TTC STANDARDS

JJ-20.24

VoIP (IP-QSIG) Protocol Specifications for IP Intranet Networks

Private Integrated Services Network (PISN) - Signalling Protocols for IP-based Connections as Inter-PINX Connections

Version 2

Established on April 23, 2003

THE TELECOMMUNICATION TECHNOLOGY COMMITTEE

TTC Telecommunication Technology Committee

Introduction

This document provides the TTC original Standard formulated and put into effect by the Technical Assembly. It contains unabbreviated version of ‘JJ-‘ Standard, which has not been defined as international standard.

In case of dispute, the original to be referred is the Japanese edition of the text.

We trust that greater understanding of TTC Standards by a wider range of users will further contribute to the development of telecommunications.

April 23, 2003

CONTENTS

<Reference>

1. Preface

This standard specifies the signalling protocols used at Q reference points applicable to IP-based corporate communication networks. While the installation of IP voice networks is in progress, it is desirable that VoIP protocols that will not impair their conventional serviceability and facilitate their implementation be developed. The purpose of the publication of this standard is to enable early execution of field tests and to develop highly practical signalling protocols reflecting the results of such tests at a speed called for by the age.

2. Background of the Standard

As provisions for multimedia communication systems using IP packets, the TTC approved the JT-H323 based on the ITU-T Recommendation H.323 in January 1998. The JT-H323 describes terminals and other entities that offer multimedia communication services on packet networks where service quality is not assured. Being a protocol for multimedia terminals, the JT-H323 procedure has caused complicated protocol procedures to be generated, and has become a protocol very hard to use for users. In an exchange, in particular, which handles more than one call at a time, the JT-H323 protocol, positioned as a terminal (TE) interface, is hard to handle for inter-PINX connections. In contrast, if QSIG (JS-11572) information having an affinity to PINXs is positioned on the IP network, the above-mentioned problem will be alleviated. In the light of user needs, the voice of users that they want to use IP networks (LANs and WANs) with simple communication protocols has intensified. With the background described above, a study was made of protocols that would realize VoIP services by making full use of the (IP) infrastructure of a corporate network, and the results of the study are summarized in this standard.

3. Revision History

Edition	Date of establishment	Description
1st Edition	May 30, 2002	Established
2nd Edition	April 23, 2003	Revision Added the T.38 FAX protocol.

4. Industrial Property

The status of the submission of the "IPR Licensing Statement" relating to this standard can be viewed on the TTC web site.

5. Miscellaneous

(1) Reference recommendations, standards, and the like

ISO/IEC Standard : ISO/IEC11579-1

TTC Standards : JT-H323, JT-H225.0, JT-H245, JS-11572, JS-11582, JT-Q931-a, JT-T38

(2) Relations with other domestic standards

There are no relations with other domestic standards.

6. Standard Preparation Divisions

First Edition : Working Group 1, Technical Committee 3

Second Edition : Enterprise Network Working Group

1. Scope

This standard defines the signalling procedures and protocols for scenario management at the C reference point between private integrated services network exchanges (PINXs) connected over an Internet protocol (IP) network.

The reference point is defined in the ISO/IEC 11579-1.

This standard uses the general-purpose procedures for the control of the additional services that are defined in the JS-11582 and that operate on the signalling protocols for basic circuit-switched call control defined in the JS-11572.

If a combination of this standard and the JT-Q931-a is desired, the occurrences of "JS-11572" in the text may be read as "JT-Q931-a" in accordance with the provisions of Appendix I of the JS-11578.

2. Conformance

For conformance to this standard, PINXs should satisfy the requirements in Appendix A, "Protocol Implementation Conformance Statement (PICS) Forms".

3. Bibliography

The standards listed below contain the portions to be incorporated into this standard by way of reference. At the time of the issue of this standard, the standards listed below were in effect. All standards are subject to revision and, therefore, those who are concerned with this standard should investigate to see if the latest editions of these standards are applicable and should endeavor to apply them to this standard after a consensus is reached. IEC and ISO members maintain a register of effective standards at all times.

ISO/IEC 14475:1998, Telecommunications and information exchange between systems -- Private Integrated Services Network -- Architecture and scenarios for Private Integrated Services Networking

ISO/IEC 11579-1:1994, Telecommunications and information exchange between systems -- Private integrated services network -- Part 1: Reference configuration for PISN Exchanges (PINX)

JS-11572:1995, Telecommunications and information exchange between systems -- Private Integrated Services Network

(circuit mode bearer services) - Layer 3 Specifications for inter-PBX signalling protocol -

JS-11582:1998, Telecommunications and information exchange between systems -- Private Integrated Services Network (Generic Functional Protocol for the support of supplementary services)

ITU-T Rec. Q. 931:1993

ISDN user-network interface layer 3 specification for basic call control, CCITT Recommendation T.50:1988, International Reference Alphabet (Formerly International Alphabet No. 5

Note: Reference whose need is added.

4. Definitions

4.1 Channel

A means for bi-directional transport for users or a means for signalling information between two points.

4.1.1 Dc-Channel

At the C reference point between PINXs or between IVNs, this channel means IPC control information.

Note: This does not prevent other bearer capabilities of information.

4.1.2 Dq-Channel

This channel means the scenario management information between two PINX-Q reference points.

Note: Scenario management information can contain information for basic services, additional services, additional network functions, and other controls.

4.1.3 Uq-Channel

This channel means the user information at the Q reference point between PINXs.

4.2 Internet

A public IP network.

4.3 Intranet

A private IP network used as a corporate network.

4.4 Internet Protocol (IP)

The protocol specified in the RFC791.

4.5 IP Network

A public or private network representing a connectionless packet mode service based on the Internet Protocol (IP) as the network layer protocol.

Note: The Internet is a main example of a public IP network.

4.6 Circuit-Switched Network (SCN)

A PISN or public ISDN representing a connection-oriented circuit mode service.

4.7 Inter-PINX Connection (IPC)

A connection between two PINXs. For an inter-PINX connection, either the per-call origination procedure or the permanent origination procedure may be selected depending on the nature of the intervening network or the user. It is necessary to select between these two procedures appropriately.

4.8 Inter-PINX Link (IPL)

A connection at the Q reference point between two PINXs (the entire signal being included in the transfer and user information transfer means).

4.9 Intervening Network (IVN)

A general term for an actual type of the network used to make preparations for an inter-PINX connection.

4.10 Signalling Functions

4.10.1 CSIG

A general term describing signal access in inter-PINX and inter-IVN information flows (i.e., specific signalling protocols) at the C reference point.

4.10.2 QSIG

A general term describing signalling information flows (i.e., specific signalling protocols) in the range of a Dq-channel.

5. Abbreviations

C	C reference point
CSIG	Signalling information flows at the C reference point
IP	Internet Protocol
IPC	Inter-PINX connection
IPL	Inter-PINX Link
IVN	InterVening Network
MP	Mapping (functional grouping)
PICS	Protocol Implementation Conformance Statement
PISN	Private Integrated Services Network
PINX	Private Integrated Services network eXchange
Q	Q reference point
QSIG	Signalling information flows at the Q reference point
SM	Scenario Management (functional grouping)
TCP	Transmission Control Protocol
UDP	User Datagram Protocol

6. General Rule: PISN-IP-PISN Scenario Management

This standard specifies the signalling procedures for establishing, retaining, and releasing a basic call on the IP network in the interface between two PINXs. These signalling procedures are defined for the messages exchanged within the range of the signalling channel (TCP link) of an inter-PINX connection. When a basic call is established, one or more connections for user information transfer are made. These connections use the user information channel of an IPL (inter-PINX link). Throughout this standard, the term user information channel is used to indicate any channel other than signalling channels. Conceptually, the IPC is connected to the PINX at the C reference point, and contains one or more signalling channels and one or more user information channels. In reality, these channels are offered by the bearer service on the intervening network (either ISDN or non-ISDN).

6.1 Scenario Management: Mutual PINX Connection over an IP Network

A PINX is connected to an IP network with a variety of data link services (such as a leased line and dial-up connection).

The scope of this scenario management is the IP layer and higher layers, and layers 1 and 2 are not in the scope of this standard.

A C reference point is specified on an IP network between PINXs and on that as an IVN. In this scenario management, the transport layer (i.e., layer 4) of the higher IP layers (TCP, UDP, and other layers) plays a role as an IPC.

Dq and Uq channels are associated for the notification of layer 3 messages to higher IP layers.

6.1.1 CSIG on an IP network

In this scenario management, CSIG is used to establish IPCs at a C reference point. This standard is used for user information resource control. After an IPC is established, a Dq channel is allocated to a TCP-related entity, while a Uq channel is allocated to a UDP-related entity at the C reference point.

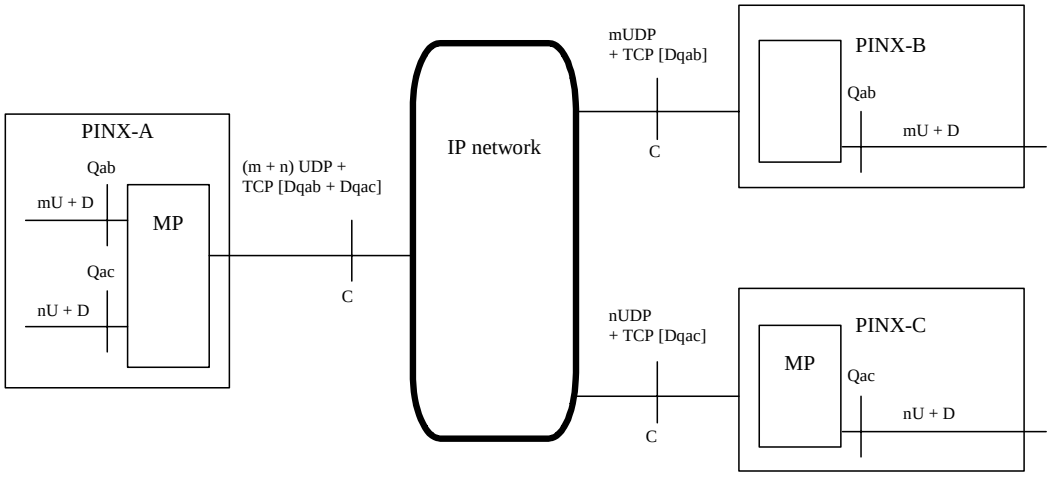


Figure 6-1/JJ-20.24 Example: Connection Model

6.1.1.1 Dq channel establishment/detachment procedures

Dq channel establishment/detachment is of two types, the per-call origination procedure and the permanent origination procedure. These two types are described below.

6.1.1.1.1 Per-call origination procedure

When a call establishment message is sent at a Q reference point, scenario management converts the called party number into an IP address. Then, through a C reference point, it establishes a TCP connection to the PINX corresponding to that IP address.

When a "RELEASE COMPLETE" message or a "RESTART" message is sent or received at the Q reference point, scenario management releases the TCP connection to the corresponding PINX at the C reference point.

If the call is released because of the expiry of the send message timer at the Q reference point, the TCP connection at the corresponding PINX is released. The TCP connection release time is not specified.

