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DIGITAL EXCHANGES

DIGITAL EXCHANGE CONNECTIONS, SIGNALLING AND ANCILLARY FUNCTIONS

ITU-T Recommendation Q.522

(Extract from the *Blue Book*)

NOTES

- 1 ITU-T Recommendation Q.522 was published in Fascicle VI.5 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).
- 2 In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Recommendation Q.522

DIGITAL EXCHANGE CONNECTIONS, SIGNALLING AND ANCILLARY FUNCTIONS

1 General

This Recommendation applies to digital local, combined, transit and international exchanges for telephony in Integrated Digital Networks (IDN) and also to local, combined, transit, and international exchanges in an Integrated Services Digital Network (ISDN). The field of application of this Recommendation is more fully defined in Recommendation Q.500.

2 Connections through an exchange

2.1 General

The characteristics of the connections detailed in this section refer to an established connection when it is made available to the users.

An exchange must be able to provide originating, terminating and internal exchange connections between input and output interfaces for telephony and other services as required. It may also provide transit connections:

- A connection (if any) between an incoming and an outgoing circuit at interfaces to other exchanges/networks is called a transit connection.
- A connection between channel(s) of a calling subscriber line at an interface for subscriber access and an outgoing circuit at an interface to other exchange/networks is called an originating connection.
- A connection between an incoming circuit at an interface to other exchange/networks and channel(s) of a called subscriber line at an interface for subscriber access is called a terminating connection.
- A connection between channels of two subscriber lines at interfaces for subscriber access is called an internal connection.

An exchange must be able to provide bidirectional connections between input and output interfaces for telephony and other services as required.

Also unidirectional connections may be required.

2.2 Basic exchange connections

2.2.1 General

The requirements in this section primarily apply to digital local or combined exchanges. Applicability to digital transit or international exchanges requires further study.

Four types of exchange connection have been identified to show the basic forms of connection and their associated information flows that a digital local or combined exchange may be required to handle in an ISDN. They have been based on originating/terminating connections established via interfaces for subscriber access as described in Recommendation Q.512 to/from locations external to the exchange. Calls may be set up in either direction, i.e., subscriber to network or network to subscriber.

These diagrams are functional and not intended to represent any particular implementation. They illustrate the options which may be available for handling a given information type or service within a digital local or combined exchange. Although this approach leads to some duplication between the individual diagrams when considered from the connection point of view, the approach is a logical basis for the further consideration of the more detailed issues arising from the impact of the ISDN on a digital local or combined exchange.

It is not intended to imply that every digital local or combined exchange should necessarily have the capability to handle all these types of connection.

Other types of connection and variants of these basic exchange connections may be feasible in an ISDN and are the subject of further study.

The signalling and control aspects of these connections are covered in §§ 3 and 5 of this Recommendation.

2.2.2 Explanatory information on the exchange connection diagrams

The functions associated with the groupings shown on the types I-IV exchanges connection diagrams are covered in § 3.

Key

{	—————	information other than separate signalling
	- - - - -	separate signalling(s)

Information flows

- p_1 : packet data information different from customer-originated packetized data;
- s_1, s_2, s_4, s_5 : signalling information different from the signalling associated with customer terminals;
- packet switching interworking functions may be provided at other exchanges in an ISDN or at the point of access to a separate packet switched network.

2.2.3 Type 1 exchange connection (Figure 1/Q.522)

This connection is used to transport telephony and associated voice services.

This connection is characterized by (see Table 2/I.340, A 4, A 5, A 7 and A 8):

- *Information transfer attributes*
 - mode: circuit
 - rate: 64 kbit/s
 - capability: speech – 3.1 kHz audio
 - establishment: switched – semi-permanent
 - symmetry: bidirectional – symmetric
 - configuration: point-to-point uniform
 - structure: 8 kHz integrity
- *Access attributes* (Table 1/Q.522)

TABLE 1/Q.522

Access attributes	User access	Network access
Access channel and rate		
Information	B/64	Digital circuit with access to analogue/digital switched network
Signalling	D/16—64	Digital circuit (s_1)
Access protocol ^{a)}		
Layer 1	For further study	Q.702, others
Layer 2	I.441	Q.703, others
Layer 3	I.451	Q.704, Q.714, Q.764, others

a) Only for switched services.

