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STANDARDIZATION SECTOR
OF ITU

SERIES Q: SWITCHING AND SIGNALLING

Specifications of Signalling System No. 7 – ISDN supplementary services

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# Stage 3 description for call offering supplementary services using Signalling System No. 7: Explicit Call Transfer

ITU-T Recommendation Q.732.7

(Previously CCITT Recommendation)

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**ITU-T RECOMMENDATION Q.732.7**

# STAGE 3 DESCRIPTION FOR CALL OFFERING SUPPLEMENTARY SERVICES USING SIGNALLING SYSTEM No. 7: EXPLICIT CALL TRANSFER


## Summary

This Recommendation defines the essential functions, procedures and messages of the ISUP protocol required for the provisioning to ISDN users of the Explicit Call Transfer supplementary service, which enables a user who has two calls, each of which can be an incoming call or an outgoing call to connect together the other users in the two calls into one call.



## Source

ITU-T Recommendation Q.732.7 was prepared by ITU-T Study Group 11 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 9th of July 1996.

## FOREWORD

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In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

## 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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## CONTENTS

**Recommendation Q.732.7**

# STAGE 3 DESCRIPTION FOR CALL OFFERING SUPPLEMENTARY SERVICES USING SIGNALLING SYSTEM No. 7: EXPLICIT CALL TRANSFER

*(Geneva, 1996)*

## 7 Explicit call transfer

### 7.1 Introduction

#### 7.1.1 Scope

The **explicit call transfer (ECT)** enables a user who has two calls, each of which can be an incoming call or an outgoing call, to connect together the other users in the two calls into one call.

#### 7.1.2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and 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.


[1] ITU-T Recommendation I.112 (1993), *Vocabulary of terms for ISDNs*.

[2] CCITT Recommendation I.130 (1988), *Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN.*

[3] ITU-T Recommendation I.210 (1993), *Principles of telecommunication services supported by an ISDN and the means to describe them.*

[4] CCITT Recommendation I.250 (1988), *Definition of supplementary services.*

[5] CCITT Recommendation E.164 (1991), *Numbering plan for the ISDN era*.

[6] ITU-T Recommendation I.252.7[1], *Call offering supplementary services: Explicit Call Transfer*.

[7] ITU-T Recommendation Q.82.7 (1996), *Stage 2 description for call offering supplementary services: Explicit Call Transfer*.

[8] ITU-T Recommendation Q.730 (1993), *ISDN supplementary services.*

[9] ITU-T Recommendation Q.761 (1993), *Functional description of the ISDN user part of Signalling System No. 7.*

[10] ITU-T Recommendation Q.762 (1993), *General function of messages and signals of the ISDN user part of Signalling System No. 7*.

[11] ITU-T Recommendation Q.763 (1993), *Formats and codes of the ISDN user part of Signalling System No. 7.*


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[1] Presently at the stage of draft.

[12] ITU-T Recommendation Q.764 (1993), *ISDN user part signalling procedures.*

[13] ITU-T Recommendation Q.952 (1993), *Stage 3 service description for call offering supplementary services using DSS 1 – Diversion supplementary services.*

[14] ITU-T Recommendation Q.731 (1993), *Stage 3 description for number identification supplementary services using Signalling System No. 7.*

[15] ITU-T Recommendation Q.737.1 (1993), *Stage 3 description for additional information transfer supplementary services using SS No. 7: User-to-User Signalling (UUS).*

### 7.1.3 Terms and definitions

This Recommendation defines the following terms.

**7.1.3.1 user A**: The served user who invokes the ECT supplementary service.

**7.1.3.2 user B**: The other user in one of the user A's calls. By convention, in this Recommendation, it is considered that this user is the one involved in an answered call.

**7.1.3.3 user C**: The other user in another of user A's calls.

**7.1.3.4 call A-B**: The (answered) call between user A and user B.

**7.1.3.5 call A-C**: The (answered or alerting) call between user A and user C.

**7.1.3.6 call B-C**: The call between user B and user C, i.e. the call between the remote parties after ECT supplementary service has been completed.

**7.1.3.7 remote party number**: The number which identifies the remote party.

**7.1.3.8 remote party's subaddress**: The subaddress associated with the remote party.

**7.1.3.9 subaddress**: See clause 12/E.164 [5].

## 7.2 Description

### 7.2.1 General description

The ECT supplementary service enables a user (user A) to transform two of that user's calls, each of which can be an incoming call or an outgoing call, into a new call between user B and user C.

After the call transfer has occurred, each remote party involved may release the new call according to the basic call procedure as specified in 2.2/Q.764 [12].

NOTE – The new call between the remote users shall no longer be under user A's control since the served user is simultaneously disconnected (see clause 7/Q.952 [13]).

The request for ECT supplementary service shall be rejected if, as a network option (see 7.5.2.1.1.2.1), it can be determined that the resulting connection would lead into a loop in the network.

The stage 1 ITU-T definitions for the ECT supplementary service are given in Recommendation I.252.7 [6]. The stage 2 ITU-T description for the ECT supplementary service is given in Recommendation Q.82.7 [7]. The stage 3 DSS 1 ITU-T description for the ECT supplementary service is given in clause 7/Q.952 [13].

This stage 3 description of the ECT supplementary service uses ISDN User Part protocol as defined in Recommendations Q.761 [9], Q.764 [12] and Q.730 [8].

### 7.2.2 Specific terminology

See 7.1.3, Terms and definitions.

### 7.2.3 Qualifications on the applicability to telecommunication services

Qualifications on the applicability to telecommunication services can be found in 2.3/I.252.7 [6].

### 7.2.4 State definitions

No specific state definitions are required.

## 7.3 Operational requirements

### 7.3.1 Provision/withdrawal

Provision and withdrawal of the ECT supplementary service are specified in 3.1/I.252.7 [6].

### 7.3.2 Requirements on the originating network side

Not applicable.

### 7.3.3 Requirements in the network

The network supporting the ECT supplementary service procedures should have the capability to support the propagation delay and echo control procedures according to 2.6/Q.764 and 2.7/Q.764 [12], respectively.

### 7.3.4 Requirements on the destination network side

Not applicable.

## 7.4 Coding requirements

The ECT supplementary service requires the use of the following messages:

– Call progress (CPG);

– Facility (FAC); and

– Loop prevention (LOP).

The format and coding of the Facility and Call progress messages are given in Recommendation Q.763 [11], Table 45/Q.763 [11] and Table 23/Q.763 [11], respectively.

The Facility message is used according to the Service Activation procedure defined in 1.3.1/Q.730 [8]. Clause 3/Q.763 [11] gives the format of the Service activation parameter; for this description, the Feature code used in the Service activation parameter is given in Table 7-1. For this description, parameters which are relevant to the Facility message are:

– Service activation;

– Generic notification indicators;

– Call transfer number; and

– Access transport.

**Table 7-1/Q.732.7 – Feature code assigned to the Service activation parameter**

| Value | Code |
|---|---|
| Call transfer | 0 0 0 0 0 0 0 1 |

For this description, the Call progress message is used with the Event indicator subfield, in the Event information parameter (see clause 3/Q.763 [11]), set to "PROGRESS". For this description, parameters which are relevant to the Call progress message are:

– Generic notification indicators; and

– Call transfer number.

The Loop prevention message is sent in either direction when the loop prevention procedure is performed (see 7.5.2.1.1.2.1).