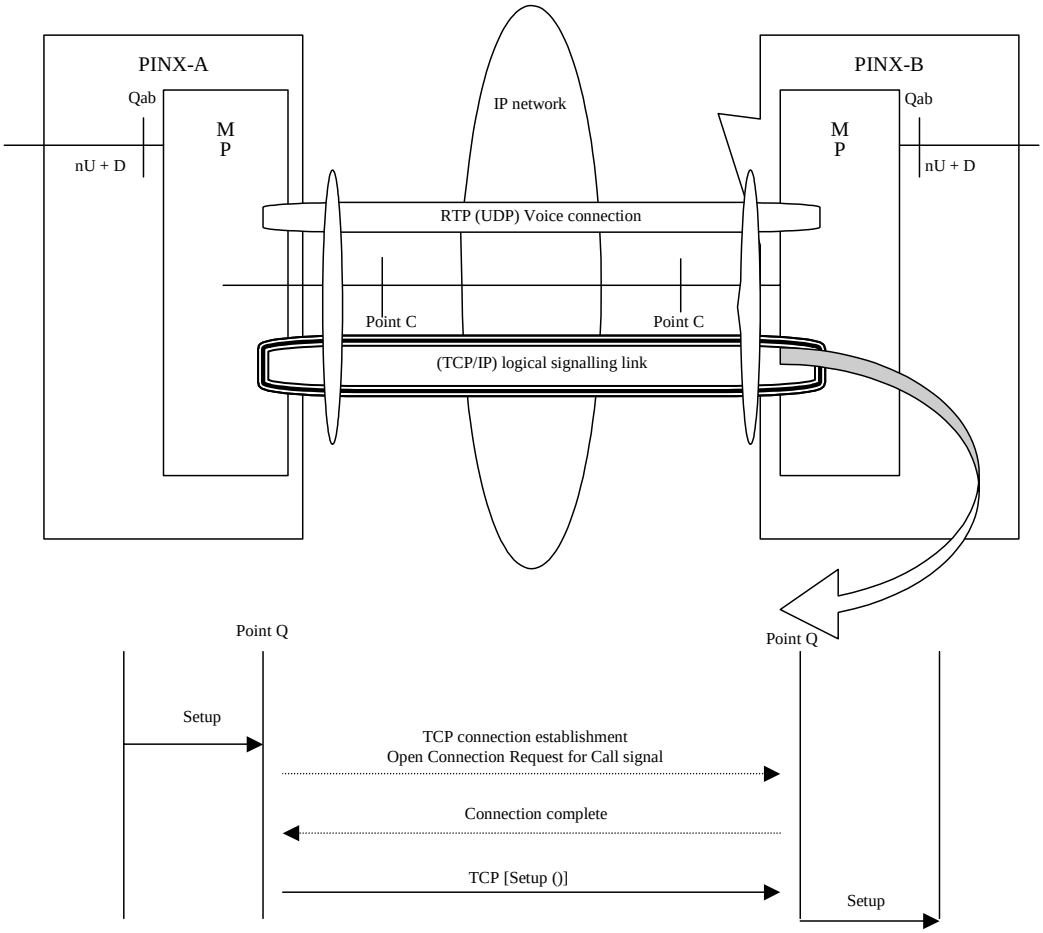


Figure 6-2/JJ-20.24 Example 1: Per-Call Origination Procedure Connection

Supplementary information: The use of this scenario management restricts the number of controllable Uq channels to one.

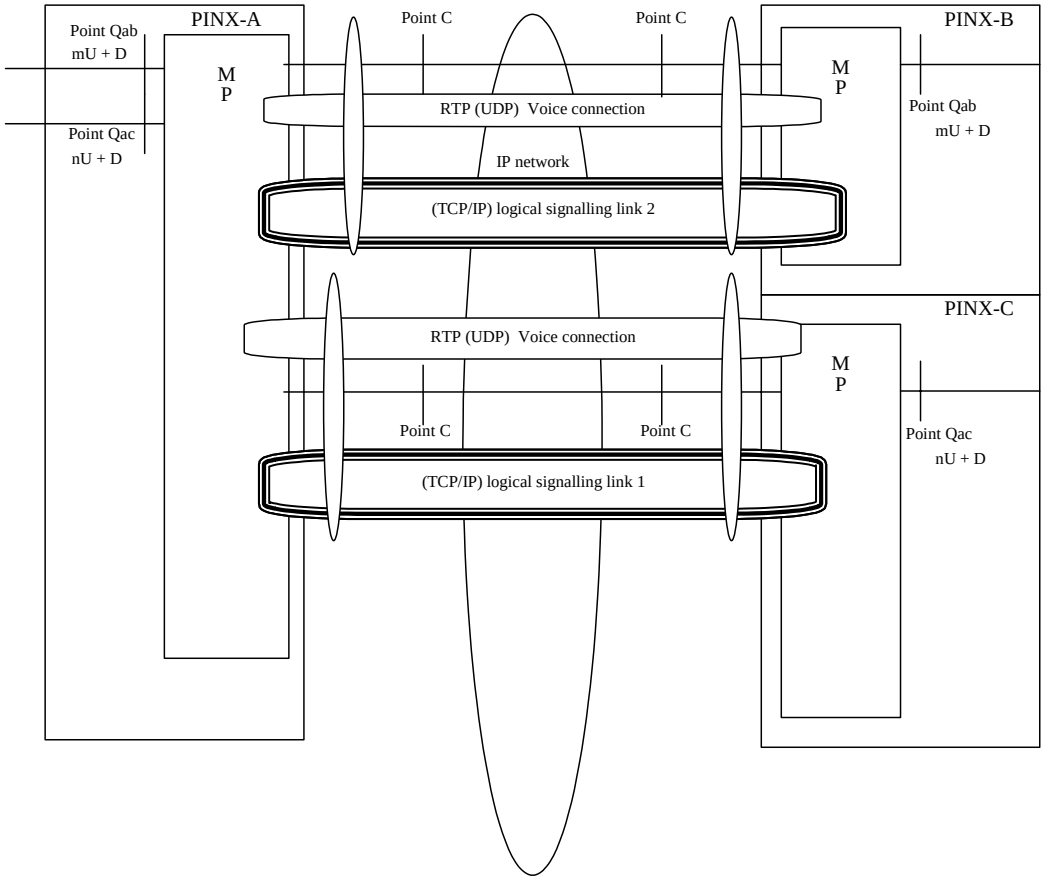


Figure 6-3/JJ-20.24 Example 2: Per-Call Origination Procedure Connection (Point-to-Multipoint Connection)

Supplementary information: The TCP port number used to generate a signalling link is a general-purpose one. Link number 1, as seen from PINX-A, may be allocated to PINX-B.

6.1.1.1.2 Permanent origination procedure

When a logical signalling link is subject to system initialization or point Q initialization, a TCP connection (logical signalling link) is automatically connected permanently. One of the features of this procedure is that more than one voice call can be controlled with a single logical signalling link.

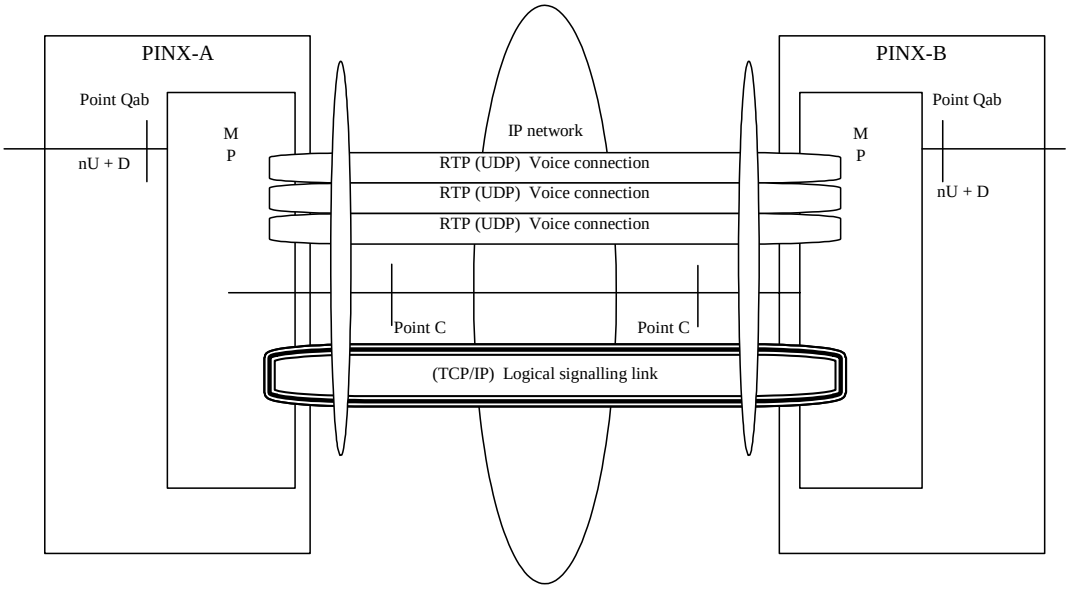


Figure 6-4/JJ-20.24 Example: Permanent Origination Procedure Connection (Point-to-Point Connection)

7. Services Offered for Call Control

Section 6.2 of the JS-11572 applies.

8. Protocol Control State

Chapter 7 of the JS-11572 applies.

9. Call Control

Chapter 8 of the JS-11572 applies.

10. General Procedures

Chapter 9 of the JS-11572 applies.

11. Call Control Procedures

Chapter 10 of the JS-11572 applies.

12. Layer Management Procedures

Chapter 11 of the JS-11572 applies.

13. Protocol Timer

Chapter 12 of the JS-11572 applies. Note, however, a sufficient timer value must be ensured for the IP network.

14. Function Definitions of Messages and Their Contents

Chapter 13 of the JS-11572 applies.

14.1 Messages for General-Purpose Procedures

Section 13.1 of the JS-11572 applies.

14.2 Messages for Call Control

Section 13.2 of the JS-11572 applies.

14.2.1 "ALERTING"

The same message information as that in Section 13.2.1 of the JS-11572 plus a user-to-user information element.

Table 14-1/JJ-20.24 Contents of "ALERTING" Message

Message type: "ALERTING"

Transfer direction: From the incoming side to the outgoing side

Information element	Reference	Type	Length
User-to-user*	15.5	O	3-*

* This area is added for the notification of media stream information, which is peculiar to VoIP.

14.2.2 "CALL PROCEEDING"

The same message information as that in Section 13.2.2 of the JS-11572 plus a user-to-user information element.

Table 14-2/JJ-20.24 Contents of "CALL PROCEEDING" Message

Message type: "CALL PROCEEDING"

Transfer direction: From the incoming side to the outgoing side

Information element	**Reference**	**Type**	**Length**
User-to-user*	**15.5**	O	**3-***

* This area is added for the notification of media stream information, which is peculiar to VoIP.

14.2.3 "CONNECT"

The same message information as that in Section 13.2.3 of the JS-11572 plus a user-to-user information element.

Table 14-3/JJ-20.24 Contents of "CONNECT" Message

Message type: "CONNECT"

Transfer direction: From the incoming side to the outgoing side

Information element	Reference	Type	Length
User-to-user*	15.5	O	3-*

* This area is added for the notification of media stream information, which is peculiar to VoIP.

14.2.4 "CONNECT ACKNOWLEDGE"

Section 13.2.4 of the JS-11572 applies.

14.2.5 "DISCONNECT"

The same message information as that in Section 13.2.5 of the JS-11572 plus a user-to-user information element.

Table 14-4/JJ-20.24 Contents of "DICONNECT" Message

Message type: "DISCONNECT"

Transfer direction: Each direction

Information element	Reference	Type	Length
User-to-user*	15.5	O	3-*

* This area is added for the notification of media stream information, which is peculiar to VoIP.

