



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.732.2-5

(12/99)

SERIES Q: SWITCHING AND SIGNALLING

**Specifications of Signalling System No. 7 – ISDN
supplementary services**

**Stage 3 description for call offering
supplementary services using signalling
system No. 7: Call diversion services**

Q.732.2 – Call Forwarding Busy (CFB)

Q.732.3 – Call Forwarding No Reply (CFNR)

Q.732.4 – Call Forwarding Unconditional (CFU)

Q.732.5 – Call Deflection (CD)

ITU-T Recommendation Q.732.2-5

(Previously CCITT Recommendation)

ITU-T Q-SERIES RECOMMENDATIONS
SWITCHING AND SIGNALLING

SIGNALLING IN THE INTERNATIONAL MANUAL SERVICE	Q.1–Q.3
INTERNATIONAL AUTOMATIC AND SEMI-AUTOMATIC WORKING	Q.4–Q.59
FUNCTIONS AND INFORMATION FLOWS FOR SERVICES IN THE ISDN	Q.60–Q.99
CLAUSES APPLICABLE TO ITU-T STANDARD SYSTEMS	Q.100–Q.119
SPECIFICATIONS OF SIGNALLING SYSTEMS No. 4 AND No. 5	Q.120–Q.249
SPECIFICATIONS OF SIGNALLING SYSTEM No. 6	Q.250–Q.309
SPECIFICATIONS OF SIGNALLING SYSTEM R1	Q.310–Q.399
SPECIFICATIONS OF SIGNALLING SYSTEM R2	Q.400–Q.499
DIGITAL EXCHANGES	Q.500–Q.599
INTERWORKING OF SIGNALLING SYSTEMS	Q.600–Q.699
SPECIFICATIONS OF SIGNALLING SYSTEM No. 7	Q.700–Q.849
General	Q.700
Message transfer part (MTP)	Q.701–Q.709
Signalling connection control part (SCCP)	Q.711–Q.719
Telephone user part (TUP)	Q.720–Q.729
ISDN supplementary services	Q.730–Q.739
Data user part	Q.740–Q.749
Signalling System No. 7 management	Q.750–Q.759
ISDN user part	Q.760–Q.769
Transaction capabilities application part	Q.770–Q.779
Test specification	Q.780–Q.799
Q3 interface	Q.800–Q.849
DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1	Q.850–Q.999
PUBLIC LAND MOBILE NETWORK	Q.1000–Q.1099
INTERWORKING WITH SATELLITE MOBILE SYSTEMS	Q.1100–Q.1199
INTELLIGENT NETWORK	Q.1200–Q.1699
SIGNALLING REQUIREMENTS AND PROTOCOLS FOR IMT-2000	Q.1700–Q.1799
BROADBAND ISDN	Q.2000–Q.2999

For further details, please refer to ITU-T List of Recommendations.

ITU-T RECOMMENDATION Q.732.2-5

STAGE 3 DESCRIPTION FOR CALL OFFERING SUPPLEMENTARY SERVICES USING SIGNALLING SYSTEM No. 7: CALL DIVERSION SERVICES

Summary

This Recommendation defines the essential functions, procedures and messages required for the transportation of call diversion information.

Source

ITU-T Recommendation Q.732.2-5 was revised by ITU-T Study Group 11 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on 3 December 1999.

FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. 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, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

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.

INTELLECTUAL PROPERTY RIGHTS

The ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. The ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

© ITU 2000

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the ITU.

CONTENTS

	Page
2.1 Introduction.....	1
2.1.1 Scope	1
2.1.2 References.....	1
2.1.3 Terms and definitions	2
2.1.4 Abbreviations.....	3
2.2 Description.....	4
2.2.1 General description.....	4
2.2.2 Specific terminology.....	4
2.2.3 Qualification on the applicability to telecommunication services.....	4
2.2.4 State definitions	4
2.3 Operational requirements.....	5
2.3.1 Provision/withdrawal.....	5
2.3.2 Requirements on the originating network side	6
2.3.3 Requirements in the network.....	6
2.3.4 Requirements on the terminating network side	6
2.4 Coding requirements.....	6
2.4.1 Messages.....	7
2.4.2 Parameters	8
2.5 Signalling requirements	9
2.5.1 Activation/deactivation/registration	9
2.5.2 Invocation and operation	9
2.6 Interactions with other supplementary services	18
2.6.1 Call Waiting (CW).....	18
2.6.2 Call transfer services.....	18
2.6.3 Connected Line Identification Presentation (COLP).....	18
2.6.4 Connected Line Identification Restriction (COLR).....	18
2.6.5 Calling Line Identification Presentation (CLIP).....	18
2.6.6 Calling Line Identification Restriction (CLIR).....	18
2.6.7 Closed User Group (CUG)	18
2.6.8 Conference calling (CONF).....	19
2.6.9 Direct Dialling-In (DDI).....	19
2.6.10 Call diversion services.....	19
2.6.11 Line Hunting (LH).....	19
2.6.12 Three Party Service (3PTY)	19
2.6.13 User-to-User Signalling (UUS)	19
2.6.14 Multiple Subscriber Number (MSN).....	19
2.6.15 Call hold (HOLD).....	19
2.6.16 Advice of Charge (AOC).....	19