The message type code for the Loop prevention message is given in Table 7-2.

**Table 7-2/Q.732.7 – Loop prevention message type code**

| Message type code | Code |
|---|---|
| Loop prevention | 0 1 0 0 0 0 0 0 |

The format of the Loop prevention message is given in Table 7-3.

**Table 7-3/Q.732.7 – Loop prevention message**

| Parameter | Type (octets) | Length |
|---|---|---|
| Message type | F | 1 |
| Loop prevention indicators | O | 3 |
| Call transfer reference | O | 3 |
| Message compatibility information | O | 4 |
| Parameter compatibility information | O | 4-? |
| End of optional parameters | O | 1 |

The Message compatibility information and Parameter compatibility information parameters are included in the Loop prevention message according to 6.2.1/Q.761 and 6.2.2/Q.761 [9], respectively.

The parameters which may be conveyed, when appropriate (see 7.5), by the Facility, Call progress and Loop prevention messages are the following:

– Generic notification indicator;

– Access transport;

– Call transfer number;

– Loop prevention indicators;

– Call transfer reference.

i) *Generic notification indicator parameter*

The Generic notification indicator parameter (see also clause 3/Q.763 [11]) is used to notify one remote user that the call is now transferred to another user; it also gives an indication on the state of the new call (i.e. answered or alerting). Table 7-4 shows the value used in the Notification indicator subfield of the Generic notification parameter, for this purpose.

**Table 7-4/Q.732.7 – Notifications used in the Notification indicator subfield of the Generic notification parameter**

| Notification | Code | Call state |
|---|---|---|
| Call transfer, alerting | 1 1 0 1 0 0 1 | alerting |
| Call transfer, active | 1 1 0 1 0 1 0 | answered |

The Generic notification indicator parameter is accompanied by the Parameter compatibility information parameter, as specified in 6.2.2/Q.761 [9], in either the Facility or Call progress message. The format and codes of the Parameter compatibility information parameter is given in clause 3/Q.763 [11].

ii) *Access transport parameter*

The Access transport parameter is used to deliver the remote party's subaddress from one user (user B or user C) to the other user (user C or user B). The format of the Access transport parameter is given in clause 3/Q.763 [11].

iii) *Call transfer number parameter*

The Call transfer number parameter is used to exchange the remote party number of the users involved in the transferred call.

The parameter name code of the Call transfer number parameter is given in Table 7-5.

**Table 7-5/Q.732.7 – Call transfer number parameter code**

| Parameter name | Code |
|---|---|
| Call transfer number | 0 1 0 0 0 1 0 1 |

The format of the Call transfer number parameter is shown in Figure 7-1.

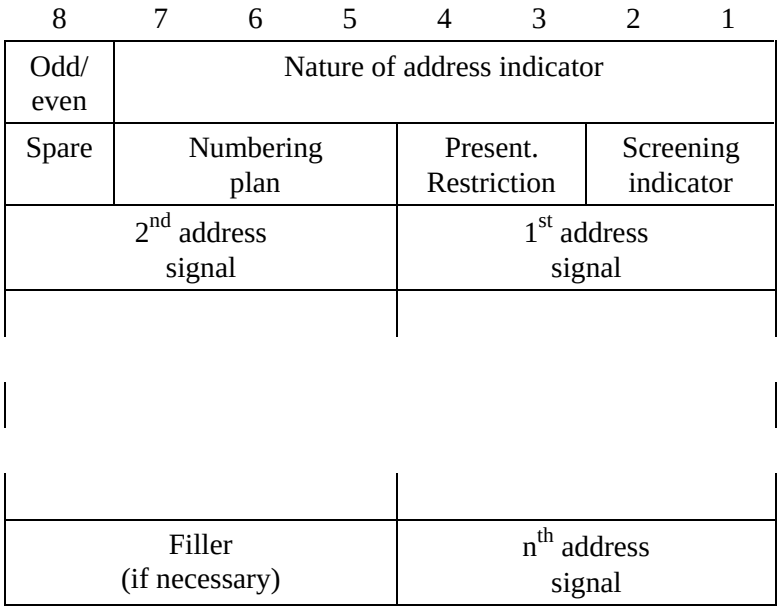



**Figure 7-1/Q.732.7 – Call transfer number parameter field**

The following codes are used in the subfields of the call transfer number parameter field.

a) *Odd/even indicator*

| | |
|---|---|
| 0 | even number of address signals |
| 1 | odd number of address signals |

b) *Nature of address indicator*

| | |
|---|---|
| 0000000 | spare |
| 0000001 | subscriber number @ |
| 0000010 | unknown @ |
| 0000011 | national (significant) number @ |
| 0000100 | international number |
| 0000101 to 1101111 | spare |
| 1110000 to 1111110 | reserved for national use |
| 1111111 | spare |

c) *Numbering plan indicator*

| | |
|---|---|
| 000 | spare |
| 001 | ISDN (Telephony) numbering plan (Recommendation E.164) |
| 010 | spare |
| 011 | Data numbering plan (Recommendation X.121) @ |
| 100 | Telex numbering plan (Recommendation F.69) @ |
| 101 | Private numbering plan @ |
| 110 | reserved for national use |
| 111 | spare |

d) *Address presentation restricted indicator*

| | |
|---|---|
| 00 | presentation allowed |
| 01 | presentation restricted |
| 10 | spare |
| 11 | spare |

e) *Screening indicator*

| | |
|---|---|
| 00 | User provided, not verified |
| 01 | User provided, verified and passed |
| 10 | User provided, verified and failed |
| 11 | Network provided |

f) *Address signal*

| | |
|---|---|
| 0000 | digit 0 |
| 0001 | digit 1 |
| 0010 | digit 2 |
| 0011 | digit 3 |
| 0100 | digit 4 |
| 0101 | digit 5 |
| 0110 | digit 6 |
| 0111 | digit 7 |
| 1000 | digit 8 |
| 1001 | digit 9 |

1010 to 1111 } spare

g) *Filler*

In case of an odd number of address signals, the filler code 0000 is inserted after the last address signal.

The Call transfer number parameter is included as an optional parameter in the Facility and Call progress messages and is accompanied by the Parameter compatibility information parameter according to 6.2.2/Q.761 [9].

iv) *Loop prevention indicators parameter*

The Loop prevention indicators parameter is sent in association with a request (or response to a request) when the loop prevention procedure is performed (see 7.5.2.1.1.2.1).

The parameter name code of the Loop prevention indicator parameter is given in Table 7-6.

**Table 7-6/Q.732.7 – Loop prevention indicators parameter code**

| Parameter name | Code |
|---|---|
| Loop prevention indicators | 0 1 0 0 0 1 0 0 |

The format of the Loop prevention indicators parameter field is shown in Figure 7-2.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| H | G | F | E | D | C | B | A |

**Figure 7-2/Q.732.7 – Loop prevention indicators parameter field**

The following codes are used in the Loop prevention indicators parameter field:

bit A: Type
0 request
1 response

If bit A equals 0 (request):

bits H-B: Spare

If bit A equals 1 (response)

bits CB: Response indicator
00 insufficient information (Note)
01 no loop exists
10 simultaneous transfer
11 spare

bits H-D: Spare

NOTE – The value "insufficient information" may be received due to interworking (see 7.7).