14.2.6 "INFORMATION"

The same message information as that in Section 13.2.6 of the JS-11572 plus a user-to-user information element.

Table 14-5/JJ-20.24 Contents of "INFORMATION" Message

Message type: "INFORMATION"

Transfer direction: From the outgoing side to the incoming side

Information element	**Reference**	**Type**	**Length**
User-to-user	**15.5**	O	**2-***

14.2.7 "PROGRESS"

The same message information as that in Section 13.2.7 of the JS-11572 plus a user-to-user information element.

Table 14-6 /JJ-20.24 Contents of "PROGRESS" Message

Message type: "PROGRESS"

Transfer direction: Each direction

Information element	Reference	Type	Length
User-to-user*	15.5	O	3-*

* This area is added for the notification of media stream information, which is peculiar to VoIP.

14.2.8 "RELEASE"

Section 13.2.8 of the JS-11572 applies.

14.2.9 "RELEASE COMPLETE"

Section 13.2.9 of the JS-11572 applies.

14.2.10 "SETUP"

The same message information as that in Section 13.2.10 of the JS-11572 plus a user-to-user information element.

Table 14-7 /JJ-20.24 Contents of "SETUP" Message

Message type: "SETUP"

Transfer direction: From the outgoing side to the incoming side

Information element	Reference	Type	Length
User-to-user*	15.5	O	3-*

* This area is added for the notification of media stream information, which is peculiar to VoIP.

14.2.11 "SETUP ACKNOWLEDGE"

Section 13.2.11 of the JS-11572 applies.

14.3 Messages for Layer Management

Section 13.3 of the JS-11572 applies.

14.4 Other Messages

14.4.1 "FACILITY"

Section 10.8 of the JS-11582 applies.

15. Message Formats and Coding of Information Elements

The figures and text in this chapter specify the contents of messages. In each octet, bit 1 is sent first, followed by bit 2, bit 3, bit 4, and so on. In each figure, the top octet is sent first, followed by the second, and so on.

The coding rules are as described in the ITU-T Recommendation Q.931.

If a field is extended to more than one octet, the larger the octet number, the less significant the bits. The least significant bit in the field is the one with the smallest number in the octet with the largest number in the field.

15.1 Protocol Identifier

Section 14.2 of the JS-11572 applies.

15.2 Call Reference

Section 14.3 of the JS-11572 applies.

15.3 Message Type

Section 14.4 of the JS-11572 applies.

15.4 Other Information Elements for Basic Call Control (Code Group 0)

Section 14.5 of the JS-11572 applies.

15.5 User-to-User Information Elements

User-to-user information elements are used for the notification of media stream information between PINXs. A user-to-user information element is coded as shown in Figure 15-1/JJ-20.24.

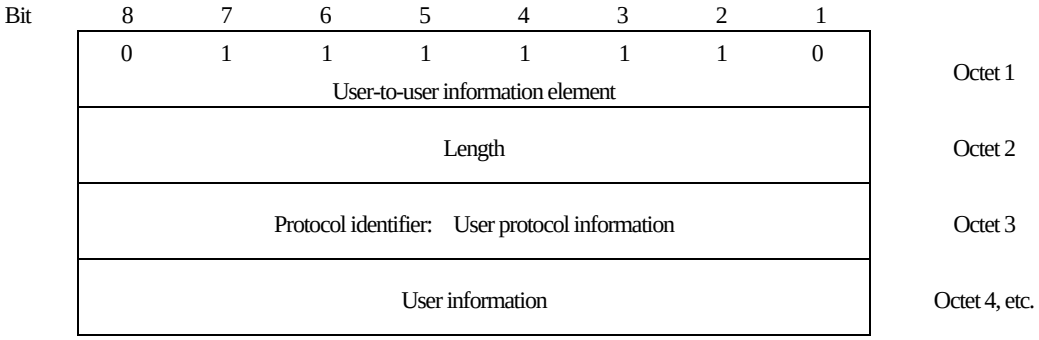


Figure 15-1/JJ-20.24 User-to-User Information Element

A protocol identifier must be coded as shown in Figure 15-2/JJ-20.24 and Table 15-1/JJ-20.24.

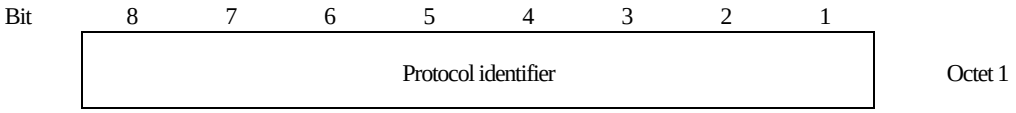


Figure 15-2/JJ-20.24 Protocol Identifier

Table 15-1/JJ-20.24 Protocol Identifier

Protocol identifier: User protocol information (Octet 1)

Bits 87654321	
01000000	Domestic standard

16. Media Stream Information

This chapter defines the media stream information necessary to establish an information channel on an IP network.

Media stream information is coded as shown in Figure 16-1/JJ-20.24.

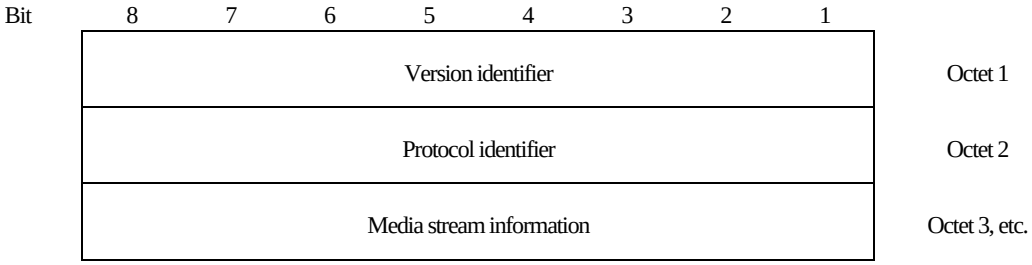


Figure 16-1/JJ-20.24 User Information Element

16.1 Version Identifier

A version identifier is used to represent the version of this standard.

A version identifier is coded as shown in Figure 16-2/JJ-20.24 and Table 16-1/JJ-20.24.

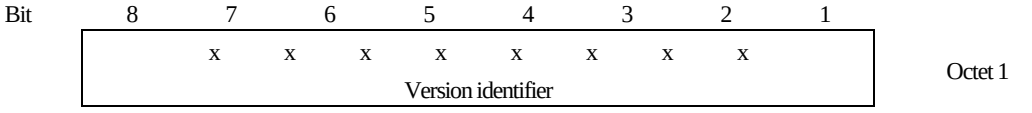


Figure 16-2/JJ-20.24 Version Identifier

Table 16-1/JJ-20.24 Version Identifier

Version identifier (Octet 1) Indicates the version of the JJ-20.24. The integer part is represented by bits 8 to 6, while the fractional part is represented in bits 5 to 1, in binary notation.

16.2 Protocol Identifier

A protocol identifier is used to represent the type of the protocol used to establish an information channel on an IP network.

A protocol identifier is coded as shown in Figure 16-3/JJ-20.24 and Table 16-2/JJ-20.24.

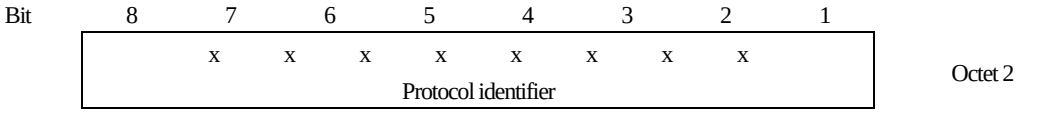


Figure 16-3/JJ-20.24 Protocol Identifier

Table 16-2/JJ-20.24　Protocol Identifier

Protocol identifier (Octet 2)	
Indicates the type of the protocol used to establish an information channel.	
Bits	
8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 0	TTC JJ-20.24
0 0 0 0 0 0 0 1	JT- H.245
0 0 0 0 0 0 1 0	IETF RFC2327
0 0 0 0 0 0 1 1	JT- H.225.0
Other than the above	Reserved

16.3　Media Stream Information

16.3.1　JJ-20.24

The media stream information in the JJ-20.24 is defined below.

Coding	Type	Reference	Maximum length
8 7 6 5 4 3 2 1			
0 0 0 0 0 0 0 1 Logical channel number	M	16.3.1.1	3
0 0 0 0 0 1 0 0 Voice bearer capability	M	16.3.1.2	4
0 0 0 0 0 1 0 1 T.38 bearer capability	O	16.3.1.6	3
0 0 0 0 0 1 1 0 T.38 protocol method	O	16.3.1.7	3
0 0 0 0 0 1 0 0 FAX rate	O	16.3.1.8	3
0 0 0 1 0 0 0 0 Receive media channel	M	16.3.1.3	21
0 0 0 1 0 0 0 1 Receive media control channel	O	16.3.1.4	21
0 1 1 0 0 0 0 0 DTMF information element	O	16.3.1.5	36

Figure 16-4/JJ-20.24　Media Stream Information Elements

16.3.1.1　Logical channel number

The logical channel number information element is used to represent the logical channel number for circuit management, and is associated with a port number.

The logical number channel information element is coded as shown in Figure 16-5/JJ-20.24 and Table 16-3/JJ-20.24.

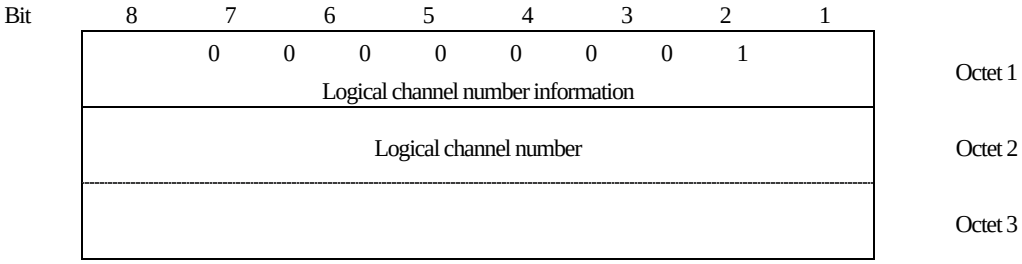


Figure 16-5/JJ-20.24　Logical Channel Number Information Element

Table 16-3/JJ-20.24　Logical Channel Number Information Element

Logical channel number (Octet 2) Indicates a logical channel number, and is managed as a pair with a port number. The length is fixed at 2 octets, and is indicated in binary notation.

16.3.1.2　Voice bearer capability

The voice bearer capability information element is used to represent a voice coding type and the payload period assumed during voice data transmission.

The voice bearer capability information element is coded as shown in Figure 16-6/JJ-20.24 and Table 16-4/JJ-20.24.