	Page
2.6.17 Sub-addressing (SUB)	19
2.6.18 Terminal Portability (TP)	19
2.6.19 Completion of Calls to Busy Subscriber (CCBS).....	19
2.6.20 Malicious Call Identification (MCID).....	20
2.6.21 Reverse charging (REV).....	20
2.6.22 Multi-level Precedence and Preemption (MLPP).....	20
2.6.23 Private Numbering Plan (PNP).....	20
2.6.24 International telecommunication charge card.....	20
2.7 Interactions with other networks.....	20
2.7.1 Interactions with networks not providing any call diversion information.....	20
2.7.2 Interactions with private ISDNs	20
2.8 Signalling flows	20
2.9 Parameter values (timers)	34
2.10 Dynamic description	34

Recommendation Q.732.2-5**STAGE 3 DESCRIPTION FOR CALL OFFERING SUPPLEMENTARY SERVICES
USING SIGNALLING SYSTEM No. 7: CALL DIVERSION SERVICES***(revised in 1999)***Q.732.2 Call forwarding busy****2.1 Introduction**

This Recommendation describes the stage 3 of the call offering supplementary service for the Integrated Services Digital Network (ISDN), by means of the signalling system No. 7 ISDN user part (ISUP).

2.1.1 Scope

The **diversion supplementary service** comprises the following services:

- Call Forwarding Busy (CFB);
- Call Forwarding No Reply (CFNR);
- Call Forwarding Unconditional (CFU);
- Call Deflection (CD).

The **call forwarding busy (CFB) supplementary service** permits a served user to have the network send all incoming calls, or just those associated with a specific basic service, which meet busy condition and are addressed to the served user's ISDN number to another number. The served user's originating service is unaffected. The busy condition may be either network determined or user determined.

The **call forwarding no reply (CFNR) supplementary service** permits a served user to have the network send all incoming calls, or just those associated with a specific basic service, which meet no reply and are addressed to the served user's ISDN number to another number. The served user's originating service is unaffected.

The **call forwarding unconditional (CFU) supplementary service** permits a served user to have the network send all incoming calls, or just those associated with a specific basic service, addressed to the served user's ISDN number to another number. The served user's originating service is unaffected. If this service is activated, calls are forwarded no matter what the condition of the termination.

The **call deflection (CD) supplementary service** allows the served user to respond to an incoming call offered by the network by requesting redirection of that call to another number specified in the response. This redirection is only allowed before the called user has answered the call. It may occur immediately as a response to the DSS1 set-up message of the access or during the alerting phase.

2.1.2 References

The following ITU-T 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 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*.

**Documents**

Document Sharing Hub

Recommendation Q.732.2-5 (12/99)

1

- [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 I.252 (1988), *Call offering supplementary services.*
- [6] CCITT Recommendation I.252.2 (1992), *Call offering supplementary services: Call forwarding busy.*
- [7] CCITT Recommendation I.252.3 (1992), *Call offering supplementary services: Call forwarding no reply.*
- [8] CCITT Recommendation I.252.4 (1992), *Call offering supplementary services: Call forwarding unconditional.*
- [9] CCITT Recommendation I.252.5 (1992), *Call offering supplementary services: Call deflection.*
- [10] CCITT Recommendation Q.80 (1988), *Introduction to stage 2 service descriptions for supplementary services.*
- [11] ITU-T Recommendation Q.82.2 (1993), *Stage 2 description for call offering supplementary services: Call forwarding.*
- [12] ITU-T Recommendation Q.730 (1999), *ISDN user part supplementary services.*
- [13] ITU-T Recommendations Q.731.3 to Q.731.5 (1993), *Stage 3 description for number identification supplementary services using signalling system No. 7.*
- [14] ITU-T Recommendation Q.761 (1999), *Signalling system No. 7 – ISDN user part – Functional description.*
- [15] ITU-T Recommendation Q.762 (1999), *Signalling system No. 7 – ISDN user part – General functions of messages and signals.*
- [16] ITU-T Recommendation Q.763 (1999), *Signalling system No. 7 – ISDN user part – Formats and codes.*
- [17] ITU-T Recommendation Q.764 (1999), *Signalling system No. 7 – ISDN user part – Signalling procedures.*
- [18] ITU-T Recommendation Q.952 (1993), *Stage 3 service description for call offering supplementary services using DSS 1 – Diversion supplementary services.*
- [19] ITU-T Recommendation Q.115 (1999), *Logic for the control of echo control devices.*