According to the coding described above, two possible types of Loop prevention messages are identified:

– *Loop prevention (request) message*

This is the case when bit A, in the Loop prevention indicators parameter, is set to 0.

– *Loop prevention (response) message*

This is the case when bit A, in the Loop prevention indicators parameter, is set to 1.

The Loop prevention indicators parameter is included as an optional parameter in the Loop prevention message and is accompanied by the Parameter compatibility information parameter according to 6.2.2/Q.761 [9].

v) *Call transfer reference parameter*

The Call transfer reference parameter is used to convey a reference number associated with the instance of the ECT supplementary service.

The parameter name code of the Call transfer reference parameter is given in Table 7-7.

**Table 7-7/Q.732.7 – Call transfer reference parameter code**

| Parameter name | Code |
|---|---|
| Call transfer reference | 0 1 0 0 0 0 1 1 |

The format of the Call transfer reference parameter is shown in Figure 7-3.

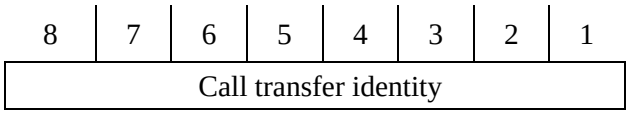



**Figure 7-3/Q.732.7 – Call transfer identity field**

The Call transfer identity is a pure binary representation of the integer (0 … 255) assigned unambiguously to the particular ECT supplementary service invocation.

The Call transfer reference parameter is included as an optional parameter in the Loop prevention message and is accompanied by the Parameter compatibility information parameter according to 6.2.2/Q.761 [9].

## 7.5 Signalling requirements

### 7.5.1 Activation/deactivation/registration

No specific signalling requirements for activation, deactivation and registration are identified.

### 7.5.2 Invocation and operation

#### 7.5.2.1 Actions at the originating local exchange

The originating local exchange is the exchange where the ECT supplementary service is invoked. The originating local exchange, for this description, is not necessarily the originating exchange for the basic call (that is, the call between user A and each remote user can be set up either by the served user or by the remote user).

##### 7.5.2.1.1 Normal operation

###### 7.5.2.1.1.1 Actions required prior to the invocation of the service

For this description, prior to the invocation of ECT supplementary service, the following call configurations are applicable:

i) Both calls (call A-B and call A-C) are answered.

NOTE 1 – In this case, the Hold supplementary service is invoked by either the served or the remote user (see clause 7/Q.952 [13]).

ii) Call A-B is answered and call A-C is alerting.

NOTE 2 – In this case, the invocation of ECT supplementary service is allowed only if user A is the calling party in the call with user C (see clause 7/Q.952 [13]).

The originating local exchange should have the capability of storing the remote party number received from the users involved in the two calls until call transfer is performed.

The remote party number may be received according to the Calling Line Identification Presentation (CLIP) or Connected Line Identification Presentation (COLP) supplementary service (see clause 3/Q.731 and clause 5/Q.731 [14], respectively). The relevant information to be stored is the following:

a) If user A is the called party for one (or both) call(s), then:

- if both the Calling party number and the Generic number parameters are received according to the Calling Line Identification Presentation supplementary service, the originating local exchange shall store only the information contained in the Generic number parameter;
- if only the Calling party number parameter is received, then the relevant information shall be stored.

b) If user A is the calling party for one (or both) call(s), then:

- if both the Connected party number and the Generic number parameters are received according to the Connected Line Identification Presentation supplementary service, the originating local exchange shall store only the information contained in the Generic number parameter;
- if only the Connected party number parameter is received, then the relevant information shall be stored.

If the Generic number parameter (additional connected number) is received with the Number incomplete indicator set to "incomplete" or the Address presentation restricted indicator set to "address not available", then no storage of this number information shall occur.

If the Connected number parameter is received with the Address presentation restricted indicator set to "address not available", then no storage of this number information shall occur.

If the Generic number parameter (additional calling party number) is received with the Number incomplete indicator set to "incomplete" or with the Address presentation restricted indicator set to "address not available", then no storage of this number information shall occur.

If the Calling party number parameter is received with the Number incomplete indicator set to "incomplete" or the Address presentation restricted indicator set to "address not available", then no storage of this number information shall occur.

#### 7.5.2.1.1.2 Actions required after the invocation of the service

If the loop prevention procedure is supported (as a network option) and if the ECT supplementary service is invoked by user A when both calls (call A-B and call A-C) are answered [see 7.5.2.1.1.1, item i)], then the originating local exchange shall act according to 7.5.2.1.1.2.1.

If the loop prevention is not supported or the ECT supplementary service is invoked by user A when one call (call A-C) is alerting [see 7.5.2.1.1.1, item ii)], then actions in 7.5.2.1.1.2.2 shall be performed (i.e. loop prevention procedure shall not be performed).

#### 7.5.2.1.1.2.1 Loop prevention procedure

When the originating local exchange receives from the access signalling system an ECT supplementary service invocation (see 7/Q.952 [13]), then the originating local exchange shall send a Loop prevention (request) message, with the Call transfer reference parameter, for both calls and shall start timer ($T_{ECT}$).

The Call transfer reference parameter shall contain an integer (0 … 255) which is unambiguously assigned to the particular ECT supplementary service invocation.

The call transfer is allowed and will be performed, according to 7.5.2.1.1.2.2:

– if the originating local exchange receives at least one Loop prevention (response) message, in response to a Loop prevention (request) message, including the Response indicator set to "no loop exists" and identical integer in the Call transfer reference parameter.

In this case, the reception of the Loop prevention (response) message shall stop timer ($T_{ECT}$).

The originating local exchange shall reject the call transfer:

– if a Loop prevention (request) message, including an identical Call transfer reference parameter, is received.

– on reception of Loop prevention (response) messages, including the Response indicator set to "simultaneous transfer" and identical integer in the Call transfer reference parameter, for both calls.

In both cases, timer ($T_{ECT}$) shall be stopped.

In addition, the originating local exchange may reject the call transfer:

– on timer expiry;

– on reception of Loop prevention (response) messages, including the Response indicator set to "insufficient information" and identical integer in the Call transfer reference parameter, for both calls. Timer ($T_{ECT}$) is stopped when both messages are received.

NOTE – In case of timer expiry or reception of Loop prevention (response) messages with the Response indicator set to "insufficient information" for both calls, it may not be possible to decide if the resulting connection would result in a loop (e.g. interworking between different signalling systems). In such cases, as a network option, the call transfer may be completed, or rejected.

#### 7.5.2.1.1.2.2 Signalling procedures to complete call transfer

Procedures to complete the call transfer depend on the call configuration applied (see 7.5.2.1.1.1).

a) *Signalling information sent to the destination local exchange*

If ECT supplementary service is invoked when call configuration i) in 7.5.2.1.1.1 is applied, the originating local exchange shall send to each destination local exchange a Facility message including the Notification indicator subfield, in the Generic notification indicator parameter, set to "call transfer, active".

If ECT supplementary service is invoked when call configuration ii) in 7.5.2.1.1.1 is applied, the originating local exchange shall send to user B's destination local exchange a Facility message including the Notification indicator subfield, in the Generic notification indicator parameter, set to "call transfer, alerting", and to user C's destination local exchange a Call progress message with the Notification indicator subfield, in the Generic notification indicator parameter, set to "call transfer, active".