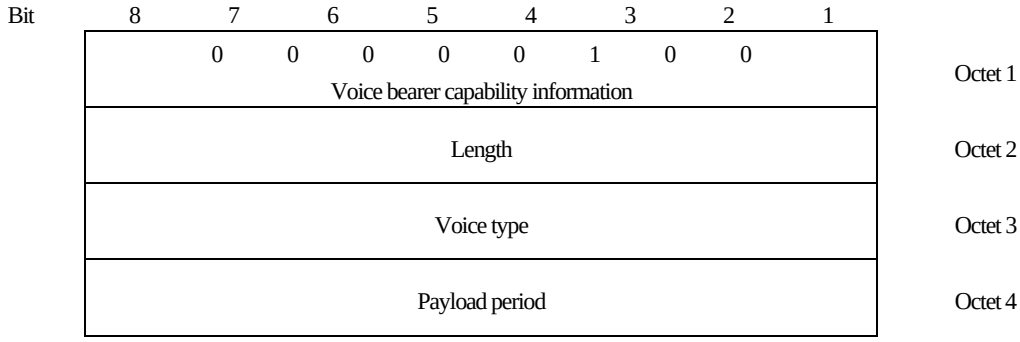


Figure 16-6/JJ-20.24　Voice Bearer Capability Information Element

Table 16-4/JJ-20.24　Voice Bearer Capability Information Element

Voice type (Octet 3) Indicates the coding type used. Bits 8 7 6 5 4 3 2 1 0 0 0 0 0 0 0 1　g711Alaw64k 0 0 0 0 0 0 1 1　g711Ulaw64k 0 0 0 0 1 0 1 0　g729 0 0 0 0 1 0 1 1　g729AnnexA 0 0 0 0 1 1 1 0　g729WannexB 0 0 0 0 1 1 1 1　g729AnnexAwAnnexB Other than the above　Reserved Payload period (Octet 4) Indicates a payload period. The size of the field is 1 octet. The period is represented in ms units, in binary notation.

16.3.1.3 Receive media channel

The receive media channel information element is used to represent the receive media channel IP type of the local station, the receive media channel address, and the receive media channel port number.

The receive media channel information element is coded as shown in Figure 16-7/JJ-20.24 and Table 16-5/JJ-20.24.

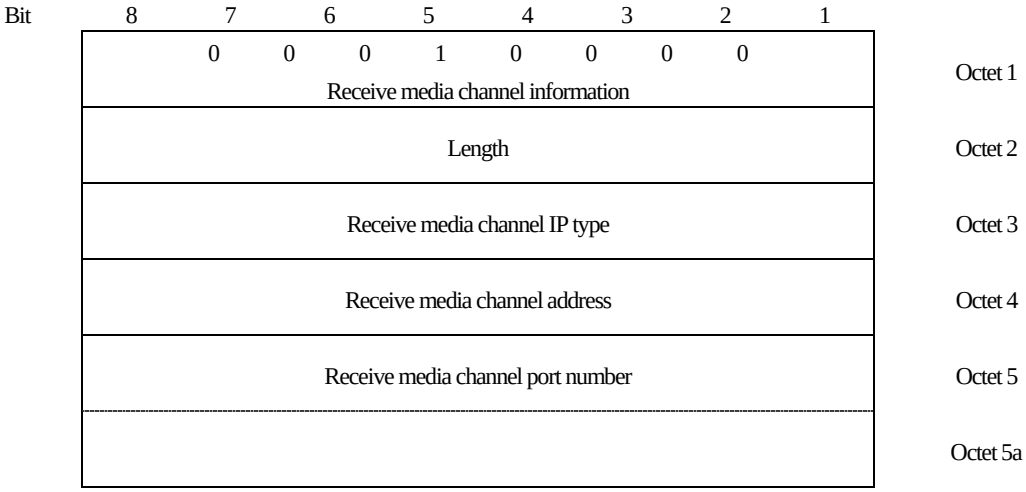


Figure 16-7/JJ-20.24 Receive Media Channel Information Element

Table 16-5/JJ-20.24 Receive Media Channel Information Element

Receive media channel IP type (Octet 3)

Indicates the type of the IP address used.

Bits 87654321	
00000000	IPv4 address
00000001	IPX address
00000010	IPv6 address
Other than the above	Reserved

Receive media channel address (Octet 4)

Indicates the address of the RTP for reception.

(1) For IPv4

An IPv4 address of 4 octets in length is represented in binary notation in octet units, starting with the highest octet.

(2) For IPX

An IPX address of 10 octets in length is represented in binary notation, as a destination node address of 6 octets in length and a destination network address of 4 octets in length.

(3) For IPv6

An IPv6 address of 16 octets in length is represented in binary notation in units of two octets, starting with the highest octets.

Receive media channel port number (Octet5)

A receive media channel port number is represented in binary notation, the size being fixed at 2 octets.

16.3.1.4 Receive media control channel

The receive media control channel information element is used to represent the receive media control channel IP type of the local station, the receive media control channel address, and the receive media control channel port number.

The receive media control channel information element is coded as shown in Figure 16-8/JJ-20.24 and Table 16-6/JJ-20.24.

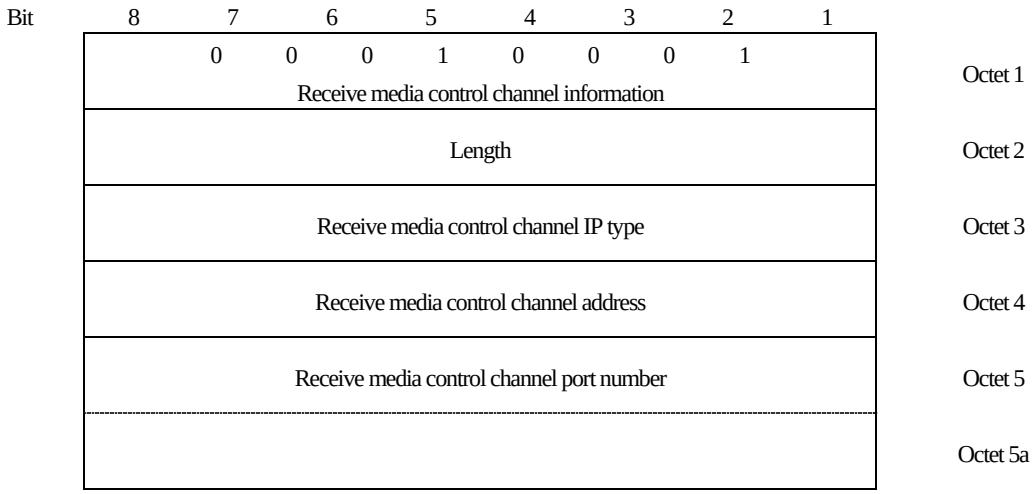


Figure 16-8/JJ-20.24 Receive Media Control Channel Information Element

Table 16-6/JJ-20.24 Receive Media Control Channel Information Element

Receive media control channel IP type (Octet 3)

Indicates the type of the IP address used.

Bits 87654321	
00000000	IPv4 address
00000001	IPX address
00000010	IPv6 address
Other than the above	Reserved

Receive media control channel address (Octet 4)

Indicates the address of a receive media control channel.

(1) For IPv4

An IPv4 address of 4 octets in length is represented in binary notation in octet units, starting with the highest octet.

(2) For IPX

An IPX address of 10 octets in length is represented in binary notation, as a destination node address of 6 octets in length and a destination network address of 4 octets in length.

(3) For IPv6

An IPv6 address of 16 octets in length is represented in binary notation in units of two octets, starting with the highest octets.

Receive media control channel port number (Octet 5)

A receive media channel port number is represented in binary notation, the size being fixed at 2 octets.

16.3.1.5 DTMF information element

This specification is the signalling information used for the conversion of a DTMF signal into a Signalling information and the notification of the information.

The DTMF information element is used to convey the SJIS codes established between PINXs.

The characters that can be used as the DTMF information element are digits 0 to 9, *, and #. The maximum length of the digit code in the table below is 34 octets.

Alphanumeric method

Bit	8	7	6	5	4	3	2	1	
	0	1	1	0	0	0	0	0	Octet 1
	DTMF information element								
	Length								Octet 2
	Digit code								Octet 3 and after

Figure 16-9/JJ-20.24 DTMF Information Element

Table 16-7/JJ-20.24 DTMF Information Element

Digit code (Octet 2)

Conforms to the SJIS code standard. Digits 0 to 9, *, and # may be used.

16.3.1.6 T.38 bearer capability

The media stream information is coded as shown in Figure 16-11/JJ-20.24 and Table 16-9/JJ-20.24.

Bit	8	7	6	5	4	3	2	1	
	0	0	0	0	0	1	0	1	Octet 1
	T.38 bearer capability information								
	Length								Octet 2
	T.38 FAX profile								Octet 3

Figure 16-10/JJ-20.24 T.38 Bearer Capability Information

Table 16-8/JJ-20.24 T.38 Bearer Capability Information

T.38 FAX profile (Octet 3)

Indicates the coding type used.

Bits

87654321	
00000001	fillBitRemoval
00000010	transcodingJBIG
00000011	transcondingMMR

16.3.1.7 T.38 protocol method

The T38 protocol method is coded as shown in Figure 16-11/JJ-20.24 and Table 16-9/JJ-20.24.

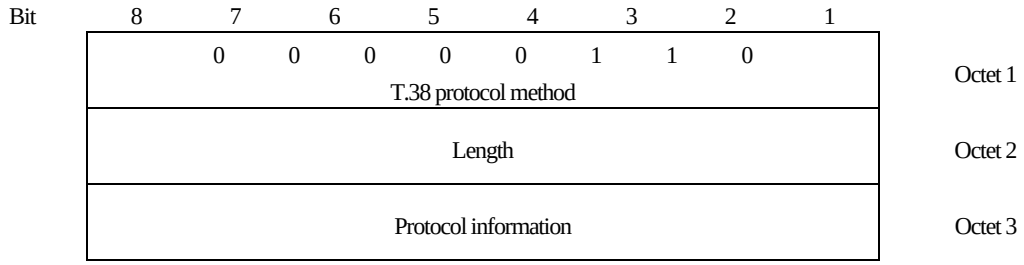


Figure 16-11/JJ-20.24 T.38 Protocol Method

Table 16-9/JJ-20.24 T.38 Protocol Method

T.38 protocol profile (Octet 3)	
Indicates the coding type used.	
Bits	
87654321	
00000001	UDP
00000010	TCP

UDP is mandatory as the send/receive procedures for sending IFP.

16.3.1.8 FAX rate

A FAX rate is coded as shown in Figure 16-12/JJ-20.24 and Table 16-10/JJ-20.24.

The specified rate must be the maximum rate at which communication is possible.

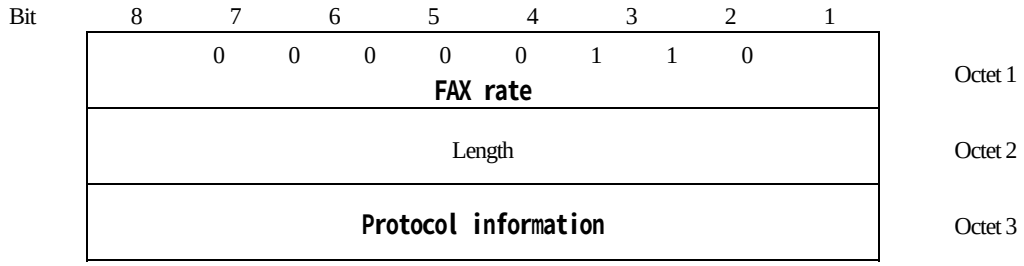


Figure 16-12/JJ-20.24 FAX Rate

Table 16-10/JJ-20.24 FAX Rate

FAX rate profile (Octet 3)

Indicates the coding type used.