2.1.3 Terms and definitions

This Recommendation defines the following terms.

2.1.3.1 calling user: The user who initiated the call that is diverted. All procedures at the calling user are provided as part of the basic service; the calling user need not have subscribed to any specific diversion supplementary service.

2.1.3.2 call forwarding may occur indicator: Information sent in the backward direction indicating that call forwarding may occur, depending on the response received (or lack thereof) from the called party.

2.1.3.3 deflected-to user: The user, to which the call shall be deflected.

2.1.3.4 forwarded-to user: The user to which a call is to be forwarded. All procedures at the forwarded-to user are provided as part of the basic service; the forwarded-to user need not have subscribed to any specific call forwarding supplementary service (e.g. CFU, CFB, CFNR).

2.1.3.5 network determined user busy (NDUB) is specified (see 2.1.4/I.221):

- if all the appropriate user-network interface information channels are busy and either the network does not support the offering of additional calls beyond the number of appropriate channels, or the maximum number of such additional calls has been reached; or
- if the maximum number of total calls supported at the given subscriber's interface(s) has been reached.

2.1.3.6 notification subscription option: Information sent in the backward direction indicating that the diversion with or without redirection number can be presented to the calling user.

2.1.3.7 redirecting indicator: Information sent in either direction indicating whether the call has been diverted or rerouted and whether or not presentation of redirection information to the calling party is restricted.

2.1.3.8 redirecting number: Information sent in the forward direction when a call is diverted, indicating the number from which the call was last diverted.

2.1.3.9 redirecting reason: Information sent in either direction indicating, in the case of calls undergoing redirection, the reason why the call has been redirected.

2.1.3.10 redirection counter: Information sent in either direction indicating the number of redirections which have occurred on a call.

2.1.3.11 redirection number: Information sent in the backward direction indicating the number towards which the call must be redirected or has been forwarded.

2.1.3.12 redirection number restriction indicator: Information sent in the backward direction indicating whether the diverted-to user allows the presentation of his number.

2.1.3.13 served user: The user of a particular ISDN number requesting calls to that number to be diverted. This user may also be referred to as the forwarding, deflecting or diverting user, or the called user. This user shall have subscribed to the specific call diversion supplementary service requested.

2.1.3.14 user determined user busy (UDUB): Is specified for the case that the network offers the call to the subscriber and if no compatible terminal responds "positively" but one or more compatible terminal responds "user busy". This condition will be determined when the response-to-call offering time-out occurs.

2.1.4 Abbreviations

This Recommendation uses the following abbreviations:

ACM	Address Complete Message
CD	Call Deflection
CFB	Call Forwarding Busy
CFNR	Call Forwarding No Reply
CFU	Call Forwarding Unconditional
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction



CPG	Call Progress Message
DSS1	Digital Subscriber Signalling System No. 1
IAM	Initial Address Message
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
Nb	Number
REL	Release Message
RLC	Release Complete

2.2 Description

2.2.1 General description

For a given ISDN number, the diversion supplementary services (including options) may be subscribed to for each basic service to which the user(s) of the number subscribe(s), or collectively for all the basic services to which the user(s) subscribe(s).

The served user can request a different diverted-to number for each basic service subscription parameter value and call diversion supplementary service to which he has subscribed.

The deflection functions are implemented in the network and they are invoked by the terminal on a call-by-call basis.

A terminating exchange that determines that call diversion may occur will not discard the set-up information until the exchange determines that call diversion will not occur in this particular instance.

The served users' originating service is unaffected.

The stage 1 descriptions of the call diversion supplementary services are given in Recommendations I.252.2, I.252.3, I.252.4 and I.252.5. The stage 2 descriptions are given in Recommendations Q.82.2 and Q.82.3.