In both call configurations, besides the Generic notification parameter, the Facility and Call progress messages may include the Call transfer number parameter. This depends on

whether the relevant address information is available in the originating local exchange or not (see 7.5.2.1.1.1).

b) *Signalling information received from the destination local exchange*

If call configuration i) in 7.5.2.1.1.1 is applied, the originating local exchange may receive from the corresponding destination local exchange a Facility message with the Service activation parameter set to "call transfer" and the Access transport parameter; in this case, the received message shall be transferred transparently to the other remote party.

If call configuration ii) in 7.5.2.1.1.1 is applied and the alerted user C answers the call, at the receipt of the Answer message the originating local exchange shall send a Facility message to user B's destination local exchange with the Notification indicator, in the Generic notification indicator parameter, set to "call transfer active".

In addition, the Facility message shall convey the Call transfer number parameter if the Answer message provides the remote party number.

If the Generic number parameter (additional connected number) is received with the Address presentation restricted indicator set to "presentation allowed" or "presentation restricted" and with the Number incomplete indicator set to "complete", then this number shall be mapped into the Call transfer number parameter. Otherwise the Connected number (if received and with the Address presentation restricted indicator not set to "address not available") shall be mapped into the Call transfer number parameter.

#### 7.5.2.1.1.2.3 Signalling procedures after call transfer

When call transfer is completed the originating local exchange shall act as a transit exchange for the new call between the remote users. All actions to complete call transfer are described in clause 7/Q.952 [13].

#### 7.5.2.1.1.3 Requirements related to echo control

a) *General*

The originating local exchange should have the capability to invoke echo control procedures. This is necessary in the case the total propagation delay for the two legs of the transferred call is above the value where echo control is necessary (see 2.6/Q.764 [12]).

The exchange should also have the capability of storing propagation delay information received either in the Initial address message (for incoming calls) or in the Answer/Connect message (for outgoing calls) until call release. This must be done for both legs of the transferred call.

b) *Criteria to initiate echo control procedures*

The originating local exchange has to sum up the propagation delay values of the calls A-B and A-C in order to determine the total value of the propagation delay of the transferred call.

If echo control is necessary, the exchange shall initiate echo control procedures for the transferred call (see 2.7/Q.764 [12]).

### 7.5.2.1.2 Exceptional procedures

No exceptional procedures are identified.

## 7.5.2.2 Actions at the transit exchange

### 7.5.2.2.1 Normal operation

Each message (see 7.4) received by a transit exchange shall be passed on unchanged to the following exchange.

#### 7.5.2.2.2 Exceptional procedures

No exceptional procedures are identified.

### 7.5.2.3 Actions at the outgoing international gateway exchange

#### 7.5.2.3.1 Normal operation

Each message (see 7.4) received by the outgoing international exchange shall be passed on unchanged to the following exchange except in the cases below.

If the outgoing international exchange receives from the preceding (national) exchange either a Facility message or a Call progress message including the Call transfer number parameter and if the Address presentation restricted indicator subfield, in the Call transfer number parameter, is set to "presentation restricted", before sending the message to the succeeding (international) exchange, the Call transfer number parameter can be omitted if there is no bilateral agreement for the transfer of restricted numbers between the two networks involved in the call (see clause 4/Q.731 [14]). If the parameter is not omitted, if necessary and before sending the message to the succeeding (international) exchange, the exchange shall convert the number contained in the Call transfer number parameter to an international number and shall set the Nature of address indicator subfield to "international number".

If the Facility message, or Call progress message is received from the succeeding (international) exchange including the Call transfer number parameter, the outgoing international exchange shall check whether the received country code is the network's own country code. If so, then the country code shall be removed and the Nature of address indicator shall be set to "national (significant) number".

#### 7.5.2.3.2 Exceptional procedures

No exceptional procedures are identified.

### 7.5.2.4 Actions at the incoming international gateway exchange

#### 7.5.2.4.1 Normal operation

Each message (see 7.4) received by the incoming international exchange shall be passed on unchanged to the following exchange except in the cases below.

If either a Facility message or a Call progress message is received from the preceding (international) exchange with the Call transfer number parameter, the exchange shall check if the received country code is the network's own country code. If so, the country code shall be removed and the Nature of address indicator shall be set to "national (significant) number".

If the Call transfer number parameter is received from the succeeding (national) exchange and if the Address presentation restricted indicator subfield is set to "presentation restricted", before sending the message to the preceding (international) exchange, the Call transfer number parameter can be omitted if there is no bilateral agreement for the transfer of restricted numbers between the two networks involved in the call (see clause 4/Q.731 [14]). If the parameter is not omitted, if necessary and before sending the received message to the preceding (international) exchange, the exchange shall convert the received number to an international number and shall set the Nature of address indicator subfield to "international number".

#### 7.5.2.4.2 Exceptional procedures

No exceptional procedures are identified.

#### 7.5.2.5 Actions at the destination local exchange

The destination local exchange is the exchange where the remote party(ies) is(are) connected to. The destination local exchange, for this description, is not necessarily the destination exchange for the basic call (that is, the call between user A and user B or user C can be set up either by the remote user or by the served user).

##### 7.5.2.5.1 Normal operation

If the network supports the loop prevention procedure, and if a Loop prevention (request) message is received with the Call transfer reference parameter, the destination local exchange shall return a Loop prevention (response) message including the Response indicator set to "no loop exists" and identical integer in the Call transfer reference parameter.

If the destination local exchange does not support the loop prevention procedure, then any received Loop prevention messages are discarded.

The handling of other messages related with ECT supplementary service are described in the following:

a) *Information received from the originating local exchange*

If the destination local exchange receives a Facility message, with the Service activation parameter set to "call transfer", or a Call progress message the information contained in the Generic notification indicator parameter is passed on to the access signalling system (see clause 7/Q.952 [13]).

NOTE 1 – The reception of the Facility message with the Service activation parameter set to "call transfer" shall be interpreted by the access signalling system as a request for subaddress.

If either the Facility message or Call progress message is received including the Call transfer number parameter, the relevant information is passed on to the access signalling system.

NOTE 2 – It is the function of the user-network interface to check whether the received address information must be restricted or not.

b) *Information sent to the originating local exchange*

If the exchange receives the remote party's subaddress from the access signalling system, a Facility message is sent to the originating local exchange with the subaddress information mapped into the Access transport parameter.

##### 7.5.2.5.2 Exceptional procedures

No exceptional procedures are identified.

### 7.6 Interaction with other supplementary services

#### 7.6.1 Call Waiting (CW)

No impact on ISUP.

#### 7.6.2 Call transfer services

The destination local exchange for the one instance of the ECT supplementary service can also act as the originating local exchange for another instance of the ECT supplementary service on the same call.

In such circumstances, if the local exchange (acting as a destination local exchange) receives a Loop prevention (request) message with any value of the Call transfer reference parameter, and if the local exchange (acting as an originating local exchange) is running timer $T_{ECT}$, then the local exchange

shall respond with a Loop prevention (response) message containing the same Call transfer reference parameter, and also containing the Response indicator set to "simultaneous transfer".

### 7.6.3 Connected line identification presentation (COLP)

No impact on ISUP.

### 7.6.4 Connected line identification restriction (COLR)

No impact on ISUP.

### 7.6.5 Calling Line Identification Presentation (CLIP)

No impact on ISUP.

### 7.6.6 Calling Line Identification Restriction (CLIR)

No impact on ISUP.