Bits

87654321	
00000000	Undefined
00000001	2400
00000010	4800
00000011	7200
00000100	9600
00000101	12000
00000110	14400

16.3.2 If the JT-H245 protocol is used as the resource control protocol

An issue under continuous study

16.3.3 If the JT-H225.0 protocol is used as the resource control protocol

An issue under continuous study

16.3.4 If the SDP protocol is used as the resource control protocol

An issue under continuous study

17. Media Stream Information Control Procedure

The originator must place on SETUP a message for the notification of media stream information using IP-QSIG information between PINXs. (This is mandatory.) The destination side must place it on one of ALERT, CONN, PROG, and FACILITY. The destination side may place media stream information on multiple messages.

For example, if the destination side notifies of different media stream information with ALERT and CONN messages, the destination side must perform control in accordance with the media stream information contained in the CONN message sent later, and the originator must perform control in accordance with the media stream information contained in the CONN message received later.

18. Packetization

A signalling channel and an information channel are packetized as follows:

-	Signalling channel	With reliability	Well Known
-	Information channel Audio/RTP	Without reliability	Dynamic
-	Information channel Audio/RTCP	Without reliability	Dynamic

A signalling channel port must use the following:

ip-qsig 4029 (IP Q signalling protocol)

19. FAX Protocol Control Procedure

This chapter defines the signalling control procedure for operating T.38 media communication.

For an explanation of T.38, refer to the TTC Standard JT-T38.

19.1 Message Formats and an Outline of Information Element Coding

Section 16.3 of this standard applies.

19.2 Protocol Identifier

A protocol identifier must be coded as shown in Figure 19-1/JJ-20.24 and Table 19-2/JJ-20.24.

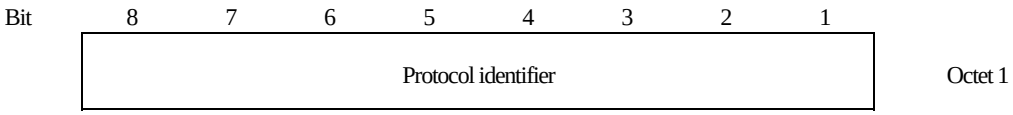


Figure 19-1/JJ-20.24 Protocol Identifier

Table 19-2/JJ-20.24 Protocol Identifier

Bits 87654321	
01000100	Media change protocol

19.3 Call Reference

Section 14.3 of the JS-11572 applies.

19.4 Message Type

A message type is used to identify the function of the message being transmitted.

A message type is placed in the third location of each message, and is coded as shown in Figure 19-2/JJ-20.24 and Table 19-3/JJ-20.24.

Bit 8 is reserved for future use as an extended bit.

Bit	8	7	6	5	4	3	2	1	
	0	Message type							Octet 1

Figure 19-2/JJ-20.24 Message Type

Table 19-3/JJ-20.24 Message Type

Bit	8	7	6	5	4	3	2	1	
	0	0	0	0	0	0	0	0	
	0	0	0	-	-	-	-	-	Media change message
				0	0	0	0	1	Media channel set (MEDIA CHANNEL SET)
				0	0	0	1	0	Media channel acknowledgment (MEDIA CHANNEL SET ACKNOWLEDGE)
				0	0	0	1	1	Media channel rejection (MEDIA CHANNEL SET REJECT)

19.5 Information Element (Code Group 0)

Chapter 15 of this standard applies.

19.6 Semi-Normal Operation

Upon receiving MEDIA CHANNEL SET, a PINX returns MEDIA CHANNEL SET ACKNOWLEDGE if it can send and receive user information corresponding to the bearer capability assigned to the message; otherwise, it returns MEDIA CHANNEL SET REJECT.

Upon returning MEDIA CHANNEL SET ACKNOWLEDGE, the PINX must change the user information to that bearer capability and send it.

For an explanation of the sequence, see Appendix H.

Appendix A (Provisions)　Protocol Implementation Conformance Statement (PICS) Forms

A.1　Introduction

The provider of a protocol implementation conforming to this standard must complete the Protocol Implementation Conformance Statement (PICS) Forms, described later.　The PICSs corresponding to the implemented protocol must be completed.

PICSs are lists prepared for the capabilities and options of the protocol implemented.

PICSs have many uses, including:

- Person implementing the protocol : A checklist used to reduce the risks of failures to conform to the standard due to oversights.
- Implementation provider/recipient : Used to indicate the capabilities in the implementation in detail.
  (or potential recipient)　Completed for comparison with the common standard for gaining the understanding given in the standard PICS Forms.
- Implementing user : A standard used to perform an initial check for interconnectivity with another implemented protocol (or potential user).　Although this does not assure interconnectivity, whether interconnection fails due to any inconformity to PICSs can be predicted to some degree.
- Protocol tester : A standard for selecting an appropriate test to examine implementation conformance requirements.

A.2　PICS Forms Completion Guideline

A.2.1　Overall configuration of PICS forms

A PICS form is a fixed-form question sheet where individual items are separated into groups.　Each item is identified by the item number, item name (question to be answered), and the chapter number used to refer to the text of this standard.

The "Rank" field indicates whether the item is applicable, and if it is, indicates whether the item is mandatory or optional.　The following symbols may be used:

m	Mandatory.　(The capability is requested for protocol conformance.)
o	Optional.　(The capability is not requested for protocol conformance.　If, however, the capability is implemented, it must conform to the protocol specifications.)
o.<n>	Optional; however, at least one of the items indicated by the same number <n> must be supported.
X	Prohibited
c.<cond>	Conditional specification.　Depends on the supported status of the item or items listed in the condition <cond>.
<item>:m	Simple conditional request.　Mandatory if the item number indicated by <item> is supported.　Otherwise, not applicable.
<item>:o	Simple conditional request.　Optional if the item number indicated by <item> is supported.　Otherwise, not applicable.

Replies to the question sheet are made by marking Yes[ ] or No[ ] in the "Support" field or [ ] in the "N/A (Not Applicable)" field.

A.2.2 Additional information

Using an additional information item, the provider may give additional information to assist in the interpretation of a PICS. This does not intend to provide large amounts of information, nor does it mean that a PICS is not completed without such information. An example of use (of additional information) is given to indicate that additional information may be used to provide an outline of one of the implementation methods that may be used in a variety of conditions and environments.

References to an additional information item may be made after any reply to a question. Such references may be included in exceptional information.

A.2.3 Exceptional information

There may arise cases in which the provider wishes to give a reply to an item ranked as Mandatory or Prohibited in a way different from those indicated (after several conditions are applied).

If no pre-printed answers are provided in the "Support" field, the provider is requested to enter x.<i> in the "Support" field to make a reference to an exceptional information item and give an appropriate description for the exceptional item.

An implementation that requires such an exceptional item does not conform to this standard.

One of the causes of the occurrence of the cases described above may be that the required item does not match the implementation due to a defect in the standard and a correction request is made.

A.3 PICS Forms

A.3.1 Implementation identification

Provider	
Whom to contact for inquiries about PICSs	
Implementation name and implementation version	
Other information necessary to fully identify the implementation Example: Device name or OS name and its version, system name	

The first three items are requested for all implementations. Other information needs to be entered if required to satisfy the request to fully identify the implementation.

The name and the version should be interpreted to appropriately match the technical terms of the provider.

(Example: Version, series, model)

A.3.2 Protocol summary

Protocol version	1.0
Supplementary information on the implemention (if applicable)	
Modification to the implentation	
Specification of an exceptional item (See A.2.3.)	No[ ] Yes[ ] (If Yes is selected, this means that the implementation does not conform to this standard.)
Date of entry	

A.3.3 Inter-PINX connection control

Item	Question/Feature	Reference	Rank	N/A	Support
A1	Per-call origination procedure control	6.1.1.1.1	M	[ ]	Yes[ ]
A2	Permanent origination procedure control	6.1.1.1.2	o	[ ]	Yes[ ]

A.3.4 User-to-user information elements

Item	Question/Feature	Reference	Rank	N/A	Support
B1	Will the use of user-to-user information be supported?	14.5	m	[ ]	Yes[ ]

A.3.5 Notification of user-to-user information elements

Item	Question/Feature	Reference	Rank	N/A	Support
C1	Notification to SETUP message	14.2.10	B1:m	[ ]	Yes[ ]
C2	Notification to ALERTING message	14.2.1	B1:o	[ ]	Yes[ ]
C3	Notification to CONNECT message	14.2.3	B1:o	[ ]	Yes[ ]
C4	Notification to PROGRESS message	14.2.7	B1:o	[ ]	Yes[ ]
C5	Notification to DISCONNECT message	14.2.5	B1:o	[ ]	Yes[ ]
C6	Notification to RELEASE message	14.2.8	B1:o	[ ]	Yes[ ]
C7	Notification to RELEASE COMPLETE message	14.2.9	B1:o	[ ]	Yes[ ]

A.3.6 Protocol identifier information

Item	Question/Feature	Reference	Rank	N/A	Support
D1	Support of JJ-20.24	16.2	B1:o	[ ]	Yes[ ]
D2	Support of JT-H245	16.2	B1:o	[ ]	Yes[ ] (Note)
D3	Support of IETF RFC2327	16.2	B1:o	[ ]	Yes[ ] (Note)
D4	Support of JT-H225.0	16.2	B1:o	[ ]	Yes[ ] (Note)

A.3.7 IP-QSIG media stream information

Item	Question/Feature	Reference	Rank	N/A	Support
E1	Version identifier information (version number)	16.1	D1:m	[ ]	Yes[ ]
E2	Logical channel number information element Value specified for port number	16.3.1.1	D1:m	[ ]	Yes[ ]
E3	Voice bearer capability information element CODEC information specification	16.3.1.2	D1:m	[ ]	Yes[ ]
E4	RTP payload period specification	16.3.1.2	D1:m	[ ]	Yes[ ]
E5	Receive media channel information (RTP) IP address and port number specification	16.3.1.3	D1:m	[ ]	Yes[ ]
E6	Receive media control channel information (RTCP) IP address and port number specification	16.3.1.4	D1:o	[ ]	Yes[ ]
E7	DTMF information element specification	16.3.1.5	D1:o	[ ]	Yes[ ]

Note: D2, D3, and D4 will be under study in the next term.

Appendix B (Provisions)　Message Sequence Examples

B.1　Basic Call Connection Sequence

Figure B.1 shows a message sequence for basic call connection on an IP network.