The stage 3 DSS1 description is given in clauses 2 to 5/Q.952. This stage 3 description of call diversion supplementary services uses the ISDN user part protocol as defined in Recommendations Q.761-Q.764 and Q.730.

2.2.2 Specific terminology

See 2.1.3, Terms and definitions.

2.2.3 Qualification on the applicability to telecommunication services

See Recommendations I.252.2, I.252.3, I.252.4 and I.252.5.

2.2.4 State definitions

No specific state definitions are required.

2.3 Operational requirements

2.3.1 Provision/withdrawal

Call forwarding unconditional, Call forwarding busy, Call forwarding no reply and Call deflection shall be provided after pre-arrangement with the service provider.

Each diversion supplementary service can be withdrawn separately by the service provider at the subscriber's request or for administrative reasons.

The four supplementary services can be offered separately with subscription options. Options apply separately to each basic service subscribed to on each ISDN number. For each subscription option, only one value can be selected. These subscription options form part of the call diversion profile for the served user.

- The subscription options for the CFU supplementary service are included in Recommendation I.252.4.
- The subscription options for the CFB supplementary service are included in Recommendation I.252.2.
- The subscription options for the CFNR supplementary service are included in Recommendation I.252.3.
- The subscription options for the CD supplementary service are included in Recommendation I.252.5.

These requirements are summarized in Table 2-1.

Table 2-1/Q.732.2 – Subscription options for call diversion supplementary services

Subscription options	Value	Applicability
Served user receives notification that a call has been forwarded	No _____ Yes	CFU CFB CFNR
Calling user receives notification that his call has been diverted (forwarded or deflected)	No _____ Yes, with diverted-to user number _____ Yes, without diverted-to user number	CFU CFB CFNR CD
Served user receives reminder notification on outgoing calls that forwarding is currently activated	No _____ Yes	CFU CFB CFNR
Served user releases his/her number to diverted-to user	Do not release diverting number information _____ Release diverting number information	CFU CFB CFNR CD

The following network provider options are available for the supplementary services:

- The network provider options for the CFU supplementary service are included in Recommendation I.252.4.
- The network provider options for the CFB supplementary service are included in Recommendation I.252.2.
- The network provider options for the CFNR supplementary service are included in Recommendation I.252.3.

- The network provider options for the CD supplementary service are included in Recommendation I.252.5.

These requirements are summarized in Table 2-2.

Table 2-2/Q.732.2 – Network provider options for call diversion supplementary services

Network provider option	Value	Applicability
Served user call retention on invocation of diversion (forwarding or deflection)	Retain call to the served user until alerting begins at the diverted-to user (option A)	CFNR CD
	Clear call to the served user on invocation of call diversion (option B)	
Served user call retention when forwarding is rejected at forwarded-to user	Continue to alert the forwarding user (Note 1)	CFNR
	No action at the forwarding user (Note 2)	
Served user call retention when deflection is rejected	Continue to alert the deflecting user (Note 3)	CD
	No action at the deflecting user (Note 4)	
Total number of all diversions for each call	Maximum number of diverted connections (with an upper limit of 5)	CFU CFB CFNR CD
Call forwarding on no reply timer	Timer duration shall be a service provider option	CFNR
NOTE 1 – This applies to the retention of the call at invocation of call forwarding. NOTE 2 – This applies to the clearing call option on invocation of call forwarding. NOTE 3 – This option shall only be used for deflection after alerting has begun. NOTE 4 – This applies to the clearing call option on invocation of call deflection.		

2.3.2 Requirements on the originating network side

Not applicable.

2.3.3 Requirements in the network

No specific requirements are needed in the network.

2.3.4 Requirements on the terminating network side

Not applicable.

2.4 Coding requirements

Recommendation Q.763 defines the messages and parameters for this supplementary service. The following messages and parameters are used to support the call diversion supplementary service.

The generic notification indicator, the redirection number restriction indicator and the call diversion information parameter are accompanied by the parameter compatibility information parameter. The procedures for the compatibility are defined in Recommendation Q.764.

2.4.1 Messages

Address complete message

Optional backward call indicators

Generic notification indicators

Redirection number

Redirection number restriction indicator

Call diversion information

Answer message

Redirection number

Redirection number restriction indicator

Call progress message

Optional backward call indicators

Event indicator

Generic notification indicator

Call diversion information

Redirection number

Redirection number restriction indicator

Connect message

Redirection number restriction indicator

Initial address message

Redirecting number

Redirection information

Original called number