### 7.6.7 Closed User Group (CUG)

No impact on ISUP.

### 7.6.8 Conference calling (CONF)

No impact on ISUP.

### 7.6.9 Direct-Dialling-In (DDI)

No impact on ISUP.

### 7.6.10 Call diversion (call forwarding) services (CDIV)

#### 7.6.10.1 Call Forwarding Busy (CFB)

No impact on ISUP.

#### 7.6.10.2 Call Forwarding no Reply (CFNR)

No impact on ISUP.

#### 7.6.10.3 Call Forwarding Unconditional (CFU)

No impact on ISUP.

#### 7.6.10.4 Call Deflection (CD)

No impact on ISUP.

### 7.6.11 Line Hunting (LH)

No impact on ISUP.

### 7.6.12 Three-Party Service (3PTY)

No impact on ISUP.

### 7.6.13 User-to-User Signalling (UUS)

#### 7.6.13.1 Service 1 (UUS1)

If the ECT supplementary service is invoked while user C is alerting, the originating local exchange shall discard the User-to-user information parameter if received in the Answer message or if received, before answer, in a Release message from any remote user (see 1.1/Q.737 [15]).

#### 7.6.13.2 Service 2 (UUS2)

If the ECT supplementary service is invoked while user C is alerting, the originating local exchange shall discard all the User-to-user information messages received from the remote user (see 1.2/Q.737 [15]) until the answer message is received.

#### 7.6.13.3 Service 3 (UUS3)

When the ECT supplementary service is invoked all User-to-user information messages received from one remote party are discarded by the originating local exchange until ECT is completed.

For the originating local exchange, ECT can be considered as completed when:

– the Facility message is sent to user B's and C's destination local exchange, in case ECT is invoked when both calls are answered [see 7.5.2.1.1.2.2 item a)];

– the Answer message is received from user C, in case ECT is invoked during alerting [see 7.5.2.1.1.2.2 item b)].

### 7.6.14 Multiple Subscriber Number (MSN)

No impact on ISUP.

### 7.6.15 Call hold (HOLD)

No impact on ISUP.

### 7.6.16 Advice of Charge (AOC)

No impact on ISUP.

### 7.6.17 Sub-addressing (SUB)

No impact on ISUP.

### 7.6.18 Terminal Portability (TP)

No impact on ISUP.

### 7.6.19 Completion of Calls to Busy Subscriber (CCBS)

No impact on ISUP.

### 7.6.20 Malicious Call Identification (MCID)

No impact on ISUP.

### 7.6.21 Reverse charging (REV)

No applicable interaction at this time.

### 7.6.22 Multi-Level Precedence and Preemption (MLPP)

No impact on ISUP.

### 7.6.23 Private Numbering Plan (PNP)

No applicable interaction at this time.

### 7.6.24 International Telecommunication Charge card

No applicable interaction at this time.

## 7.7 Interaction with other networks

No particular requirements are needed when peer-to-peer interworking (see 2.4.1/Q.761 [9]) takes place between two exchanges that support different versions of the ISUP protocol.

NOTE – If received, the Call progress message, containing the Generic notification indicator parameter, is discarded by a Q.767 exchange (this is because the Call progress message is discarded by a Q.767 exchange as it is sent during alerting in the forward direction of the call). The Facility message is always discarded in case of interworking with Q.767.

If either the Facility or the Call progress messages, containing the Generic notification indicator parameter, are received by a *Blue Book* exchange, they may be discarded or passed on according to the appropriate *Blue Book* procedures.

In case call control interworking between ISUP '92 and protocols that do not support the notification mechanism (e.g. PSTN) takes place, the interworking exchange shall discard the Facility and Call progress messages.

In case call control interworking between ISUP '92 supporting the loop prevention procedure and protocols that do not support the loop prevention procedure takes place, then at the reception of a Loop prevention (request) message, with the Call transfer reference parameter, the interworking exchange shall return a Loop prevention (response) message with the indication "insufficient information" and identical Call transfer reference parameter.

Independent of whether peer-to-peer or call control interworking takes place, the call shall be completed according to the basic call procedure described in Recommendation Q.764 [12].

In case user A is located in a private ISDN and invokes ECT supplementary service, the public local exchange which interfaces the private network may receive from the access signalling system a notification information (i.e. "call transfer, active" or "call transfer alerting"); this information shall be mapped into the Generic notification indicator parameter and sent in a Facility or Call progress message to the relevant remote party depending on the state of each call, as described in 7.5.2.1.1.

If the public local exchange supports the loop prevention procedure, then the information received in any Loop prevention messages is passed on to the access signalling system and vice versa.

All other information received from the access signalling system, such as the remote party number, the subaddress, shall be mapped into the Call transfer number and Access transport parameters, respectively, and sent to the relevant party.

## 7.8 Signalling flows

Signalling information flows for the ECT supplementary service are shown in Figures 7-2 through Figure 7-5.

These figures include indication of both DSS 1 and ISUP signalling flows. The DSS 1 messages are included for illustrative purpose only.

The contents of DSS 1 and ISUP messages is not complete. The contents of messages are only shown to the extent they have significance for the understanding of the procedure.

Figure 7-4 shows the ECT invocation when both calls, A-B and A-C, are answered.

Figure 7-5 shows the ECT invocation when call A-B is answered and call A-C is alerting.

Figure 7-6 shows the ECT invocation in the case the served user is located in a private network (private ISDN) as well as one of the remote users (user C).

Figure 7-7 shows the case when one remote party (user B) is located inside a private ISDN.

NOTE – The Loop prevention procedure is not considered in these figures.

The following abbreviations are used in the diagrams:

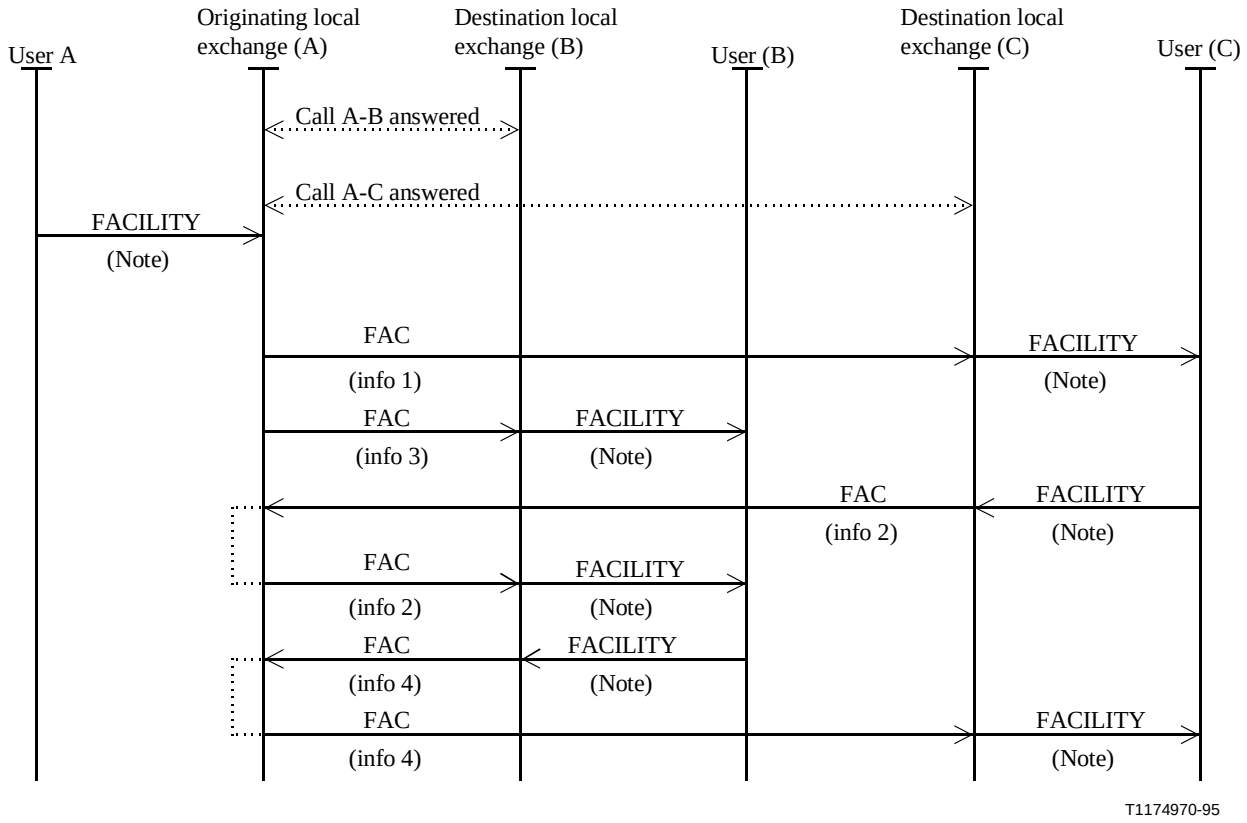
ANM Answer
CPG Call progress
FAC Facility

