

TTC STANDARDS

JJ-20.70

Private Integrated Services Network

Version 3

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THE TELECOMMUNICATION TECHNOLOGY COMMITTEE



Introduction

This document provides the TTC original Standards formulated and put into effect by the Technical Assembly. It contains unabbreviated version of 'JJ-' Standards, which have not been defined as international standards.

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

**JJ-20.70 Private Integrated Services Network
(Data communication with a digital network of a different transfer rate)
- Specifications for inter-PBX signaling protocol -**

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<Remarks>

1. Relations with international standards

There is no international standard relating to this standard.

At the time when a standard or a recommendation relating to this standard is established, revision of this standard will be considered.

<Supplement>

This standard defines specifications necessary for providing unrestricted digital information bearer services between PBXs with a network of a different transfer rate such as PHS.

Since the needs of standardization from our nation will not be adopted at ISO/IEC JTC1, associating international standardization organization, the Japanese proprietary standard is established.

<Note>

The term "PHS" indicates the second generation cordless telephone system applying "Personal Handy phone System RCR standard (STD-28) " specified by Association of Radio Industry and Businesses (ARIB).

2. Summary of differences from international standards

None.

3. History of revisions

| Version | Date of issue | Contents of revision |
|---------|------------------|--|
| 1 | November 26 1997 | Initial issue |
| 2 | April 28 1998 | Addition of descriptions regarding 64kbit/s transfer rate. Chapter 1, sections 3.1, 4.1, 4.2 and annex C are modified. Sections A.3 and B.2 are added. |
| 3 | November 25 1999 | Reflection of amendments onto JT-Q931 regarding rate adaptation per JT-I460. Section 3.1, 4.2.2 are modified . Section A.1, A.2,C.1,C.2 are added. |

4. Others

(1) Referred recommendations and/or standards

TTC standards: JS-11572, JT-Q931-a, JT-I460,
JT-Q931, JT-Q931-b
ARIB standards: RCR STD-28

(2) Relations with other national standards

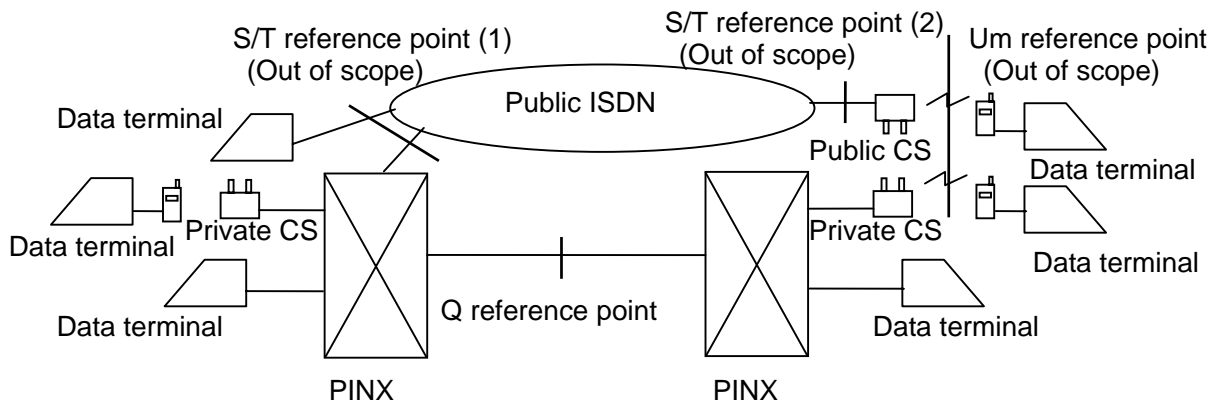
According to the purpose of the standardization, conformity to the other standards relating to the public network, such as JT-Q931, JT-Q931-b, and ARIB standard RCR STD-28, are considered.

1. General

This standard defines specifications necessary for providing 32kbit/s and/or 64 kbit/s unrestricted digital information bearer services between Private Integrated services Network eXchange (PINX) with a network of a different transfer rate.

The layer 3 protocol between adjacent PINXs is assumed to be either TTC standard JS-11572 or JT-Q931-a, which are standards relating to the digital interface between PBXs.

2. Reference configuration



Specification at S/T reference point (1) shall conform to JT-Q931 and its supplement.

Specification at S/T reference point (2) shall conform to JT-Q931-b.

