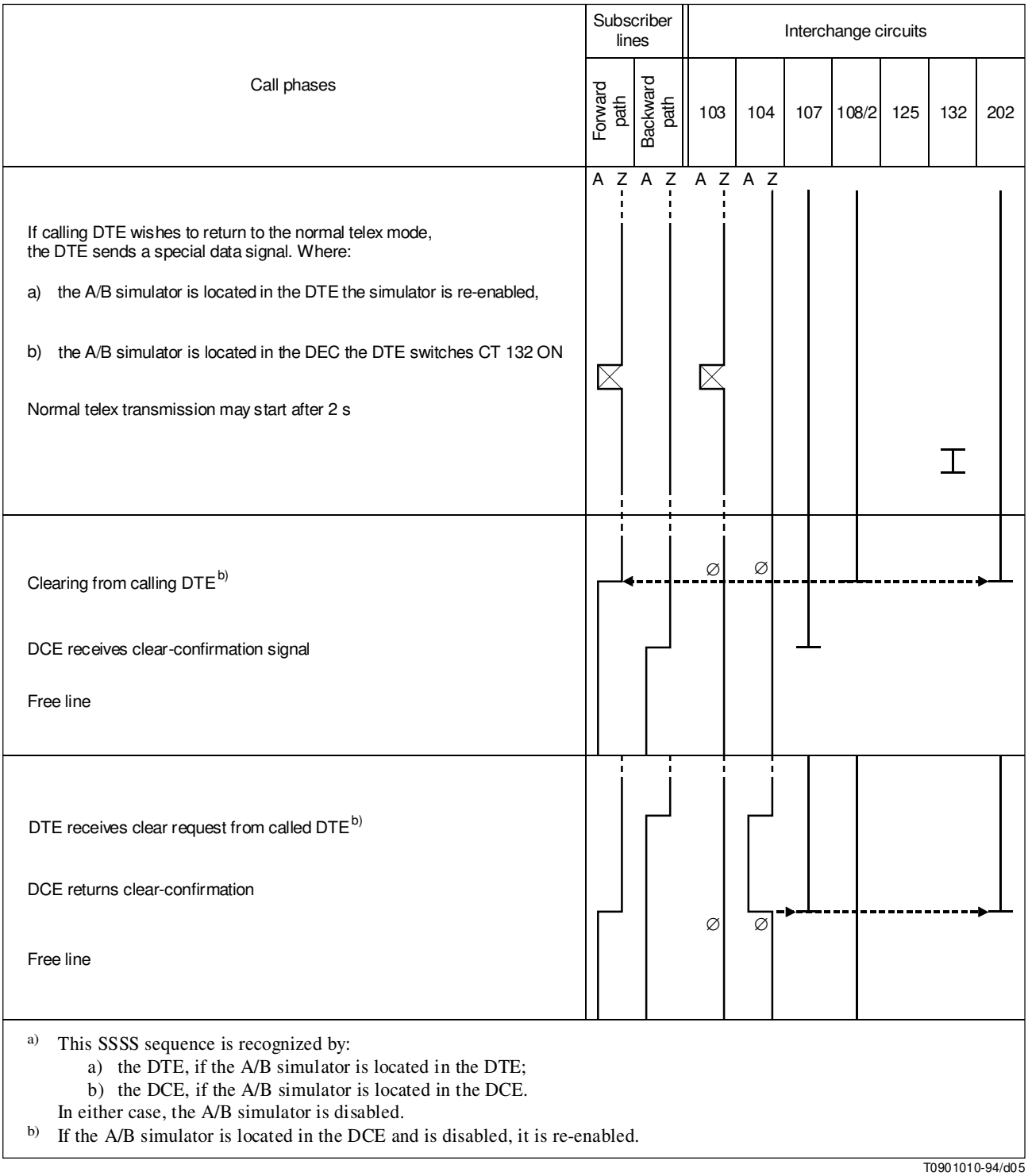
Annex B

Automatic call by DTE

(Keyboard selection)

(This annex forms an integral part of this Recommendation)





a) This SSSS sequence is recognized by:
   a) the DTE, if the A/B simulator is located in the DTE;
   b) the DCE, if the A/B simulator is located in the DCE.
   In either case, the A/B simulator is disabled.

b) If the A/B simulator is located in the DCE and is disabled, it is re-enabled.