### 7.9 Parameter value (timers)

For this description, timer $T_{ECT}$ is in the originating local exchange as shown in Table 7-8.

**Table 7-8/Q.732.7 – New timer identified for the Loop prevention procedure**

| Symbol | Time-out value | Cause for initiation | Normal termination | At expiry |
|---|---|---|---|---|
| $T_{ECT}$ | 2-6 sec | When LOP (request) message, with the Call transfer reference parameter, is sent | – At the receipt of LOP (response) message, with "no loop exists" indication and identical Call transfer reference parameter<br>– At the receipt of LOP (response) messages, with "simultaneous transfer" and identical Call transfer reference parameter<br>– At the receipt of LOP (request) message with identical Call transfer reference parameter<br>– At the receipt of LOP (response) messages with "insufficient information" indication and identical Call transfer reference parameter, for both calls | Call transfer may be rejected |




info 1: The Generic notification indicator parameter is included with the Notification indicator subfield set to "call transfer, active".
The Call transfer number parameter is included if user B's remote party number is available (see 7.5.2.1.1).

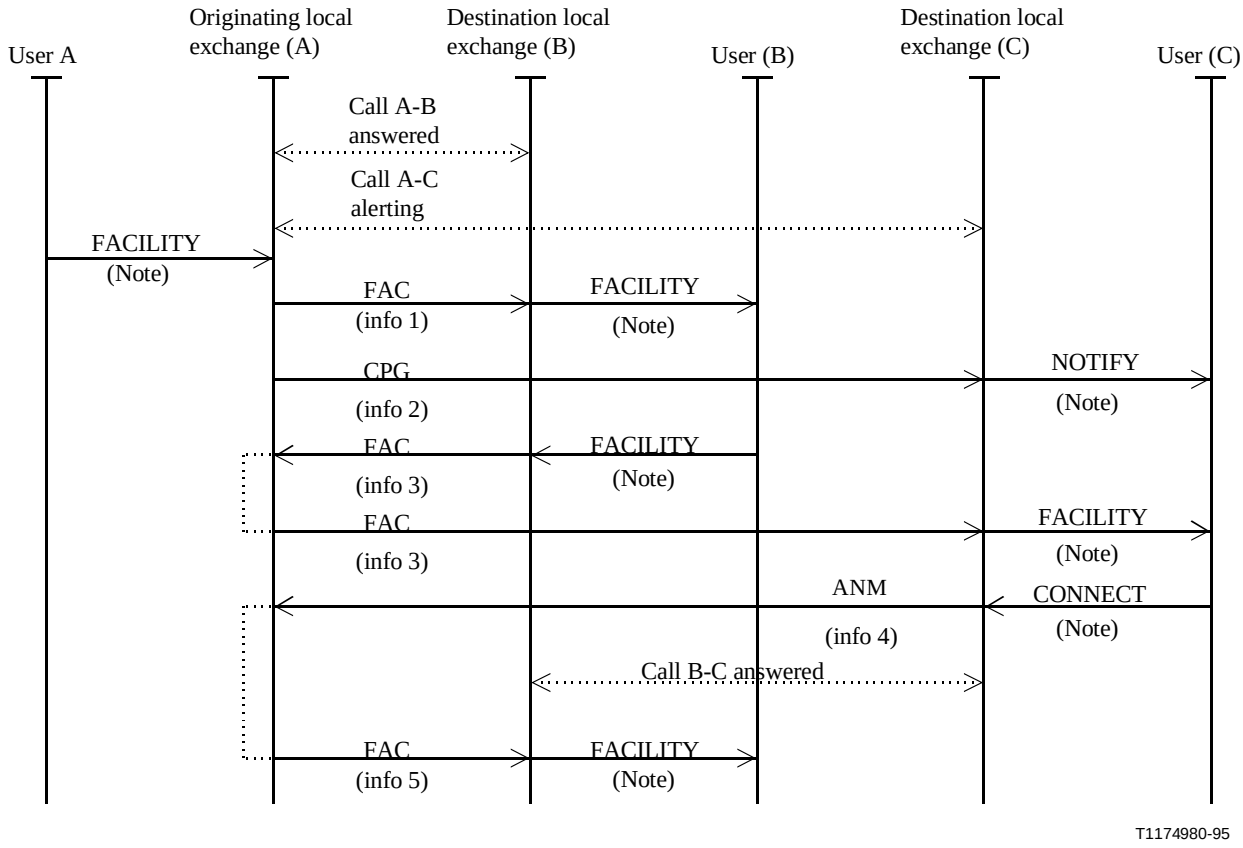
info 2: User C's subaddress, received from the access signalling system, is included in the Access transport parameter and transferred to user B.

info 3: The Generic notification indicator parameter is included with the Notification indicator subfield set to "call transfer, active".
The Call transfer number parameter is included if user C's remote party number is available (see 7.5.2.1.1).

info 4: User B's subaddress, received from the access signalling system, is included in the Access transport parameter and transferred to user C.

NOTE – See clause 7/Q.952 [13].

**Figure 7-4/Q.732.7 – ECT invocation when both calls (calls A-B and A-C) are answered**




info 1: The Generic notification indicator parameter is included with the Notification indicator subfield set to "call transfer, alerting".
The Call transfer number parameter is included if user C's remote party number is available (see 7.5.2.1.1.1).

info 2: The Generic notification indicator parameter is included with the Notification indicator subfield set to "call transfer, active".
The Call transfer number parameter is included if user B's remote party number is available (see 7.5.2.1.1.1).