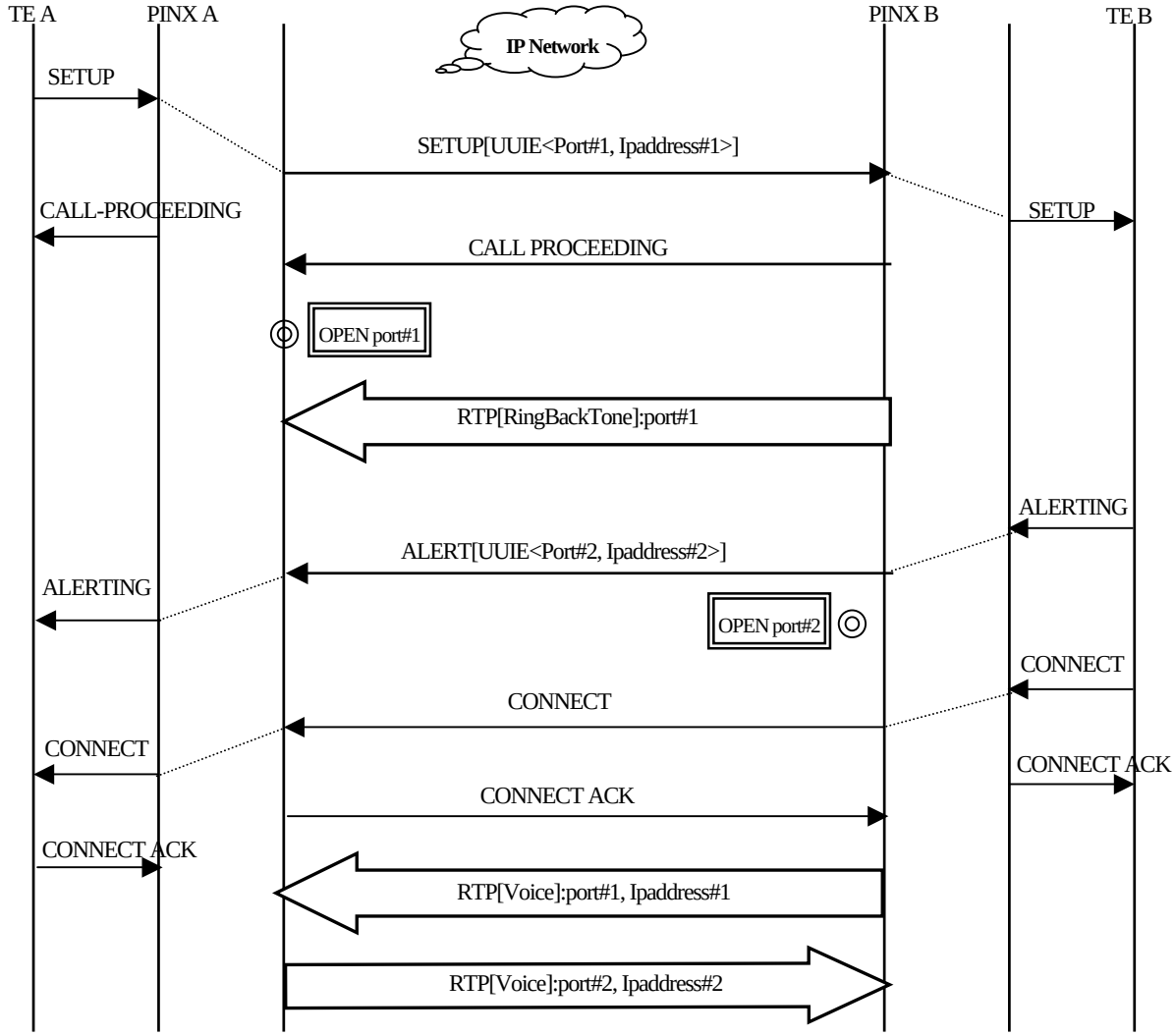


Figure B-1/JJ-20.24　Basic Call Connection Sequence

Signalling transfers information using the TCP/IP procedure.

B.2 Call Release

Figure B.2 shows a message sequence for basic call release on an IP network.

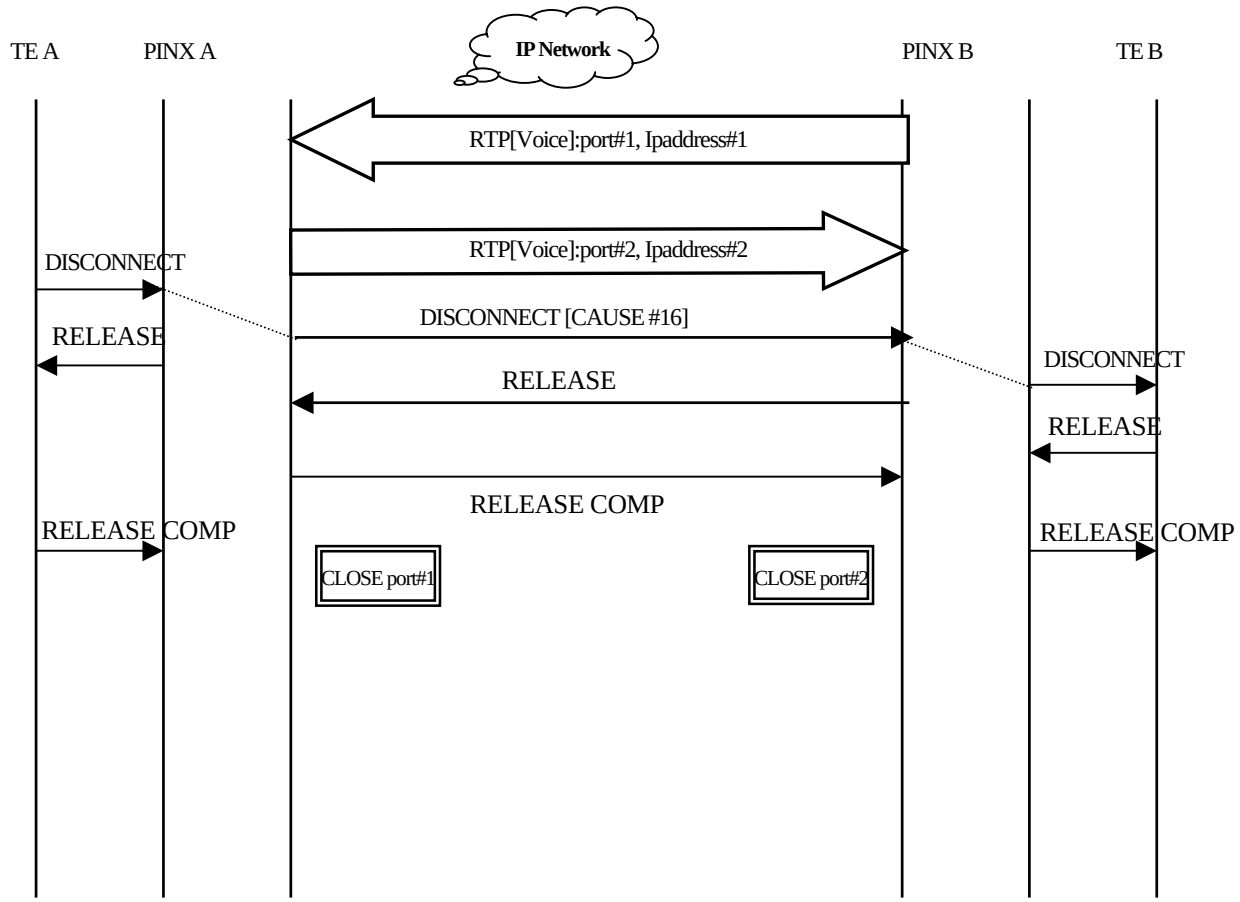


Figure B-2/JJ-20.24 Basic Call Release Sequence

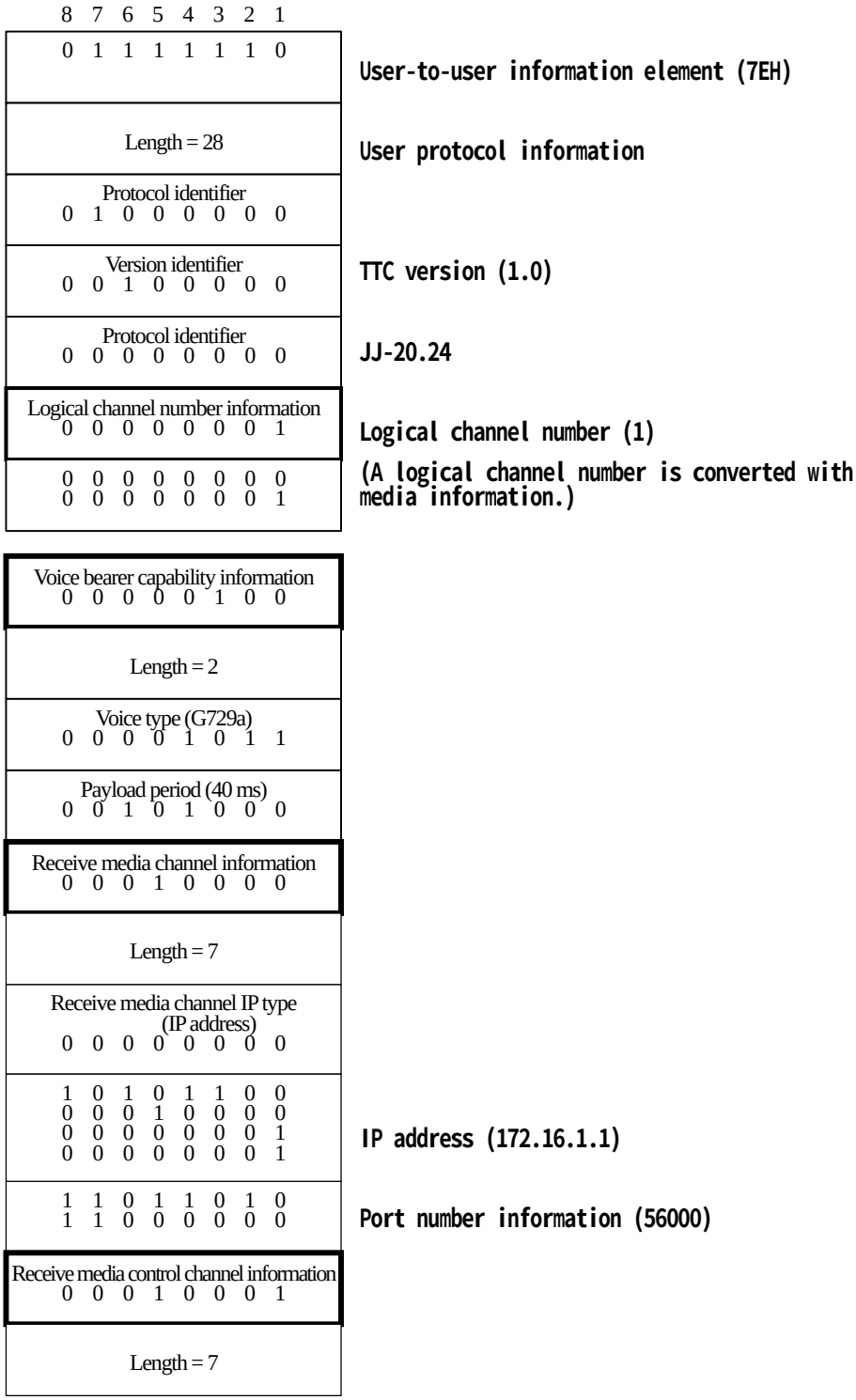
Appendix C (Reference)　Same as Appendix E of the JS-11572

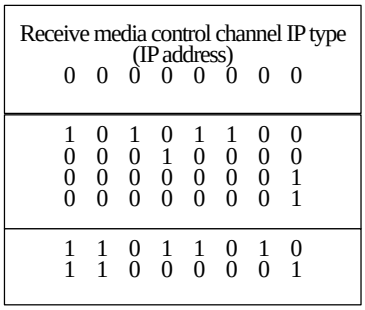
Appendix D (Reference)　Media Stream Information Setting Example

Media stream information setting example:　Voice　G729a (8k) coding information

RTP media channel number　IP address (172.16.1.1)　Port number (56000)

RTCP media control channel number　IP address (172.16.1.1)　Port number (56001)





IP address (172.16.1.1)