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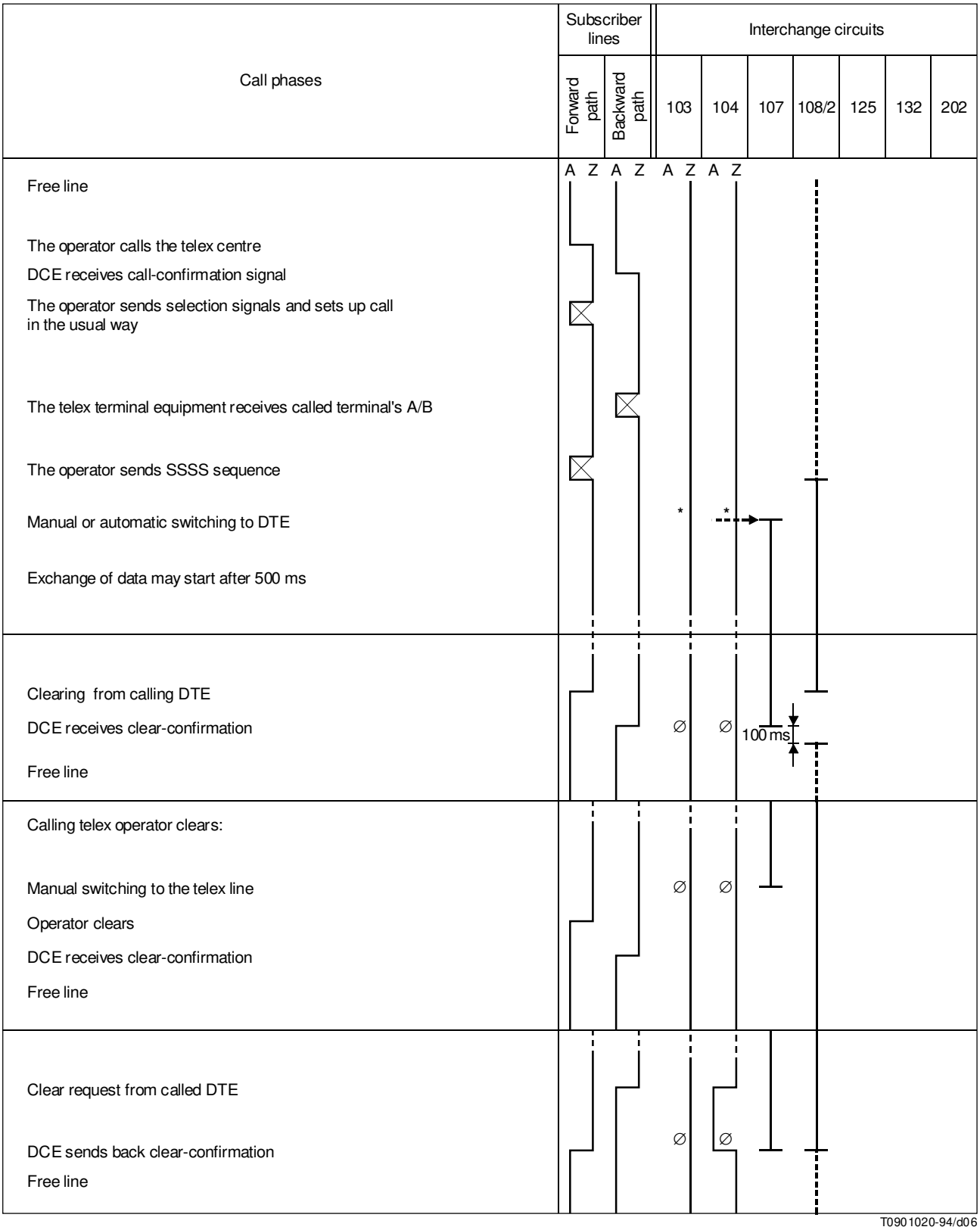
Annex C