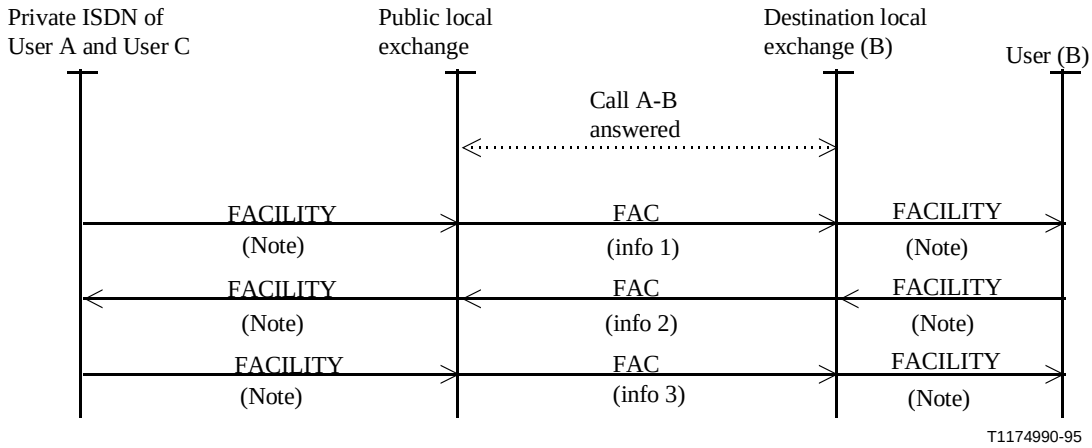
info 3: User B's subaddress, received from the access signalling system, is included in the Access transport parameter and transferred to user C.

info 4: User C's connected line identity (see 7.5.2.1.1.1) and subaddress, received from the access signalling system, can be included.

info 5: The Generic notification indicator parameter is includd with the Notification indicator subfield set to "call transfer, active".
The Call transfer number parameter is included if user C's connected line identity is available (see 7.5.2.1.1.1).
User C's subaddress, if received in the Answer message, is included in the Access transport parameter.

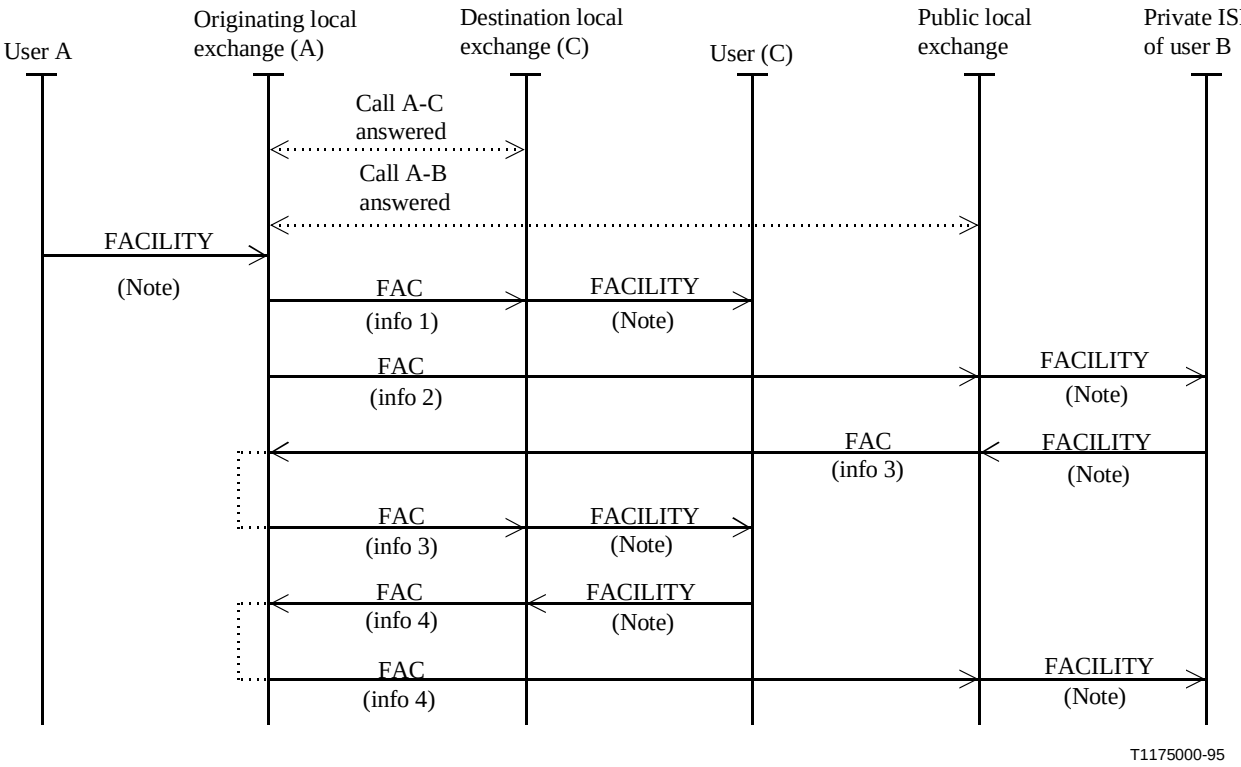
NOTE – See clause 7/Q.952 [13].

**Figure 7-5/Q.732.7 – ECT invocation when one call (call A-B) is answered and one call (call A-C) is alerting**




info 1: The Generic notification indicator parameter is included with the Notification indicator subfield set to "call transfer, active".
The Call transfer number parameter is included if user C's remote party number is received from the access signalling system.
info 2: User B's subaddress, received from the access signalling system, is included in the Access transport parameter.
info 3: User C's subaddress, received from the access signalling system, is included in the Access transport parameter.
NOTE – See clause 7/Q.952.

**Figure 7-6/Q.732.7 – ECT invocation when the served user (user A) and one remote party (user C) belong to a private ISDN**




info 1: The Generic notification indicator parameter is included with the Notification indicator subfield set to "call transfer, active".
The Call transfer number parameter is included if user B's remote party number is available (see 7.5.2.1.1).

info 2: The Generic notification indicator parameter is included with the Notification indicator subfield set to "call transfer, active".
The Call transfer number parameter is included if user C's remote party number is available (see 7.5.2.1.1).

info 3: User B's subaddress, received from the access signalling system, is included in the Access transport parameter and transferred to user C.