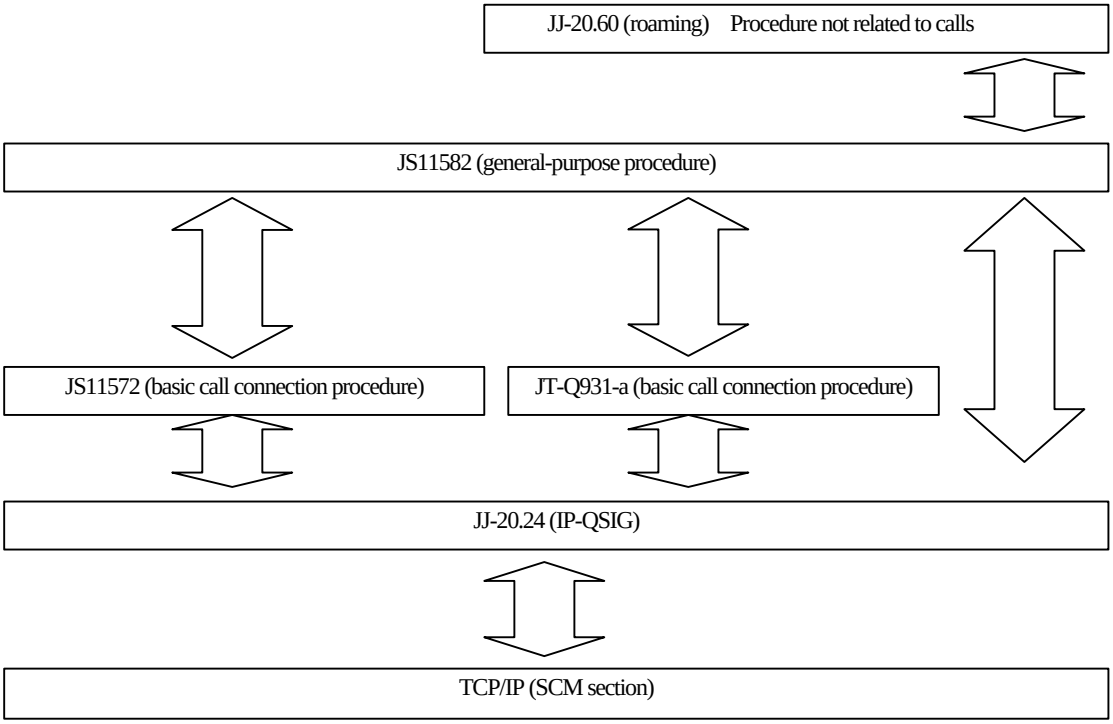
Port number information (56001)

Appendix E (Reference)　Handling of the JJ-20.60

JJ-20.60 contains some controls not related to calls, and the signalling sequence has an affinity for expansion onto an IP network. Thus, roaming (JJ-20.60) is within the scope of this standard.　With regard to media stream information (UUIE), it is not necessary to notify of UUIE information if the control procedure is not related to calls.

Any additional services using roaming (JJ-20.60) are outside the scope of this standard.

Protocol ranks are shown as in the figure below.



Appendix F　Handling of TPKT

The notification of IP-Qsig message information on an IP network requires identification information between IP-Qsig messages. Thus, the following information is added to the TCP packet.

Qsig + UUIE (media control information)
TPKT (judgment information between Qsig packets)
TCP
IP

Figure F-1.　IP-Qsig Protocol Hierarchy

TPKT			PDU
LNG	Spare	length	Qsig message + UUIE

LNG ： TPKT length (data:　set 3)

Spare ： Set 0

length ： PDU length

Figure F-2.　IP-Qsig Mapping Information

Appendix G (Reference)　Media Change Protocol Timer

The same protocol timer description as that in Chapter 12 of the JS-11572, plus Table G-1.

Legend of columns 6 and 7 of Table G-1

M　: Mandatory timer

O　: Optional timer

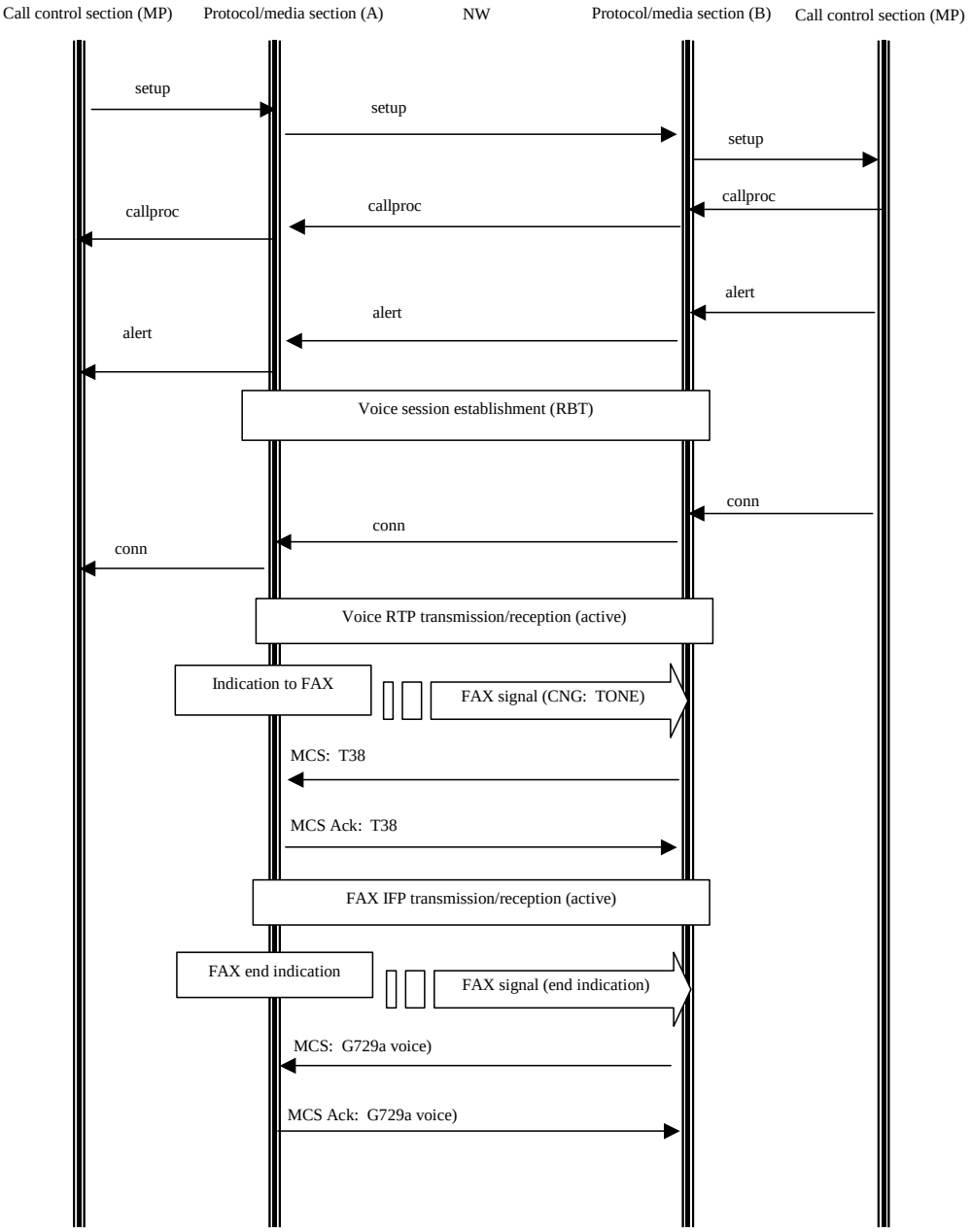
M(I): Mandatory if the related procedure is implemented

Table G-1　Protocol Timer Definition

Timer No.	Call state	Reason for origination	Normal termination condition	Operation to be performed when the timer expires	Incoming side	Outgoing side
T1	Active	Transmission of "MEDIA CHANNEL SET message"	Reception of "MEDIA CHANNEL SET ACKNOWLEDGE message"	Retransmission of "MEDIA CHANNEL SET message" and restart of timer T_set (notification of timer expiry to higher layer)	-	O

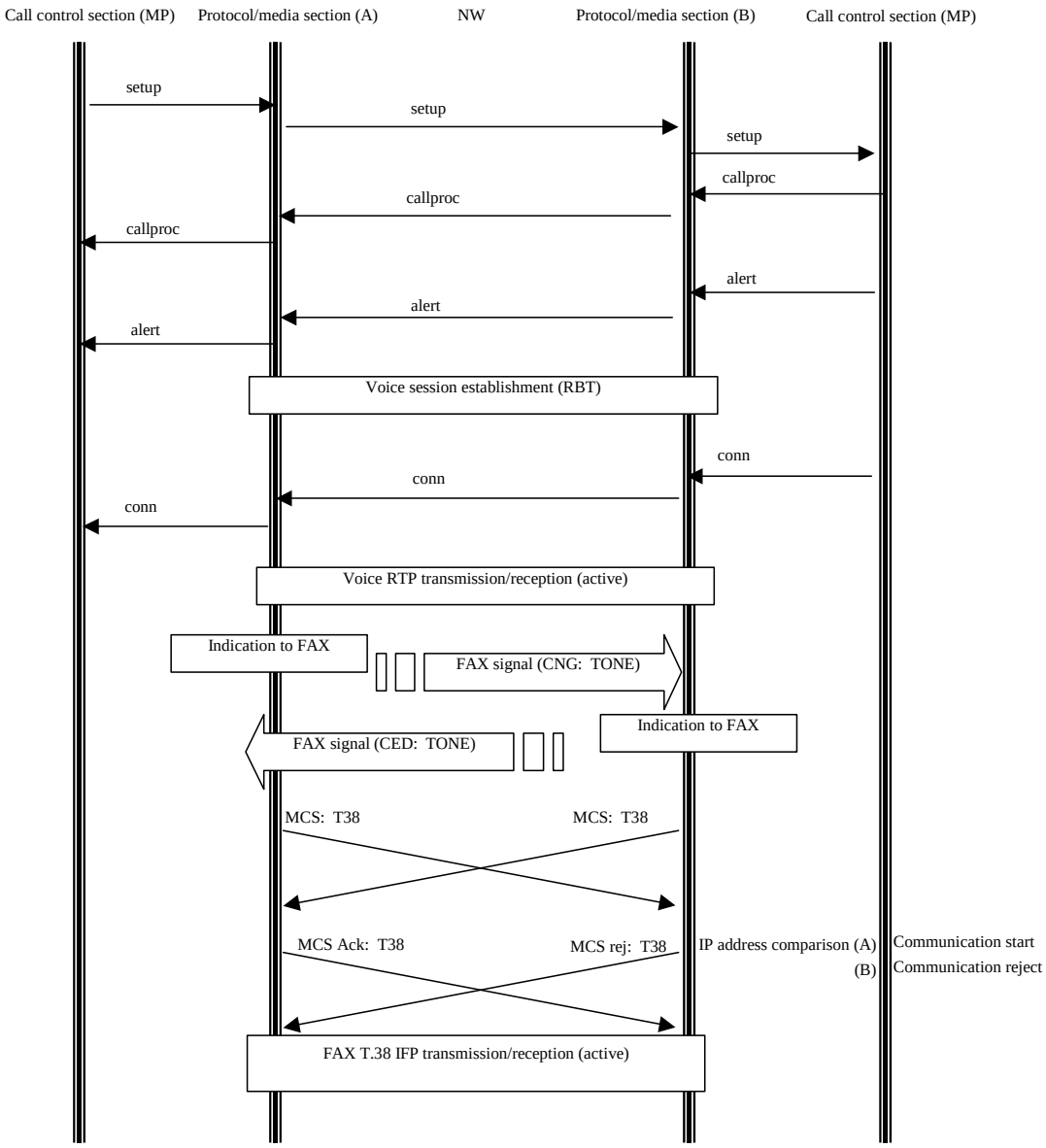
Appendix H (Reference)　Media Change Sequences