Teleprinter + DTE

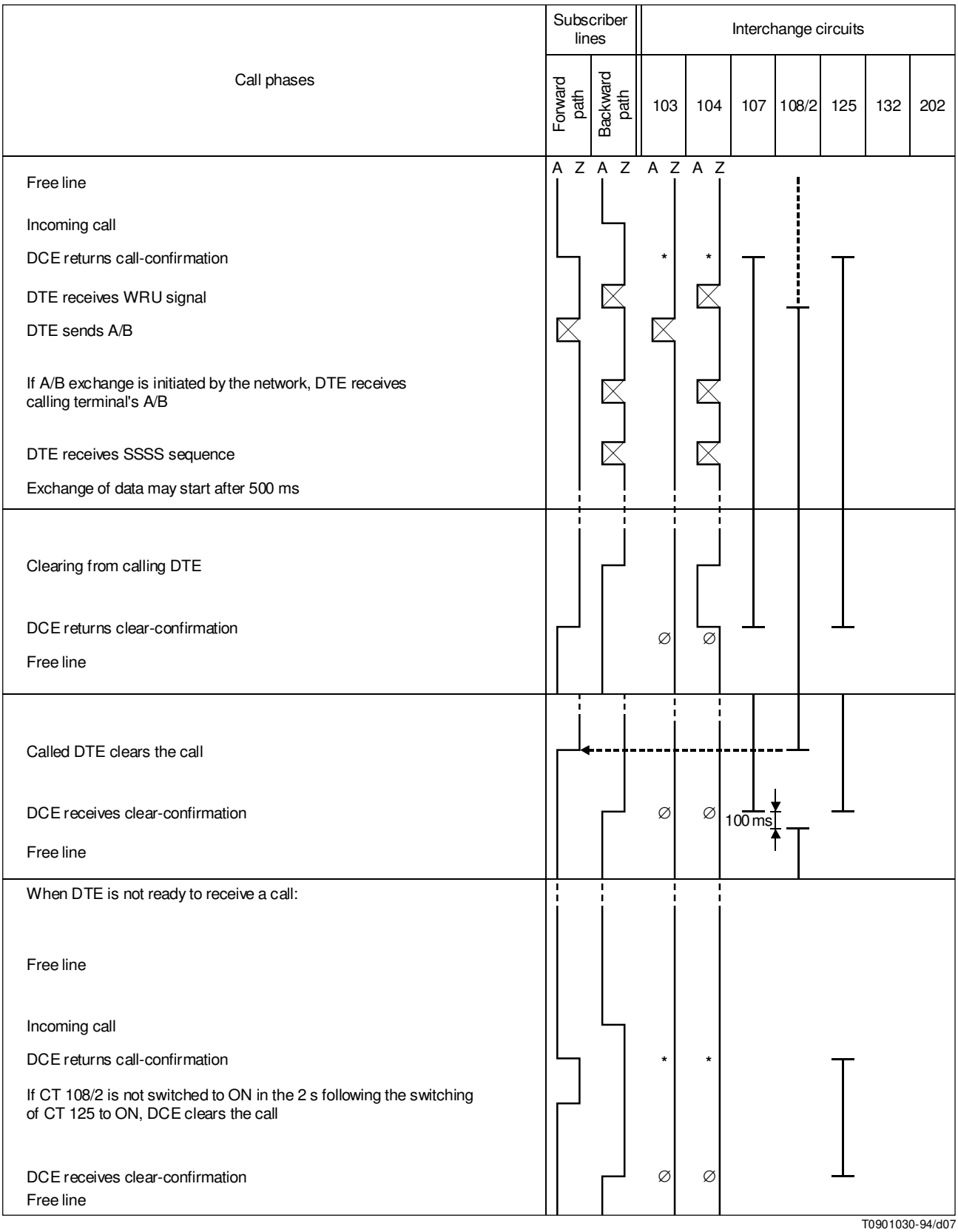
(Manual call with manual or automatic switching to DTE)
(This annex forms an integral part of this Recommendation)



Annex D

Answering by DTE

(This annex forms an integral part of this Recommendation)