Specification at Um reference point shall conform to ARIB standard RCR STD-28.

This standard defines specifications at Q reference point.

Fig.1/JJ-20.70 Reference configuration

3. Information elements coding

Coding requirements at Q reference point are specified in this chapter.

Coding requirements of a Bearer Capability and an optional Lower Layer Compatibility information element in a SETUP message are shown below.

The contents of the other information fields and information elements are as specified in the layer 3 protocol used as the basis.

Coding examples are shown in Annex A.

3.1 Bearer Capability

Coding requirements in case of the 32kbit/s unrestricted digital information are shown in Table 1/JJ-20.70.

In case of the 64kbit/s unrestricted digital information, User Information Layer 1 protocol field (Octets 5 and below) of the Bearer Capability information element shall be omitted.

Table 1/JJ-20.70 Coding of a Bearer Capability Information Element

| | | |
|---|-----------|---|
| <u>User Information Layer 1 protocol (Octet 5) (Note 1)</u> | | |
| bits | 5 4 3 2 1 | |
| | 0 0 0 0 1 | TTC standard Rate Adaptation (JT-V110/JT-X30/JT-I460) |
| <u>User Information rate (Octet 5a) (Note 1)</u> | | |
| bits | 5 4 3 2 1 | |
| | 0 1 1 0 0 | 32kbit/s TTC standard JT-I460 |
| | else | reserved |
| Note1: Included only in case of the rate adaptation by JT-I460 is used. If the rate adaptation by JT-V110 is used, these octets are omitted. | | |

3.2 Lower Layer Compatibility

Coding requirements are shown in Table 2/JJ-20.70.

Table 2/JJ-20.70 Coding of a Lower Layer Compatibility Information Element

| | | | |
|---|---|---|----------|
| <u>Information Transfer Rate (Octet 4) (Note 1)</u> | | | |
| bits | 5 | 4 | 3 2 1 |
| | 1 | 0 | 0 0 0 |
| | | | 64kbit/s |
| Note1: If this information element exists, the field shall be coded as above. | | | |
| Note2: The contents of other information fields shall be transferred transparently by a PINX | | | |

4. Actions on interworking

In case where private CSs are attached to a PINX, the conversion of user information and signaling information necessary for interworking between Um reference point, interface reference point of a digital network of a different transfer rate (32kbit/s), and Q reference point, interface reference point of a private ISDN (64kbit/s), are performed by either private CSs or a PINX.

If the private CS has the interworking function (i.e. satisfies descriptions defined in Annex AH of ARIB standard RCR. STD-28), a PINX shall act as "a network conforming to ISDN".

However, if the private CS has no or a part of required interworking function, a PINX is required to provide the missing function.

This chapter describes the case where a PINX provides all required interworking functions.

<Note>

Although the interworking functions between Um reference point and S/T reference point (1) are out of scope of this standard, the same way of thinking can be used.

4.1 Rate adaptation of user information

The description defined in 1.1 JT-I460 regarding rate adaptation at a rate of 32kbit/s shall apply in case of the 32kbit/s unrestricted digital information. The description defined in 2.1 JT-I460 regarding rate adaptation at a rate of 32kbit/s shall apply in case of the 64kbit/s unrestricted digital information. Annex B shows rate adaptation scheme.

4.2 Information element conversion at each PINX

Following conversion processes are required for interworking in case of the 32kbit/s unrestricted digital information.

Annex C shows the outline of the conversion

Note: In case of the 64kbit/s unrestricted digital information, following descriptions shall not apply since any information element conversion is not required.

4.2.1 General rules

Since the information transfer rate field (octet 4) of Bearer Capability and optional Lower Layer Compatibility information elements at Um reference point are set to be 32kbit/s, an originating PINX shall convert it to 64kbit/s at Q reference point.

A terminating PINX shall convert the signaling information of 64kbit/s at Q reference point to 32kbit/s.

The terminating PINX shall examine compatibility, at time of conversion, using the contents of the user information layer 1 protocol field (octet 5) and user rate field (octet 5a) of Bearer Capability or optional Lower Layer Compatibility information elements.

If the compatibility is not confirmed, the call shall be disconnected.

Also, if an intermediate rate field (octet 5b) is included in the Lower Layer Compatibility information element, the information can be used for compatibility check.