Example:　FAX protocol sequence　Normal sequence



Example: FAX protocol sequence

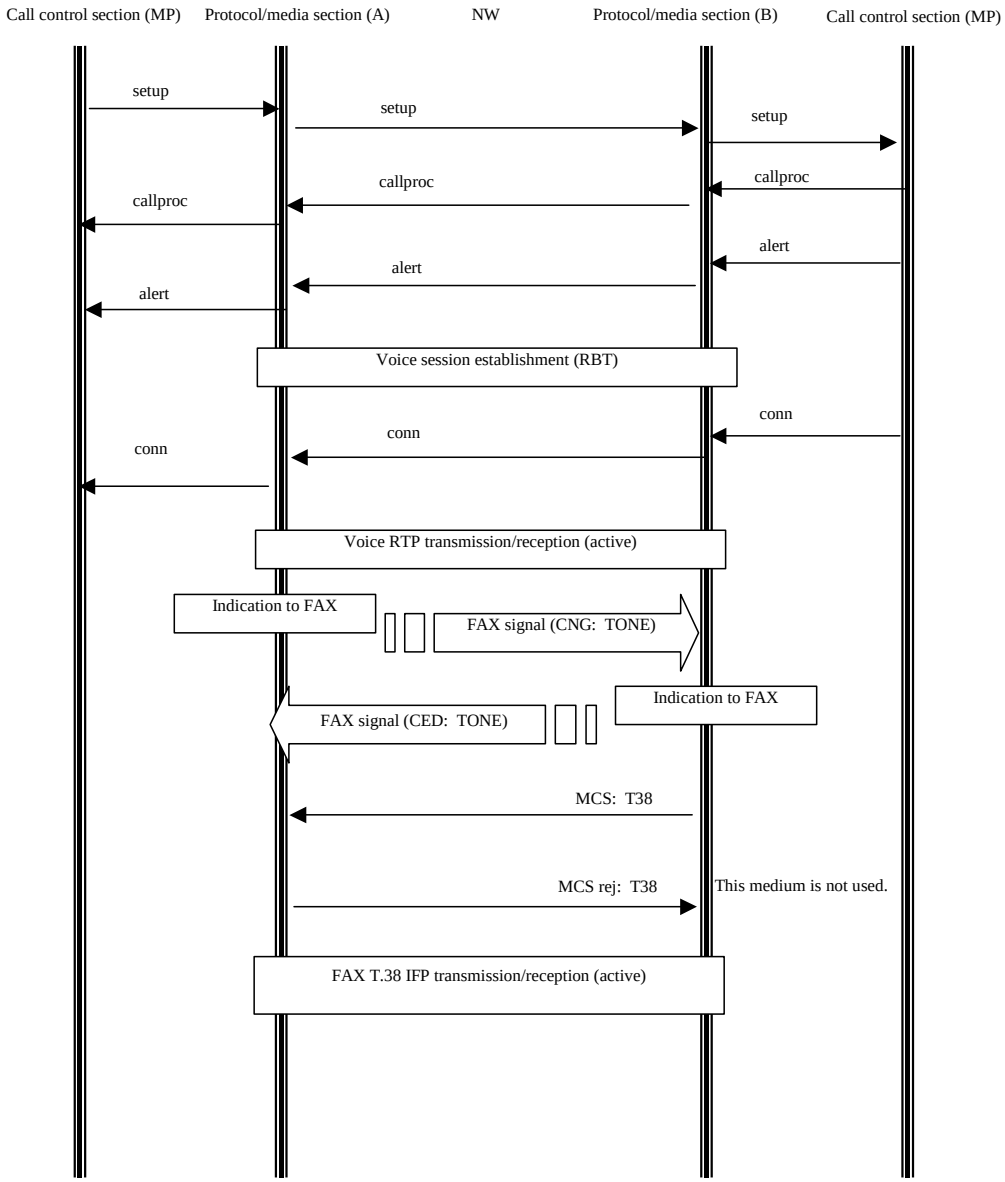
Semi-normal sequence (media conversion message conflict)



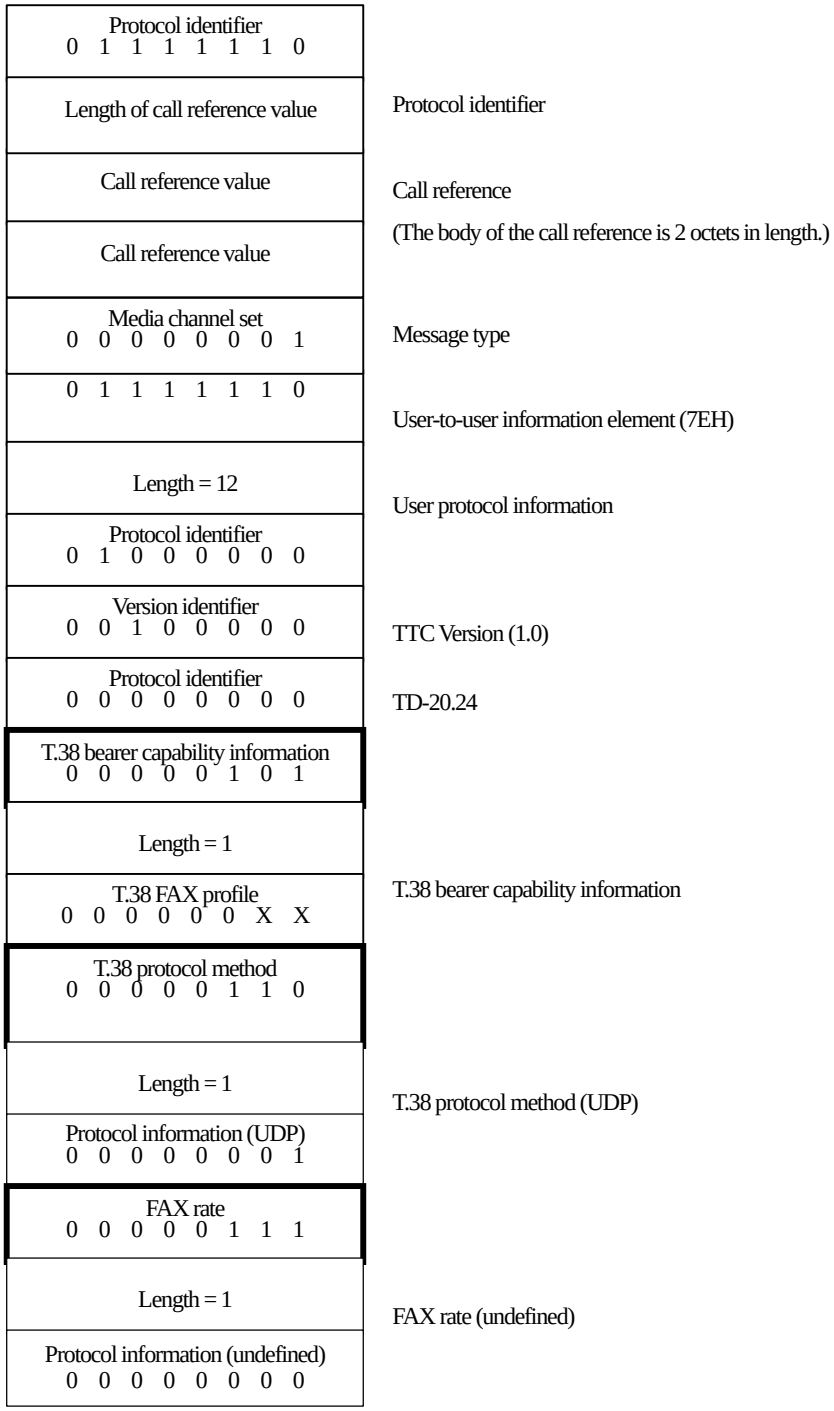
Note: An agreement on IP address comparison must be incorporated by each user using this protocol.

Example: FAX protocol sequence

Semi-normal sequence (MEDIA CHANNEL SET REJECT)

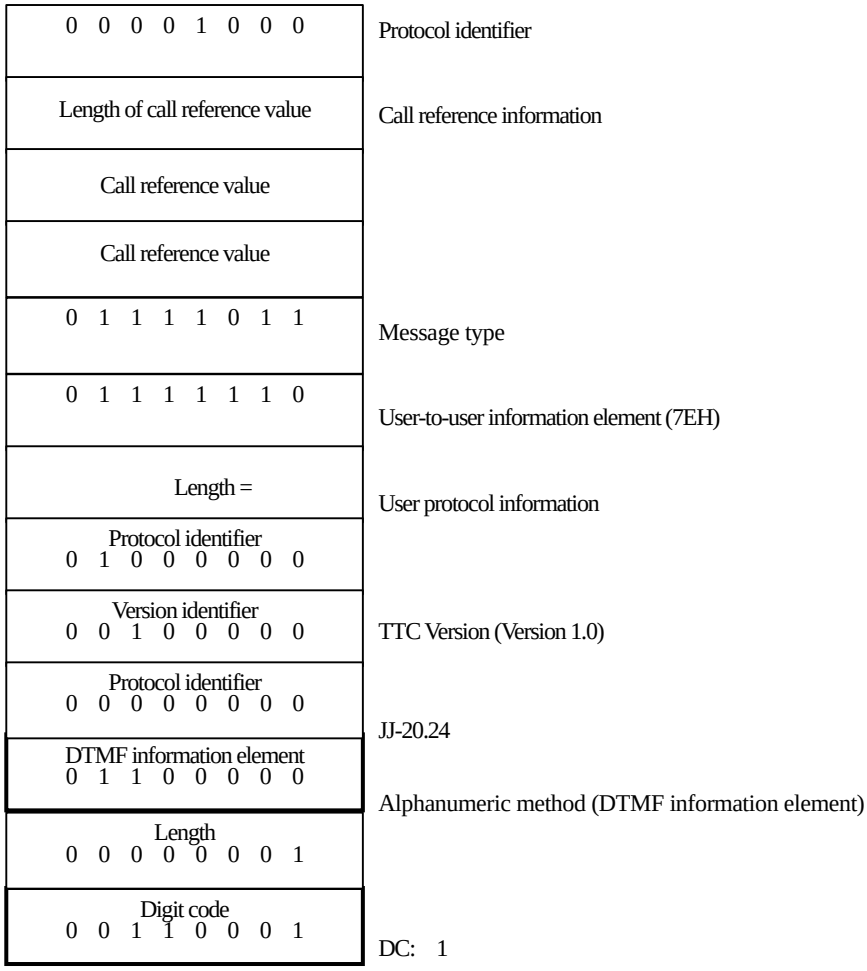


Appendix I (Reference)　Configuration Example of a Media Change Message



Appendix J (Reference)　DTMF Information　Coding Information Setting Example

Additional information message



PBX

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THE TELECOMMUNICATION TECHNOLOGY COMMITTEE (TTC)

Hamamatsu-cho Suzukibuilding 1-2-11, Hamamatsu-cho, Minato-ku,

TOKYO 105-0013, JAPAN

TEL；＋81 3 3432 1551　FAX；＋81 3 3432 1553