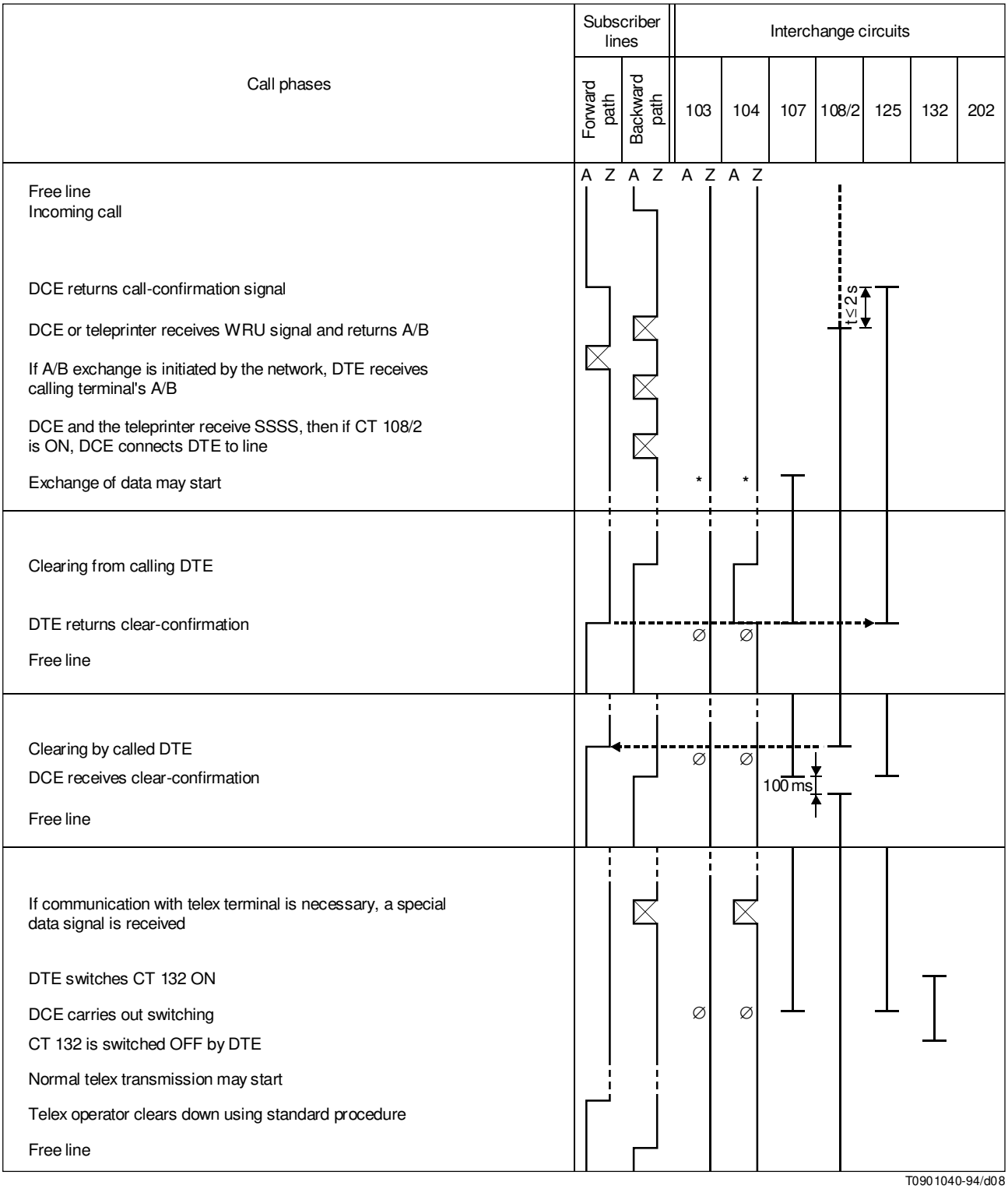


Annex E

Teleprinter answering

(With automatic switching to DTE)

(This annex forms an integral part of this Recommendation)



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References

[1] CCITT Recommendation *List of definitions for interchange circuits between data terminal equipment and data circuit terminating equipment*, Rec. V.24.

[2] CCITT Recommendation *Standardization of dials and dial pulse generators for the international telex service*, Rec. U.2.

[3] CCITT Recommendation *Electrical characteristics for unbalanced double-current interchange circuits*, Rec. V.28.

[4] CCITT Recommendation *Electrical characteristics for unbalanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications*, Rec. V.10.

[5] CCITT Recommendation *Interconnection of private teleprinter networks with the telex network*, Rec. F.71.

[6] CCITT Recommendation *Reactions by automatic terminals connected to the telex network in the event of ineffective call attempts or signalling incidents*, Rec. U.40.