4.2.2 additional description

Since compatibility check can not be examined unless the codepoint "JT-V110/X.30/JT-I460" is indicated as the contents of the user information layer 1 protocol field (octet 5) of a Bearer Capability or a Lower Layer Compatibility information element at Um reference point, the following description is added to that of section 4.2.1.

If a Lower Layer Compatibility information element does not exist or a codepoint other than "JT-V110/X.30/JT-I460" is indicated in user information layer 1 protocol field (octet 5) of a Lower Layer Compatibility information element at Um reference point, a originating PINX shall set "JT-V110/X.30/JT-I460" in user information layer 1 protocol field (octet 5) and "32kbit/s JT-I460" in user rate information field (octet 5a) of a Bearer Capability information element.

A terminating PINX shall examine compatibility with information such as user rate to execute conversion in section 4.2.1. The octets 5 and 5a are omitted at Um reference point.

Annex A (informative)

Coding Examples

A.1 Coding example – In case of a rate adaptation by JT-I460 –

A coding example in case of a rate adaptation by JT-I460 (Information transfer rate=32kbit/s) is shown below.

Table A-1-1/JJ-20.70 Bearer Capability information element

| Bit | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | | |
|--------------------------------|-----------------------|-----------------------------------|--|----------|---|---|---|---|-----------------|--|
| | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | Octet 1 | |
| Information element identifier | | | | | | | | | | |
| | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | Octet 2 | |
| Length | | | | | | | | | | |
| | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | Octet 3 | |
| Exp. | TTC STD. | | Unrestricted digital information | | | | | | | |
| | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | Octet 4 | |
| Exp. | Circuit mode | | 64kbit/s | | | | | | | |
| | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | Octet 5 (Note) | |
| Exp. | Layer 1 indication | | TTC std. rate adaptation (JT-V110/JT-X30/JT-I460) | | | | | | | |
| | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | Octet 5a (Note) | |
| Exp. | Syn c. | No in- band negoti ation | | 32kbit/s | | | | | | |

Note: This octet shall not be omitted in this case.

Table A-1-2/JJ-20.70 Lower Layer Compatibility information element

| Bit | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|--------------------------------|-----------------|---|-------------------------------------|---|---|---|---|---|---------|
| | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | Octet 1 |
| Information element identifier | | | | | | | | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Octet 2 |
| Length | | | | | | | | | |
| | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | Octet 3 |
| Exp. | TTC STD. | | Unrestricted digital information | | | | | | |
| | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | Octet 4 |
| Exp. | Circuit mode | | 64kbit/s | | | | | | |

Note: This octet may be omitted in this case.

A.2 Coding example – In case of JT-V110 –

A coding example in case of JT-V110 is shown below.

Table A-2-1/JJ-20.70 Bearer Capability information element

| Bit | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|--------------------------------|-----------------|---|-------------------------------------|---|---|---|---|---|---------|
| | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | Octet 1 |
| Information element identifier | | | | | | | | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Octet 2 |
| Length | | | | | | | | | |
| 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | Octet 3 |
| Exp. | TTC STD. | | Unrestricted digital information | | | | | | |
| 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | Octet 4 |
| Exp. | Circuit mode | | 64kbit/s | | | | | | |

Note: Octets 5 and below shall be omitted in this case.

Table A-2-2/JJ-20.70 Lower Layer Compatibility information element

| Bit | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|--------------------------------|----------------------------------|-----------------------------------|--|------------|----------------------|----------------------|-----------|---|----------|
| | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | Octet 1 |
| Information element identifier | | | | | | | | | |
| | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | Octet 2 |
| Length | | | | | | | | | |
| 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | Octet 3 |
| Exp. | TTC STD. | | Unrestricted digital information | | | | | | |
| 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | Octet 4 |
| Exp. | Circuit mode | | 64kbit/s | | | | | | |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | Octet 5 |
| Exp. | Layer 1 indication | | TTC std. rate adaptation (JT-V110/JT-X30/JT-I460) | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Octet 5a |
| Exp. | Sync / Asyn c | In-ba nd nego tatio n | User rate (Due to terminal; up to 19.2kbit/s) | | | | | | |
| 1 | 1 | 1 | Tx. NIC | Rx. NIC | Tx. Flow cont. | Rx. Flow cont. | 0 | 0 | Octet 5b |
| Exp. | adaptation rate (32kbit/s) | | | | | | Res. . | | |

Note: This information element and octets 5 shall not be omitted in this case.