- *Other attributes*
For further study.

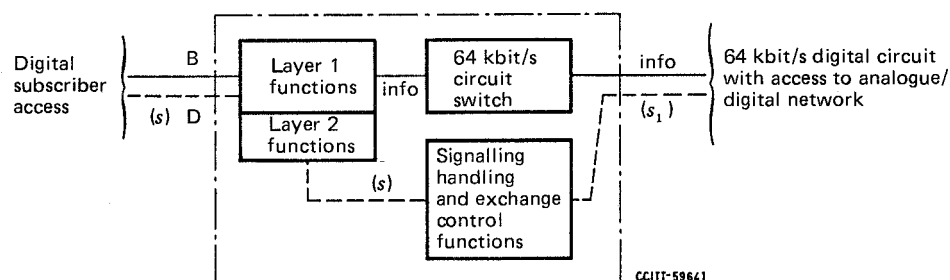


FIGURE 1/Q.522
Type I exchange connection

2.2.4 Type II exchange connection (Figure 2/Q.522)

This connection is used to transport circuit switched services such as data, telephony, multiple subrate information streams multiplexed into 64 kbit/s by the user, transparent access to a PSPDN (see § 5.2.2).

This connection is characterized by:

- *Information transfer attributes* (see Table 2/I.340, A 1 and A 2)
 - mode: circuit
 - rate: 64 kbit/s
 - capability: unrestricted digital information
 - establishment: switched – semi-permanent
 - symmetry: bidirectional – symmetric
 - configuration: point-to-point uniform
 - structure: 8 kHz integrity
- *Access attributes* (Table 2/Q.522)

TABLE 2/Q.522

Access attributes	User access	Network access
Access channel and rate		
Information	B/64	Digital circuit with access to analogue/digital switched network
Signalling	D/16-64	Digital circuit (s ₁)
Access protocol	See type I (For signalling only) ^{a)}	See type I (For signalling access to digital switched network) ^{a)}

^{a)} Further study is required for information transfer protocol or access to PSPDN.

- *Other attributes*
For further study.

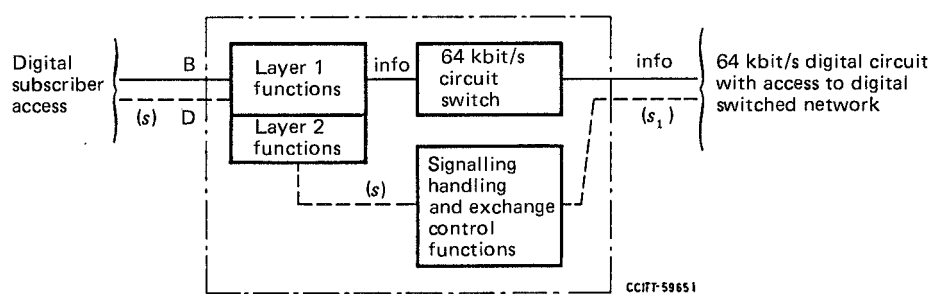


FIGURE 2/Q.522
Type II exchange connection

2.2.5 *Type III exchange connection* (Figure 3/Q.522)

This is a connection used to transport packetized data information between an information channel on a digital subscriber access and a 64 kbit/s digital circuit which has an access to:

- a remote ISDN Packet Handling Functional Grouping;
- a remote ISDN Packet Switching Interworking Functional Grouping;
- a public packet network (see § 5.2.3).

This connection is characterized by:

- *Information transfer attributes* (see Table 3/Q.522)
(see Table 2/I.340, A 10 and A 11)

TABLE 3/Q.522

Access attributes	Option a)	Options b) and c)
Mode	Circuit	Packet
Rate	64 kbit/s (further study)	64 kbit/s (further study)
Capability	Unrestricted digital information	Unrestricted digital information
Establishment	Switched – semi-permanent	Switched – semi-permanent
Symmetry	Bidirectional symmetric	Bidirectional symmetric
Configuration	Point-to-point	Point-to-point
Structure	8 kHz	Service data unit integrity