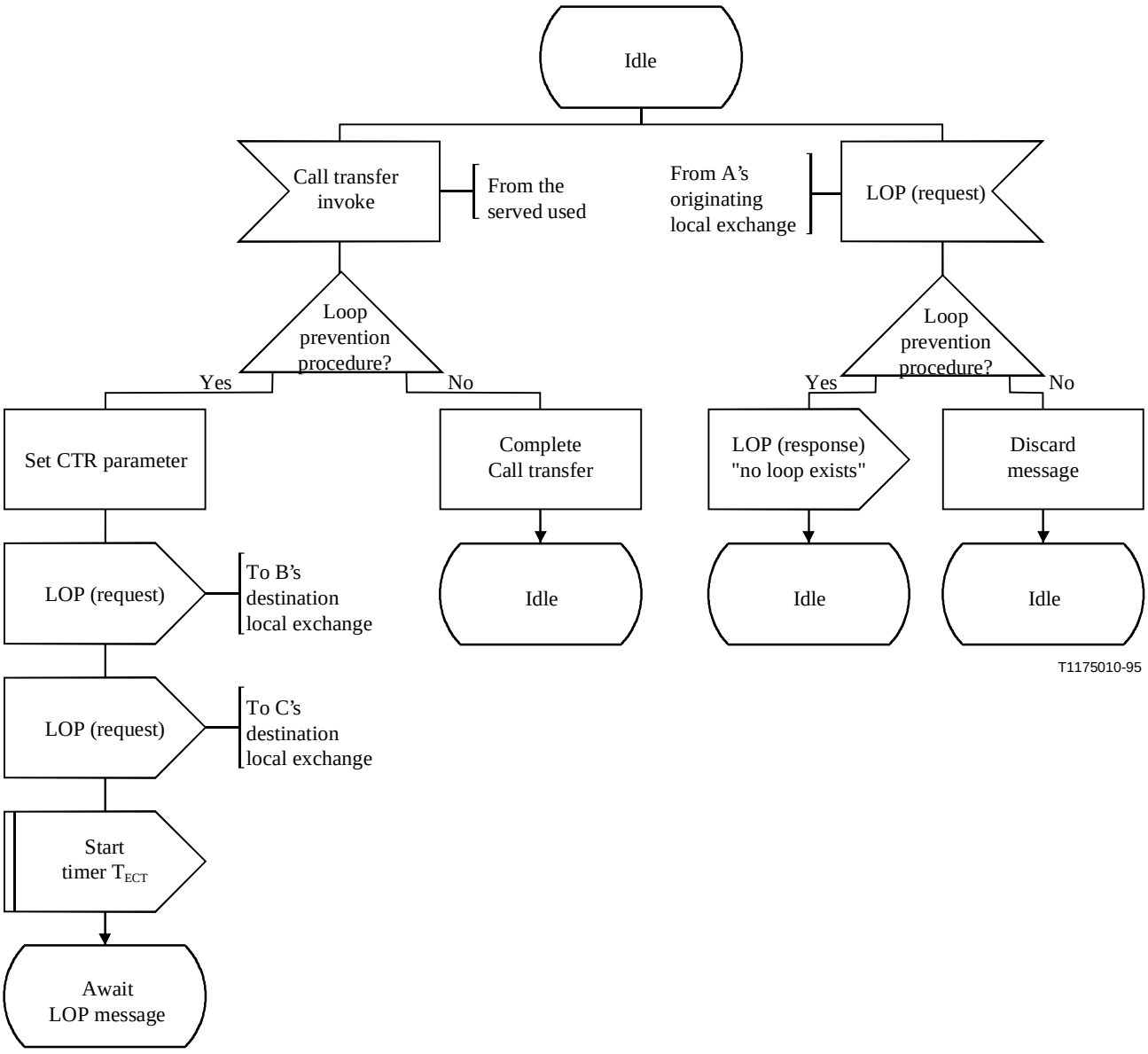
info 4: User C's subaddress, received from the access signalling system, is included in the Access transport parameter and transferred to user B.

NOTE – See clause 7/Q.952.

**Figure 7-7/Q.732.7 – ECT invocation when one remote user (user B) belongs to a private ISDN**

ANNEX A

Figure A.1 shows the dynamic behaviour of the loop prevention procedure as described in 7.5.2.1.1.2.1, 7.5.2.5.1 and 7.6.2.




CTR Call transfer reference parameter
LOP Loop prevention message

**Figure A.1/Q.732.7 (sheet 1 of 2) – SDL for Loop prevention procedure performed in the originating/destination local exchange**

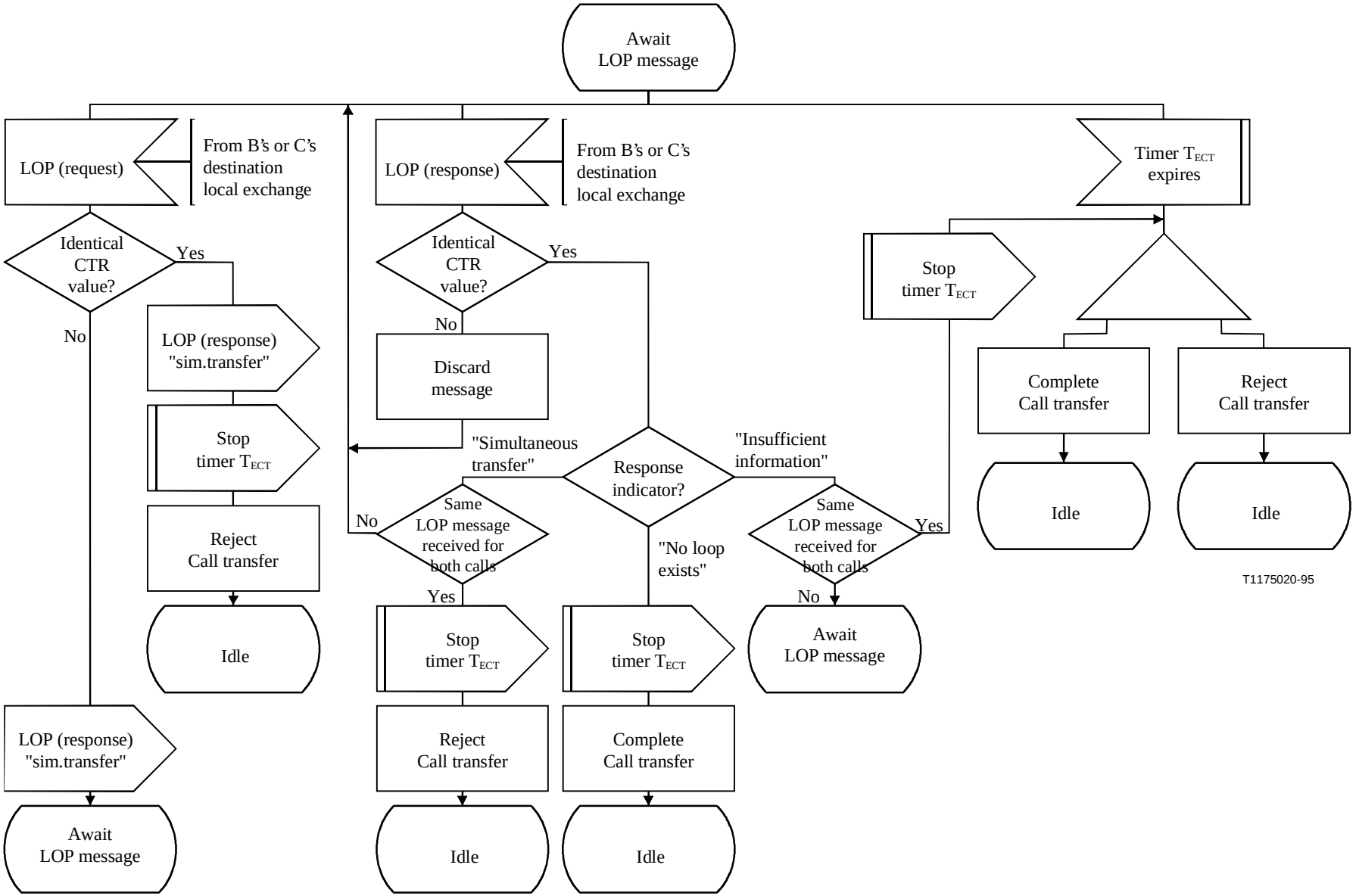



**Figure A.1/Q.732.7 (sheet 2 of 2) – SDL for Loop prevention procedure performed in the orginating/destination local exchange**

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