A.3 Coding example – In case of 64kbit/s unrestricted digital information –

A coding example in case of 64kbit/s unrestricted digital information is shown below.

Table A-3-1/JJ-20.70 Bearer Capability information element

| Bit | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
|--------------------------------|-----------------|---|-------------------------------------|---|---|---|---|---|---------|
| | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | Octet 1 |
| Information element identifier | | | | | | | | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | Octet 2 |
| Length | | | | | | | | | |
| 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | Octet 3 |
| Exp. | TTC STD. | | Unrestricted digital information | | | | | | |
| 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | Octet 4 |
| Exp. | Circuit mode | | 64kbit/s | | | | | | |

Note: Octets 5 and below shall be omitted in this case.

Table A-3-2/JJ-20.70 Lower Layer Compatibility information element(Note)

| Bit | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | | |
|--------------------------------|-----------------------|---|-------------------------------------|---|---|---|---|---|---------|---|
| | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | Octet 1 | |
| Information element identifier | | | | | | | | | | |
| | X | X | X | X | X | X | X | X | Octet 2 | |
| Length | | | | | | | | | | |
| 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | Octet 3 | |
| Exp. | TTC STD. | | Unrestricted digital information | | | | | | | |
| 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | Octet 4 | |
| Exp. | Circuit mode | | 64kbit/s | | | | | | | |
| 0 | 0 | 1 | X | X | X | X | X | X | Octet 5 | |
| Exp. | Layer 1 indication | | User Info. Layer 1 capability | | | | | | | : |

Note: This information element can be omitted in this case. And octets 5 and below may be designated properly by each terminal.

Annex B (normative)

Rate Adaptation

B.1 Mapping of user information for rate adaptation

The rate adaptation according to the definition in section 1.1 JT-I460 is shown in Table B-1/JJ-20.70.

A PINX converts a 32kbit/s information channel at U_m reference point to 64kbit/s according to the table.

**Table B-1/JJ-20.70 Rate Adaptation scheme
(Imported from Table 1-1/JT-I460)**

| Information transfer rate | Bit position | | | | | | | |
|---------------------------|--------------|----|----|----|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 32kbit/s | B1 | B2 | B3 | B4 | 1 | 1 | 1 | 1 |

Note: Bits are transmitted in ascending order of the bit position in terms of a timeslot on a inter-PINX physical link.

Bits B1 through B4 are numbered according to the order sent to U_m reference point.

B.2 Mapping of user information for multiplexing

The multiplexing according to the definition in section 2.1 JT-I460 is shown in Table B-2/JJ-20.70.

A PINX converts two 32kbit/s information channels at U_m reference point to 64kbit/s according to the table.

**Table B-2/JJ-20.70 Rate Adaptation scheme
(Imported from Table 2-1/JT-I460)**

| Information transfer rate | Bit position | | | | | | | |
|---------------------------|--------------|-----|-----|-----|-----|-----|-----|-----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 32kbit/s X 2 | B11 | B12 | B13 | B14 | B21 | B22 | B23 | B24 |

Note: Bits are transmitted in ascending order of the bit position in terms of a timeslot on a inter-PINX physical link.

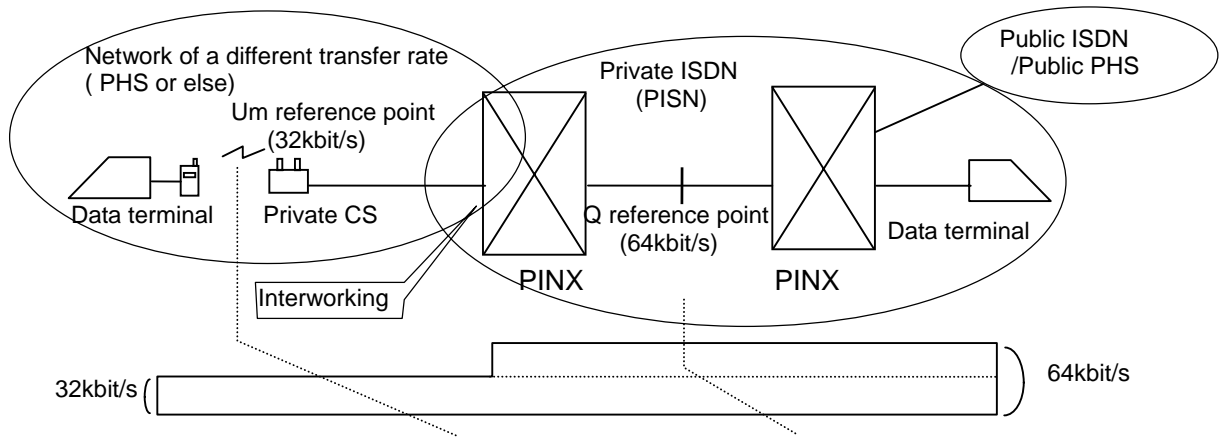
Bits B11 through B14 are numbered according to the order sent to the first 32kbit/s channel at U_m reference point, and Bits B21 through B24 are numbered according to the order sent to the second 32kbit/s channel.

Annex C (informative)

Outline of the conversion of information elements at each PINX

The contents of this annex is an application, to an inter-PINX link, of what is described in Annex AH of ARIB standard RCR STD-28, and in section 9 of the supplement of TTC standard JT-Q931 in case of 32kbit/s unrestricted digital information. Following shall not apply in case of 64kbit/s unrestricted digital information, since any information element conversion is required.

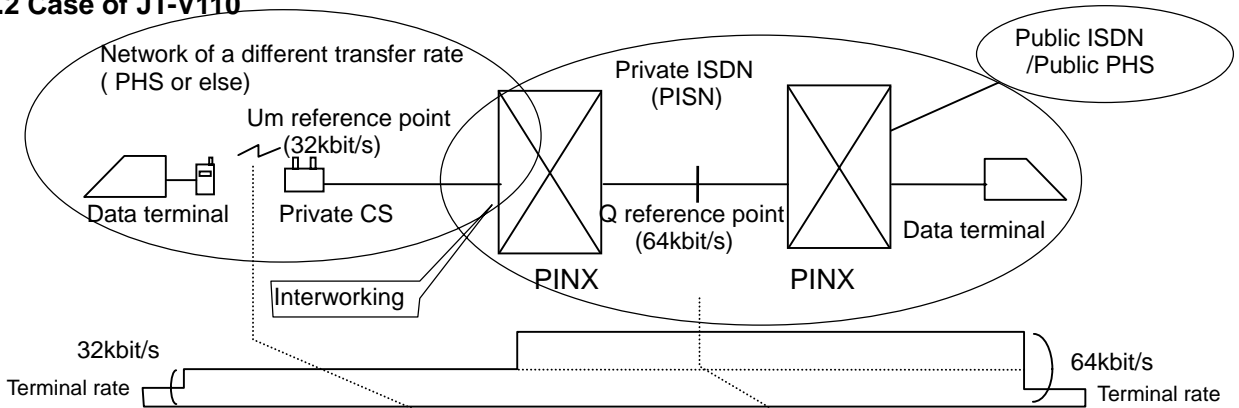
C.1 Case of rate adaptation by JT-I460



| | | |
|-------------------------------------|----------------------|----------------------|
| Bearer Capability IE | RCR.STD-28 | JJ-20.70 |
| Information transfer capability (3) | Unrestricted digital | Unrestricted digital |
| Information transfer rate (4) | 32kbit/s | 64kbit/s |
| User Info. Layer 1 protocol(5) | - | JT-V110/X.30/JT-I460 |
| User rate(5a) | - | 32kbit/s(JT-I460) |

Fig.C-1/JJ-20.70 in case of rate adaptation by JT-I460

C.2 Case of JT-V110



| | | |
|-------------------------------------|----------------------|----------------------|
| Bearer Capability IE | RCR.STD-28 | JJ-20.70 |
| Information transfer capability (3) | Unrestricted digital | Unrestricted digital |
| Information transfer rate (4) | 32kbit/s | 64kbit/s |
| User Info. Layer 1 protocol(5) | - | - |
| User rate(5a) | - | - |
| Lower Layer Compatibility IE | | |
| Information transfer capability (3) | Unrestricted digital | Unrestricted digital |
| Information transfer rate (4) | 32kbit/s | 64kbit/s |
| User Info. Layer 1 protocol(5) | JT-V110/X.30/JT-I460 | JT-V110/X.30/JT-I460 |
| User rate(5a) | Terminal rate | Terminal rate |

Fig.C-2/JJ-20.70 in case of JT-V110